

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**Department of Civil Engineering (R20)**

**I B. Tech. – I Sem**

**(20HS0830) ALGEBRA AND CALCULUS**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Develop the use of matrix algebra techniques that is needed by engineers for practical applications.
2. Utilize mean value theorems to real life problems.
3. Familiarize with functions of several variables which is useful in optimization.
4. Learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional coordinate systems.
5. Interpret the physical meaning of different operators such as gradient, curl and divergence.
6. Apply Fundamental Theorem of Line Integrals, Green's Theorem, Stokes' Theorem, or Divergence Theorem to evaluate integrals.

**(20HS0848) ENGINEERING PHYSICS**

**COURSE OUTCOMES**

On successful completion of this course, student will be able to

1. Analyze the differences between interference and diffraction with applications.
2. Apply the Bragg's Law for crystal structure for the determination by X-rays.
3. Explain applications of acoustics and ultrasonics in various engineering fields.
4. Explain the importance of various mechanical properties of solids.
5. Explain the basic properties and applications of superconductors in various fields.
6. Illustrate methods for synthesis and characterization of nanomaterials and apply basic principles of nanomaterials in various engineering applications

**(20ME0351) BASIC ELECTRICAL & MECHANICAL ENGINEERING**

**COURSE OUTCOMES**

On successful completion of this course, the students will be able to

1. State various laws in Electrical Engineering and explain the operation of networks
2. Recognize the importance of different network theorems and explicate its applications in two port networks.
3. Interpret the principle operation of DC motors and derive an EMF equation for the transformers.
4. Classify various casting and metal joining processes in the manufacturing processes
5. Distinguish the types of machines in the manufacturing and elucidate the machining operations
6. Categorize the automobile engines and refrigeration & Air-conditioning systems

**(20CS0501) C and DATA STRUCTURES**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Recognize the programming elements of C Programming language
2. Select the control structure for solving the problem
3. Apply modular approach for solving the problem

4. Solve mathematical problems using C Programming language
5. Develop the applications using stacks and queues
6. Construct the linked lists for various applications and perform sorting techniques

### **(20CE0101) CIVIL ENGINEERING MATERIALS**

#### **COURSE OUTCOMES**

After the completion of the course student should be able to

1. Classify stones and describe process of stone quarrying
2. Classify bricks and tiles, describe manufacturing process of bricks and tiles and can estimate the quality of bricks and tiles
3. Explain properties of cement and its product and can conduct tests on cement, mortar and concrete
4. Explain characteristics of good, describe seasoning of wood, estimate quality of wood and can conduct tests on wood
5. Describe the properties, tests and applications of various metallic, non-metallic and synthetic materials used for construction
6. Discuss properties, tests related to bitumen and road aggregates

### **(20HS0850) ENGINEERING PHYSICS LAB**

#### **COURSE OUTCOMES**

On successful completion of this course, student will be able to

1. Operate various optical instruments.
2. Estimate wavelength of laser and particles size using laser.
3. Plot the intensity of the magnetic field of induction along the axis of circular coil carrying current with distance.
4. Evaluate the acceptance angle of an optical fiber and numerical aperture.
5. Determine energy loss by B-H curve.
6. Evaluate rigidity modulus of a given wire.

### **(20ME0352) BASIC ELECTRICAL AND MECHANICAL ENGINEERING LAB**

#### **COURSE OUTCOMES**

Students undergoing this course can

1. List few Basics in Electrical Engineering
2. Explain steps in Pattern making, Casting & Moulding
3. Produce a Lap & Butt joint using Arc Welding
4. Carryout Drilling & Tapping operation on a given workpiece
5. Describe Cylindrical & Surface Grinding operation
6. Understand about Shaping & Slotting Operation

### **(20CS0502) C and DATA STRUCTURES LAB**

#### **COURSE OUTCOMES**

On Successful completion of this course, the student will be able to

1. Read, understand and trace the execution of programs written in C language
2. Develop C programs for simple applications making use of basic constructs, arrays and strings
3. Develop C programs involving functions, recursion, pointers, and structures

4. Select the data structure appropriate for solving the problem
5. Illustrate the working of stack and queue
6. Implement searching and sorting algorithms

## **I B. Tech. – II Sem**

### **(20HS0831) DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Classify the differential equations with respect to their order and linearity.
2. Solve the differential equations related to various engineering fields.
3. Identify solution methods for partial differential equations that model physical processes.
4. Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions.
5. Understand the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations.
6. Recognize and apply the Cauchy's integral formula and the generalized Cauchy's integral formula (relationship between the derivative and the contour integral of a function).

### **(20HS0804)ENGINEERING CHEMISTRY**

#### **COURSE OUTCOMES**

At the end of the course student will be able to:

- 1.Explain the principles of reverse osmosis and electro dialysis
- 2.Apply Nernst equation for calculating electrode and cell potentials.
- 3.Differentiate between thermoplastics and thermosetting plastics.
- 4.Explain the setting and hardening of cement and concrete phase.
- 5.Explain the synthesis of colloids with examples.
6. Acquire spotlight to the nano materials and basic engineering materials used in academics, industry and daily life

### **(20HS0810) COMMUNICATIVE ENGLISH**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. To understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
2. To ask and answer general questions on familiar topics and introduce oneself/others
3. To employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
4. To recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs
5. To form sentences using proper grammatical structures and correct word forms
6. To use effective sentence structure for their professional activities

### **(20ME0301) ENGINEERING GRAPHICS**

#### **COURSE OUTCOMES**

At the end of the course, the student will be able to

1. Interpret the engineering drawing fundamentals to draw the curves like ellipse, cycloid and Involutés.
2. Know the projection of points and implement the same in the construction of projection of lines and planes.
3. Recognize the basic solids like cylinders, cones, prisms and pyramids and sketch the projections of them.
4. Explain the sectional views of Right regular Solids and Apply visualization skills in developing new products.
5. Understand the basic principles of isometric and Orthographic Projections.
6. Construct the isometric and orthographic projections of simple objects.

### **(20CE0102) ENGINEERING MECHANICS**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Explain basic principles of statics and can apply them for various force systems
2. Describe the equilibrium conditions and analyze various types of frames
3. Describe the principals associated with centroid, centre of gravity, moment of inertia and apply these principals evaluate them for various two dimensions geometric sections
4. Explain fundamental principles of deformable bodies and compute various types of stress, strain and elastic constants
5. Analyze thin and thick cylinders subjected internal and external forces for stress
6. Describe shear force and bending moment for statically determinate beams for various loading conditions and draw shear force and bending moment diagrams

### **(20HS0805)ENGINEERING CHEMISTRY LAB**

#### **COURSE OUTCOMES**

On successful completion of this course, student will be able to

1. Develop and perform analytical chemistry techniques to address the water related problems (for e.g., hardness, alkalinity present in water) technically.
2. Prepare advanced polymer materials
3. Estimate the Iron in cement
4. Handle electro-analytical instruments like digital conductivity meter and potentiometer to perform neutralization, precipitation and redox titrations respectively.
5. Think innovatively and improve the creative skills that are essential for solving engineering problems
6. At the end of the course the students learn the alkalinity, acidity and viscosity of the any solutions

### **(20HS0811) COMMUNICATIVE ENGLISH LAB**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
2. Apply communication skills through various language learning activities.
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
5. Create awareness on mother tongue influence and neutralize it in order to improve fluency in

spoken English.

6. Use effective communicative approaches by preparing job application, report and other kinds of writing correspondences.

### **(20ME0302) WORKSHOP PRACTICE LAB**

#### **COURSE OUTCOMES**

Upon Completion of the course the students will be able to

1. Describe the different types of wood and carpentry joints
2. Produce Tapered Tray and Conical funnel using sheet metal
3. Understands about Fitting and Electrical Wiring
4. Identify various peripherals of a computer
5. Explain the procedure to install MS Windows & Linux
6. Understand about Productivity tools & Networking

### **(20HS0816) INDIAN CONSTITUTION**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Explain the key concepts of political economy
2. Analyze the significant developments in the political ideologies
3. Describe the salient features of the constitution of India interpret, integrate and critically
4. Analyze the political economy of Indian international relations and gain knowledge in Judiciary system
5. Apply their knowledge and skills acquired to write various competitive examinations
6. Analyze the constitutional rights in relating to practical life

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY::  
PUTTUR(AUTONOMOUS)**

**ELECTRICAL AND ELECTRONICS ENGINEERING**

**I B.Tech.–I Sem.**

**(20HS0830) ALGEBRA AND CALCULUS**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- Utilize mean value theorem to real life problems.
- Familiarize with functions of several variables which is useful in optimization.
- Learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional coordinate systems.
- Interpret the physical meaning of different operators such as gradient, curl and divergence.
- Apply Fundamental Theorem of Line Integrals, Green's Theorem, Stokes' Theorem, or Divergence Theorem to evaluate integrals.

**(20HS0802) APPLIED CHEMISTRY**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Apply Nernst equation for calculating electrode and cell potentials
- Illustrate the molecular orbital energy level diagram of different molecular species
- Explain the different types of polymers and their synthesis.
- Synthesize of plastics, elastomers, conducting polymers and their applications in our daily life
- Comprehend the principles and applications of spectroscopies.
- Acquire spotlight to the nanomaterials and basic engineering materials used in academics, industry and daily life.

**(20HS0810) COMMUNICATIVE ENGLISH**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- To understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information.
- To ask and answer general questions on familiar topics and introduce oneself/others.
- To employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information.
- To recognize paragraph structure and be able to match beginnings/endings/heading switch paragraphs.
- To form sentences using proper grammatical structures and correct word forms.
- To use effective sentence structure for their professional activities.

## **(20ME0353) THERMAL AND FLUID ENGINEERING**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Describe the different types of power plants.
- Explain the various properties of a thermodynamic system.
- Recognize the importance of boiler mountings & boiler accessories for power generation.
- List the different types of fluid flows.
- Understand various types of pressure and pressure measuring instruments.
- Describe various types of hydraulic turbines.

## **(20ME0301) ENGINEERING GRAPHICS**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Interpret the engineering drawing fundamentals to draw the curves like ellipse, cycloid and involutes.
- Know the projection of points and implement the same in the construction of projection of lines and planes.
- Recognize the basic solids like cylinders, cones, prisms and pyramids and sketch the projections of them.
- Explain the sectional views of right regular solids and apply visualization skills in developing new products.
- Understand the basic principles of isometric and orthographic projections.
- Construct the isometric and orthographic projections of simple objects.

## **(20HS0803) APPLIED CHEMISTRY LAB**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Develop and perform analytical chemistry techniques to address water-related problems (e.g., hardness, alkalinity present in water) technically.
- Prepare advanced polymer materials
- Estimate the iron in cement
- Handle electro-analytical instruments like digital conductivity meter and potentiometer to perform neutralization, precipitation and redox titrations respectively.
- Think innovatively and improve the creative skills that are essential for solving engineering problems

## **(20HS0811) COMMUNICATIVE ENGLISH LAB**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
- Apply communication skills through various language learning activities.
- Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.

- Evaluate and exhibit acceptable etiquette essential in social and professional settings.
- Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
- Use effective communicative approaches by preparing job application, report and other kinds of writing correspondences.

### **(20ME0354) THERMAL AND FLUID ENGINEERING LAB**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Explain the need of Boilers and also list various classifications of boiler.
- Describe the working of Water tube and Fire tube boilers.
- State and verify Bernoulli's theorem.
- Compute discharge of fluid flowing through Venturimeter and Orificemeter.
- Carry out an experiment on Turbine flowmeter.
- Find the friction factor for a given pipeline.

I B.Tech.–II Sem.

### **(20HS0831) DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Classify the differential equations with respect to their order and linearity. Solve the differential equations related to various engineering fields.
- Identify solution methods for partial differential equations that model physical processes.
- Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions.
- Understand the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations.
- Recognize and apply the Cauchy's integral formula and the generalized
- Cauchy's integral formula (relationship between the derivative and the contour integral of a function).

### **(20HS0849) APPLIED PHYSICS**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Analyze the differences between interference and diffraction with applications.
- Explain concepts of free electron theory and energy bands in solids and assess the EM wave propagation in non-conducting medium by using Maxwell Equations.
- Explain the basic principles and properties of Lasers and Optical Fibers.
- Identify the applications of semiconductors in electronic devices
- Explain the basic properties and applications of superconductors in various fields.
- Illustrate methods for synthesis and characterization of nanomaterial's and apply basic principles of nanomaterial's in various engineering applications.



## **(20CS0501)C PROGRAMMING AND DATA STRUCTURES**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Recognize the programming elements of C language
- Select the control structure for solving the problem
- Apply modular approach for solving the problem
- Solve mathematical problems using C Programming language
- Develop the applications using stacks and queues
- Construct the linked lists for various applications and perform sorting techniques

## **(20EE0201)FUNDAMENTALS OF ELECTRICAL CIRCUITS**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Analyze DC circuits using different methods.
- Analyze AC circuits and apply appropriate Network theorem for solving electric Circuits
- Understand series and parallel resonance concepts and analyze coupled circuits.
- Understand magnetically coupled circuits
- Formulate network matrices using network topology and understand the concept of duality.
- Understand the concepts of KVL and KCL

## **(20EC0402)ELECTRONIC DEVICES AND CIRCUITS**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Demonstrate the characteristics of PN Junction Diode, Rectifiers, Filters, BJT, JFET, MOSFET and special purpose electronic devices.
- Analyze numerical and analytical problems in Rectifiers, Filters, Transistor biasing circuits and Transistor amplifiers.
- Design and develop electronic circuits such as Rectifiers with and without filters, Transistor biasing circuits and Transistor amplifiers.
- Solve engineering problems and arrive at solutions relating to electronic devices and circuits.
- Identify a suitable semiconductor device and transistor for any given specification.
- Select a suitable technique for transistor modelling.

## **(20HS0851)APPLIED PHYSICS LAB**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Operate various optical instruments.
- Estimate wavelength of laser and particle size using laser.
- Plot the intensity of the magnetic field of induction along the axis of circular coil carrying current with distance.
- Evaluate the acceptance angle of an optical fiber and numerical aperture.
- Determine energy loss by B-H curve.
- Evaluate rigidity modulus of a given wire.

## **(20CS0502)C PROGRAMMING AND DATA STRUCTURES LAB**

### **COURSE OUTCOMES:**

On Successful completion of this course, the student will be able to

- Read, understand and trace the execution of programs written in C language
- Develop C programs for simple applications making use of basic constructs, arrays and strings
- Develop C programs involving functions, recursion, pointers, and structures
- Select the data structure appropriate for solving the problem
- Illustrate the working of stack and queue
- Implement searching and sorting algorithms

## **(20ME0302)WORKSHOP PRACTICE LAB**

### **COURSE OUTCOMES**

Upon Completion of the course the students will be able to

- Describe the different types of wood and carpentry joints.
- Produce Tapered Tray and Conical funnel using sheet metal.
- Understand about Fitting and Electrical Wiring.
- Identify various peripherals of a computer.
- Explain the procedure to install MS Windows & Linux.
- Understand about Productivity tools & Networking.

## **(20HS0816)INDIAN CONSTITUTION**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Explain the key concepts of political economy.
- Analyse the significant developments in the political ideologies.
- Describe the salient features of the constitution of India interpret, integrate and critically.
- Analyse the political economy of Indian international relations and gain knowledge in Judiciary system.
- Apply their knowledge and skills acquired to write various competitive examinations.
- Analyse the constitution a right in relating to Practical life.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**Department of Mechanical Engineering**

**I B. Tech. – I Semester (M.E)**

**(20HS0830) ALGEBRA AND CALCULUS**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Develop the use of matrix algebra techniques that is needed by engineers for practical applications.
2. Utilize mean value theorems to real life problems.
3. Familiarize with functions of several variables which is useful in optimization.
4. Learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional coordinate systems
5. Interpret the physical meaning of different operators such as gradient, curl and divergence.
6. Apply Fundamental Theorem of Line Integrals, Green's Theorem, Stokes' Theorem, or Divergence Theorem to evaluate integrals.

**(20HS0804) ENGINEERING CHEMESTERY**

**COURSE OUTCOMES**

At the end of the course student will be able to:

1. Explain the principles of reverse osmosis and electro dialysis.
2. Apply Nernst equation for calculating electrode and cell potentials.
3. Differentiate between thermoplastics and thermosetting plastics.
4. Explain the setting and hardening of cement and concrete phase.
5. Explain the synthesis of colloids with examples.
6. Acquire spotlight to the nanomaterials and basic engineering materials used in academics, industry and daily life.

**(20HS0810) COMMUNICATIVE ENGLISH**

**COURSE OUTCOMES**

1. To understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information.
2. To ask and answer general questions on familiar topics and introduce oneself/others.
3. To employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information.
4. To recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs.
5. To form sentences using proper grammatical structures and correct word forms.

## **(20EE0251) BASIC ELECTRICAL&ELECTRONICS ENGINEERING**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Determine the equivalent impedance of a given network by using network reduction techniques.
2. Calculate the voltage and current for a given particular network by using KCL&KVL.
3. Analyze the working operation & characteristics of DC generators.
4. Understand the construction of DC motors and transformer.
5. Analyze the operating principles of major electronic devices, its characteristics and application
6. Design and analyze the DC bias circuitry of BJT and FET.

## **(20ME0301) ENGINEERING GRAPHICS**

### **COURSE OUTCOMES**

At the end of the course, the student will be able to

1. Interpret the engineering drawing fundamentals to draw the curves like ellipse, cycloid and involutes.
2. Know the projection of points and implement the same in the construction of projection of lines and planes.
3. Recognize the basic solids like cylinders, cones, prisms and pyramids and sketch the projections of them.
4. Explain the sectional views of Right regular Solids and Apply visualization skills in developing new products.
5. Understand the basic principles of isometric and Orthographic Projections.
6. Construct the isometric and orthographic projections of simple objects.

## **(20HS0805) ENGINEERING CHEMISTRY LAB**

### **COURSE OUTCOMES**

On successful completion of this course, student will be able to

1. Develop and perform analytical chemistry techniques to address the water related problems (for e.g., hardness, alkalinity present in water) technically.
2. Prepare advanced polymer materials
3. Estimate the Iron in cement
4. Handle electro-analytical instruments like digital conductivity meter and potentiometer to perform neutralization, precipitation and redox titrations respectively.
5. Think innovatively and improve the creative skills that are essential for solving engineering problems
6. At the end of the course the students learn the alkalinity, acidity and viscosity of the any solutions.

## **(20HS0811) COMMUNICATIVE ENGLISH LAB**

### **COURSE OUTCOMES**

1. Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.

2. Apply communication skills through various language learning activities.
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
5. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
6. Use effective communicative approaches by preparing job application, report and other kinds of writing correspondences.

### **(20EE0252) BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Students will understand all the fundamental components about electrical Engineering and Electronics Engineering.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the usage of common electrical and electronic measuring instruments.
4. Understand the basic characteristics of transformers and electrical machines.

### **(20HS0831) DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Classify the differential equations with respect to their order and linearity.
2. Solve the differential equations related to various engineering fields.
3. Identify solution methods for partial differential equations that model physical processes.
4. Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions.
5. Understand the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations.
6. Recognize and apply the Cauchy's integral formula and the generalized Cauchy's integral formula (relationship between the derivative and the contour integral of a function).

### **(20HS0848) ENGINEERING PHYSICS**

#### **COURSE OUTCOMES**

On successful completion of this course, student will be able to

1. Analyze the differences between interference and diffraction with applications.
2. Apply the Bragg's Law for crystal structure determination by X-rays.
3. Explain applications of acoustics and ultrasonics in various engineering fields.
4. Explain the importance of various mechanical properties of solids.
5. Explain the basic properties and applications of superconductors in various Fields.
6. Illustrate methods for synthesis and characterization of nanomaterials and apply basic principles of nanomaterials in various engineering applications.

## **(20CS0501) C Programming and DATA STRUCTURES**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Recognize the programming elements of C language
2. Select the control structure for solving the problem
3. Apply modular approach for solving the problem
4. Solve mathematical problems using C Programming language
5. Develop the applications using stacks and queues
6. Construct the linked lists for various applications and perform sorting techniques

## **(20ME0303) BASIC THERMODYNAMICS**

### **COURSE OUTCOMES**

On successful completion of the course, the students will be able to

1. State and explain the open and closed systems as well as develop and apply continuity equation for them.
2. Describe the Basic concepts of thermodynamics such as temperature, pressure, system, Properties, process, state, cycles and equilibrium.
3. Explain the Basic laws of thermodynamics and their applications.
4. Interpret the Concepts of enthalpy, entropy and other thermodynamic properties of ideal gas Process.
5. Analyze Thermodynamic cycles and behavior of pure substances, usage of steam tables and Mollier chart in solving steam related problems.
6. Summarize various types of boilers, their construction, working and their applications.

## **(20CE0102) ENGINEERING MECHANICS**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Explain basic principles of statics and can apply them for various force systems
2. Describe the equilibrium conditions and analyze various types of frames
3. State the laws of friction and apply them to wedges, screw jack, ladder and other friction dominant mechanical systems to study their behavior
4. Describe the principals associated with centroid, centre of gravity, moment of inertia and apply these principals evaluate them for various two dimensions geometric sections
5. Explain fundamental principles of deformable bodies and compute various types of stress, strain and elastic constants
6. Analyze thin and thick cylinders subjected internal and external forces for stress

## **(20HS0850) ENGINEERING PHYSICS LAB**

### **COURSE OUTCOMES**

On successful completion of this course, student will be able to

1. Operate various optical instruments.
2. Estimate wavelength of laser and particles size using laser.

3. Plot the intensity of the magnetic field of induction along the axis of circular coil carrying current with distance.
4. Evaluate the acceptance angle of an optical fiber and numerical aperture.
5. Determine energy loss by B-H curve.
6. Evaluate rigidity modulus of a given wire.

### **(20CS0502) C Programming and DATA STRUCTURES LAB**

#### **COURSE OUTCOMES**

On Successful completion of this course, the student will be able to

1. Read, understand and trace the execution of programs written in C language
2. Develop C programs for simple applications making use of basic constructs, arrays and strings
3. Develop C programs involving functions, recursion, pointers, and structures
4. Select the data structure appropriate for solving the problem
5. Illustrate the working of stack and queue
6. Implement searching and sorting algorithms

### **(20ME0302) WORKSHOP PRACTICE LAB**

#### **COURSE OUTCOMES**

Upon Completion of the course the students will be able to

1. Describe the different types of wood and carpentry joints.
2. Produce Tapered Tray and Conical funnel using sheet metal.
3. Understands about Fitting and Electrical Wiring.
4. Identify various peripherals of a computer.
5. Explain the procedure to install MS Windows & Linux.
6. Understand about Productivity tools & Networking.

### **(20HS0816) INDIAN CONSTITUTION**

#### **COURSE OUTCOMES**

1. Explain the key concepts of political economy.
2. Analyze the significant developments in the political ideologies.
3. Describe the salient features of the constitution of India interpret, integrate and critically.
4. Analyze the political economy of Indian international relations and gain knowledge in Judiciary system.
5. Apply their knowledge and skills acquired to write various competitive examinations.
6. Analyse the constitutional rights in relating to Practical life.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**Department of Electronics and Communication Engineering**

**I B. Tech. – I Semester (E.C.E)**

**(20HS0830) ALGEBRA AND CALCULUS**

**(Common to All branches)**

Course Outcomes:

On successful completion of this course, the student will be able to

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- Utilize mean value theorems to real life problems.
- Familiarize with functions of several variables which is useful in optimization.
- Learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems.
- Interpret the physical meaning of different operators such as gradient, curl and divergence.
- Apply Fundamental Theorem of Line Integrals, Green's Theorem, Stokes' Theorem, or Divergence Theorem to evaluate integrals.

**(20HS0802) APPLIED CHEMISTRY**

Course Outcomes:

On successful completion of this course, the student will be able to

- Apply Nernst equation for calculating electrode and cell potentials
- Illustrate the molecular orbital energy level diagram of different molecular species
- Explain the different types of polymers and their synthesis.
- Synthesis of plastics, elastomers, conducting polymers and their applications in our daily life
- Comprehend the principles and applications of spectroscopies.
- Acquire spotlight to the nanomaterials and basic engineering materials used in academics, industry and daily life.

**(20HS0810) COMMUNICATIVE ENGLISH**

**(Common to EEE, MECH & ECE)**

Course Outcomes:

On successful completion of this course, the student will be able to

- Understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information.
- Ask and answer general questions on familiar topics and introduce oneself/others.



- Employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information.
- Recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs.
- Form sentences using proper grammatical structures and correct word forms.
- Use effective sentence structure for their professional activities.

### **(20EE0253) PRINCIPLES OF ELECTRICAL CIRCUITS**

Course Outcomes:

On successful completion of this course, the student will be able to

- Formulate the equations of the electric circuits using basic laws
- Determine the response of DC circuits using basic analysis methods
- Compute the response of DC circuits using network theorems
- Analyze the transient behavior of electric circuits with different types of source
- Describe the elements of AC circuits and the phasor concept
- Solve simple two port networks

### **(20ME0301) ENGINEERING GRAPHICS (Common to all branches)**

Course Outcomes:

On successful completion of this course, the student will be able to

7. Interpret the engineering drawing fundamentals to draw the curves like ellipse, cycloid and Involute.
8. Know the projection of points and implement the same in the construction of projection of lines and planes.
9. Recognize the basic solids like cylinders, cones, prisms and pyramids and sketch the projections of them.
10. Explain the sectional views of Right regular Solids and Apply visualization skills in developing new products.
11. Understand the basic principles of isometric and Orthographic Projections.
12. Construct the isometric and orthographic projections of simple objects.

### **(20HS0803) APPLIED CHEMISTRY LAB**

Course outcomes:

On successful completion of this course, student will be able to

- Develop and perform analytical chemistry techniques to address the water related problems (for e.g., hardness, alkalinity present in water) technically.
- Prepare advanced polymer materials
- Estimate the Iron in cement
- Handle electro-analytical instruments like digital conductivity meter and potentiometer to perform neutralization, precipitation and redox titrations respectively.
- Think innovatively and improve the creative skills that are essential for solving engineering problems

- At the end of the course the students learn the alkalinity, acidity and viscosity of the any solutions.

### **(20HS0811) COMMUNICATIVE ENGLISH LAB**

**(Common to EEE, MECH & ECE)**

Course outcomes:

On successful completion of this course, the student will be able to

- Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
- Apply communication skills through various language learning activities.
- Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
- Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
- Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
- Use effective communicative approaches by preparing job application, report and other
  - kinds of writing correspondences.

### **(20ME0302) WORKSHOP PRACTICE LAB**

**(Common to all branches)**

Course outcomes:

On successful completion of this course, student will be able to

- Describe the different types of wood and carpentry joints.
- Produce Tapered Tray and Conical funnel using sheet metal.
- Understands about Fitting and Electrical Wiring.
- Identify various peripherals of a computer.
- Explain the procedure to install MS Windows & Linux.
- Understand about Productivity tools & Networking.

### **(20HS0831) DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS**

**(Common to: CIVIL, EEE, ME & ECE)**

Course Outcomes:

On successful completion of this course, the student will be able to

- Classify the differential equations with respect to their order and linearity.
- Solve the differential equations related to various engineering fields.
- Identify solution methods for partial differential equations that model physical processes.
- Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions.
- Understand the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations.

- Recognize and apply the Cauchy's integral formula and the generalized Cauchy's integral formula (relationship between the derivative and the contour integral of a function).

## **I B.Tech- II Sem**

### **(20HS0849) APPLIED PHYSICS**

Course Outcomes:

On successful completion of this course, student will be able to

- Analyze the differences between interference and diffraction with applications.
- Explain concepts of free electron theory and energy bands in solids and assess the EM wave propagation in non-conducting medium by using Maxwell Equations.
- Explain the basic principles and properties of Lasers and Optical Fibers.
- Identify the applications of semiconductors in electronic devices
- Explain the basic properties and applications of superconductors in various fields.
- Illustrate methods for synthesis and characterization of nanomaterials and apply basic principles of nanomaterials in various engineering applications.

### **(20CS0501) C PROGRAMMING AND DATA STRUCTURES**

**(Common to EEE, MECH and ECE)**

Course Outcomes:

On successful completion of this course, the student will be able to

- Recognize the programming elements of C language
- Select the control structure for solving the problem
- Apply modular approach for solving the problem
- Solve mathematical problems using C Programming language
- Develop the applications using stacks and queues
- Construct the linked lists for various applications and perform sorting techniques

### **(20EC0401) FUNDAMENTALS OF DIGITAL COMPUTING SYSTEMS**

Course Outcomes:

On successful completion of this course, the student will be able to

- Understand the evolution of computers and its applications.
- Understand the need of different computer architectures and role of system architect for it.
- Analyze various system architectures used in the real-world applications.
- Familiarize with various number systems, their representation and conversion techniques.
- Understand various data formats that can be given to the computer for processing.
- Solve the Arithmetic examples based on Binary arithmetic.

## **(20EE0254) ELECTRICAL TECHNOLOGY**

Course Outcomes:

On successful completion of this course, the student will be able to

- To analyse the performance of DC generators and motors
- To analyze the speed control of DC motors.
- To analyze the characteristics of DC machines.
- To analyze the performance of transformers
- To analyze the performance of three phase inductionmotors.
- To analyze the performance of three phase alternators.
- Conduct O.C, S.C tests and predetermine the regulation and efficiency of transformer.

## **(20HS0851) APPLIED PHYSICS LAB**

Course Outcomes:

On successful completion of this course, student will be able to

- Operate various optical instruments.
- Estimate wavelength of laser and particles size using laser.
- Plot the intensity of the magnetic field of induction along the axis of circular coil carrying current with distance.
- Evaluate the acceptance angle of an optical fiber and numerical aperture.
- Determine energy loss by B-H curve.
- Evaluate rigidity modulus of a given wire.

## **(20CS0502) C PROGRAMMING AND DATA STRUCTURES LAB**

Course Outcomes:

On Successful completion of this course, the student will be able to

- Read, understand and trace the execution of programs written in C language
- Develop C programs for simple applications making use of basic constructs, arrays and strings
- Develop C programs involving functions, recursion, pointers, and structures
- Select the data structure appropriate for solving the problem
- Illustrate the working of stack and queue
- Implement searching and sorting algorithms

## **(20HS0816) INDIAN CONSTITUTION**

(Common to All Branches)

Course Outcomes:

On successful completion of this course, the student will be able to

- Explain the key concepts of political economy.
- Analyse the significant developments in the political ideologies.
- Describe the salient features of the constitution of India interpret, integrate and critically.
- Analyse the political economy of Indian international relations and gain knowledge in Judiciary system.
- Apply their knowledge and skills acquired to write various competitive examinations.
- Analyse the constitutional rights in relating to Practical life.

#### (19HS0834) NUMERICAL METHODS AND TRANSFORMS

##### Course Outcomes:

On successful completion of this course, the student will be able to

- To develop the mathematical skills of the students in the areas of numerical methods.
- Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.
- Work out numerical differentiation and integration whenever and wherever routine methods are not applicable.
- Calculate the Laplace transform of standard functions both from the definition and by using tables.
- Students will be able to comprehend basic systems properties and signals.
- Students will be able to apply Fourier analysis to periodic and aperiodic signals

#### (19EE0242) NETWORK THEORY

##### Course Outcomes:

On successful completion of this course, the student will be able to

- Understand basics electrical circuits with nodal and mesh analysis.
- Solve the given circuit with various theorems and methods.
- Determine the transient response of R-L, R-C, R-L-C circuits for d.c and a.c excitations.
- Apply Fourier transforms to electrical circuits excited by non-sinusoidal sources.
- Learn the various parameters and their interrelationship, able to solve numerical with series, cascade, and parallel connection using two port parameters.
- Design different types of filters.

#### (19EC0402) ELECTRONIC DEVICES AND CIRCUITS

(Common to EEE and ECE)

##### Course Outcomes:

On successful completion of this course, the student will be able to

- Demonstrate the characteristics of PN Junction Diode, Rectifiers, Filters, BJT, JFET, MOSFET and special purpose electronic devices.
- Analyze numerical and analytical problems in Rectifiers, Filters, Transistor

biasing circuits and Transistor amplifiers.

- Design and develop electronic circuits such as Rectifiers with and without filters, Transistor biasing circuits and Transistor amplifiers.
- Solve engineering problems and arrive at solutions relating to electronic devices and circuits.
- Identify a suitable semiconductor device and transistor for any given specification.
- Select suitable technique for transistor modelling.

#### (19EC0403) SIGNALS, SYSTEMS AND RANDOM PROCESSES

Course Outcomes:

At the end of this course students will demonstrate the ability to

- Analyze different types of signals.
- Represent continuous systems in time and frequency domain using different transforms.
- Investigate the system stability.
- Understand the concept of convolution of signals.
- Understand and Analyze the Laplace Transform and ROC.
  - A student will be able to determine the temporal and spectral characteristics

#### (19CE0136) WATER TECHNOLOGY

(Open Elective-I) Course Outcomes:

Course Outcomes:

On successful completion of this course, the student will be able to

- Underline the importance of water and describe the mechanism of hydrological cycle.
- Describe various elements associated with public water supply.
- Describe water quality criteria and standards, and their relation to public health.
- Recognize the cause of water pollution and influence of climatic changes on water resources.
- Summarize various water conservation techniques in practice.
- Explain need for watershed management and implement various Plans for watershed management.

#### (19EE0238) GENERATION OF ENERGY THROUGH WASTE

Course Outcomes:

On successful completion of this course, the student will be able to

- Analyse agro based, forest residue and industrial waste conversion processes.
- Manufacture of Pyrolytic oils and gases
- Manufacture of charcoal, yields and applications
- Understand various types of gasifier operation
- Understand inclined and fluidized bed combustor operation

- Understand types of biogas plants and biomass energy programme in India

### (19ME0349) FUNDAMENTALS OF MECHANICAL ENGINEERING

#### Course Outcomes:

On successful completion of this course, the student will be able to

- List the types of Engineering materials and also describe alloying, Heat treatment Processes.
- Recognize the importance of IC Engines in automobiles and the classification of air compressors
- Distinguish various types of air conditioning systems for house and Industrial applications
- Explicate the working of various Power plants like nuclear, Hydro & thermal power plants
- Classify various types modern machining processes and determine the best suitable process to machine a component.
- Apply the working principles of CAD, CAM and CIM in the operation of Robotic manufacturing and quality control systems

### (19CS0549) LINUX PROGRAMMING

(Open Elective – I)

#### Course Outcomes:

On successful completion of this course, the student will be able to

- Understand the basic set of commands and editors in Linux operating system.
- Implement and execute various shell scripts.
- Work with filters, pipes and user communication, Vi-Editor commands.
- Execute various commands related to regular expressions
- Implement Korn shell programming
- Execute commands related to C shell.

### (19HS0813) MANAGEMENT SCIENCE

#### Course Outcomes:

On successful completion of this course, the student will be able to

- Utilize appropriate theoretical frameworks to real life business and managerial problems.
- Identify appropriate operational risks and develop appropriate responses to them.
- Apply human resource principles to recruit, select and manage employees to achieve organizational goals.
- Enact strategy, including contingent plans for the effective management of the organization.
- Identify, plan, and implement the projects and evaluate the performance of the projects.

- Analyze effective application of latest developments to diagnose and solve organizational problems.

#### (19EC0404) SWITCHING THEORY AND LOGIC DESIGN LAB

(Common to EEE and ECE)

##### Course Outcomes:

On successful completion of this course, the student will be able to

- Verify the operation of Logic gates, combinational and Sequential circuits
- Construct basic combinational circuits and verify their functionalities.
- Apply the design procedures in designing basic sequential circuits.
- Understand the functionality of counters.
- Understand the sequencing of Shift registers.
- Construct various digital circuits and verify their operation.

#### (19EC0405) ELECTRONIC DEVICES AND CIRCUITS LAB

(Common to EEE and ECE)

##### Course Outcomes:

On successful completion of this course the students will be able to

- Demonstrate knowledge in different electronic devices and analog circuits.
- Analyze the characteristics of different electronic devices and circuits like Diodes-PN Junction Diode, Zener Diode and Transistors-BJT, FET.
- Design and develop electronic circuits like rectifiers, clippers, clampers, BJT and FET Amplifiers.
- Solve engineering problems with better Electronic circuits.
- Function effectively as an individual and as a member in a group in the area of electronic devices and circuits.
- Develop skills to communicate verbally and in written form in the area of electronic devices and circuits.

#### (19EC0406) BASIC SIMULATION LAB

##### Course Outcomes:

On successful completion of this course, the student will be able to

- Analyze various types of signals and sequences.
- Apply convolution and correlation operations on different signals.
- Determine the response of an LTI system to given signals.
- Plot and analyze the spectrum of a given signal using MATLAB.
- Verify the Sampling theorem.
- Compute various statistical properties of a random noise.



## (19HS0816) INDIAN CONSTITUTION

### Course Outcomes:

On successful completion of the course, students will be able to

- Explain the key concepts of political economy.
- Analyse the significant developments in the political ideologies.
- Describe the salient features of the constitution of India interpret, integrate and critically.
- Analyse the political economy of Indian international relations and gain knowledge in Judiciary system.
- Apply their knowledge and skills acquired to write various competitive examinations.
- Analyse the constitutional rights in relating to Practical life.

### II B. Tech. – II Sem

## (19EC0407) ELECTRONIC CIRCUIT ANALYSIS

### Course Outcomes:

On successful completion of the course, students will be able to

- Acquire knowledge of BJT High Frequency Model, Multistage amplifiers, Feedback amplifiers, oscillators, Power amplifiers, Tuned amplifiers and Multivibrators.
- Perform analysis of analog electronic circuits for meeting defined specifications.
- Design and develop analog electronic circuits such as Multistage amplifiers, Feedback amplifiers, Oscillators, Power amplifiers, Tuned amplifiers and Multivibrators with given specifications.
- Solve problems relating to analog electronic circuit design.
- Select an Amplifier circuit suitable for a specific electronics subsystem.
- Apply course knowledge to assess societal issues and understand the consequent responsibilities relevant to the professional engineering practice using analog electronic circuits.

## (19EC0408) ANALOG COMMUNICATIONS

### Course Outcomes:

On successful completion of this course, the student will be able to

- Understand different blocks in communication system and distinguish between different amplitude modulation schemes with their advantages, disadvantages and applications.
- Analyze generation and detection of FM signal and comparison between amplitude and angle modulation schemes.
- Study the different types of noises and its effects to analyze the behavior of different Analog modulation schemes in presence of noise & evaluate the performance of analogue communications in the presence of noise.
- Differentiate between different analog pulse modulation and demodulation

techniques and signal multiplexing for various applications.

- Identify different radio receiver circuits and role of AGC and understand the concept of information and capacity
- Identify source coding and channel coding schemes for a given communication link.

#### (19EC0409) LINEAR & DIGITAL IC APPLICATIONS

Course Outcomes:

On successful completion of this course, the student will be able to

- Able to define internal structures of the op amp and basic concepts of filters, timers and converters
- Able to experiment the linear, nonlinear applications of op-amp with specialized ICs and converters.
- Evaluate the applications of op-amp circuits, specialized ICs and converters.
- Able to design the op amp circuits and converters for real time applications.
- Understand CMOS and TTL Logic families and their interfacing.
- Describe various design style of VHDL programming.
- Apply the knowledge of VHDL programming to develop VHDL model for standard combinational and sequential IC structures.

#### (19EC0410) ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

Course Outcomes:

On successful completion of this course, the student will be able to

- Analyse the relation between electric and magnetic fields using vector analysis.
- Evaluate the Maxwell's Equation in Static Electric and Magnetic Field.
- Apply Maxwell's equations in Electromagnetic fields.
- Characterize Maxwell's equation in both static and Time varying fields.
- Understand the propagation of electromagnetic waves in different media.
- Understand the concepts of Transmission lines and Their Applications.
- (19EC0410) ELECTROMAGNETIC THEORY AND TRANSMISSION LINES

Course Outcomes:

On successful completion of this course, the student will be able to

- Analyse the relation between electric and magnetic fields using vector analysis.
- Evaluate the Maxwell's Equation in Static Electric and Magnetic Field.
- Apply Maxwell's equations in Electromagnetic fields.
- Characterize Maxwell's equation in both static and Time varying fields.
- Understand the propagation of electromagnetic waves in different media.
- Understand the concepts of Transmission lines and Their Applications.

## (19CE0143) FUNDAMENTALS OF URBAN PLANNING

(Open Elective –II)

### Course Outcomes:

On successful completion of this course, the student will be able to

- Recognize issues related to town planning and discuss the objectives, necessity and stages of town planning
- Summarize importance of zoning, can classify various town planning practices and can conduct surveys for town planning
- Classify the residential building, list the agencies involved in improving house and review the problems associated with residential housing
- Discuss the issues associated with slums and recognize the methods to improve condition of slums
- Interpret norms laid down for public and industrial building and can summarize building bye-laws
- List and discuss various urban roads and the concepts of traffic management in a town

## (19EE0233) INDUSTRIAL INSTRUMENTATION

### Course Outcomes:

On successful completion of this course, the student will be able to

- Identify and explain the types of errors occurring in measurement systems.
- Differentiate among the types of data transmission and modulation techniques.
- Apply digital techniques to measure voltage, frequency and speed.
- Analyse the working principles of different Signal Analyzers and Digital meters.
- Understand the operation of several types of transducers.
- Choose suitable Transducers for the measurement of non-electrical quantities.

## (19ME0350) MECHANICAL MEASUREMENTS & CONTROL SYSTEMS

### Course Outcomes:

On successful completion of this course, the student will be able to

- State the basic principles of measurement systems and explain its performance characteristics
- Distinguish the types of various temperature and pressure measurement instruments and find the best one for the industrial applications
- Explicate the principle of measurement of Speed, Acceleration and Vibration instruments and describe its working
- Illustrate the operation of Fuel level, measurement of Flow and Humidity Measurement instruments and also state the applications of various control systems
- Identify the appropriate device for the measurement of temperature, pressure, speed, stress, humidity, flow velocity etc., and justify its use through

characteristics and performance.

- Classify the various types of control systems for the measurement of temperature, speed and position

### (19CS0551) JAVA PROGRAMMING

(Open Elective- II)

Course Outcomes:

On successful completion of this course, the student will be able to

- Implement simple abstract data types and design abstraction functions.
- Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
- Apply object-oriented design patterns for problem solving.
- Implement Exception handling with synchronization.
- Execute programs on Multithreading and String handling concepts.
- Design applications with an event-driven graphical user interface.

### (19HS0814) INTELLECTUAL PROPERTY RIGHTS

Course Outcomes:

On successful completion of this course, the student will be able to

- Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights
- Identify different types of intellectual properties, ownership rights and the scope of the protection
- Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work
- Able to identify, apply, and assess ownership rights, registration processes for IP rights
- To discern the approaches for intellectual property management and intellectual property audits
- Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level

### (19EC0411) ELECTRONIC CIRCUIT ANALYSIS LAB

Course Outcomes:

On successful completion of the course, students will be able to

- Acquire knowledge in different electronic circuits using transistor amplifier.
- Analyze and design of amplifiers, feedback amplifiers, oscillators, Tuned amplifiers and Multivibrators.
- Measure and simulate important parameters of various amplifiers which are used to understand the behavior of analog electronic circuits.

- Identify a suitable analog electronic circuit for various applications with a given specification.
- Function effectively as an individual and as a member in a group in the area of analog electronic circuits.
- Develop skills to communicate in verbal and written form in the area of analog electronic circuits.

#### (19EC0412) ANALOG COMMUNICATIONS LAB

##### Course Outcomes:

On successful completion of this course, the student will be able to

- Technically visualize spectra of different analog modulation schemes
- Analyze practical behavior of different elements available in an analog communication system such as filters, amplifiers etc.
- Measure characteristics of radio receiver measurements.
- Experience real time behavior of different analog modulation schemes
- Acquire knowledge about pulse modulation systems
- Observe the modulation and demodulation behavior of various modulation techniques

#### (19EC0413) LINEAR & DIGITAL IC APPLICATIONS LAB

##### Course Outcomes:

On Successful Completion of this, Course the Student will be able to

- Design and analyze the various linear & Non-Linear applications of op-amp.
- Design and analyze filter circuits using op-amp.
- Design and analyze oscillators and multivibrators circuits using op-amp (IC741) or IC555
- Design and draw the internal structure of the various digital integrated circuits.
- Develop VHDL/Verilog HDL source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer.
- Verify the logical operations of the digital IC's (Hardware) in the laboratory.

#### (19HS0805) ENVIRONMENTAL SCIENCE

##### Course Outcomes:

On Successful Completion of this Course, the Student will be able to

- Recognize the physical, chemical and biological components of the earth's systems and show how they function.
- Characterize and analyze human impacts on the environment.
- Integrate facts, concepts and methods from multiple disciplines and apply to environmental problems.
- Create informed opinions about how to interact with the environment on both a personal and a social level.

- Perform independent research on human interactions with the environment.
- Recognize the ecological basis for regional and global environmental issues.

#### (18EC0428) MICROWAVE THEORY AND TECHNIQUES

Course Outcomes:

On successful completion of this course, the student will be able to

1. Design and simulate waveguide components for various applications
2. Compare between the conventional waveguides & microwave tubes
3. Able to analyze micro-wave circuits incorporating hollow, dielectric and planar waveguides, transmission lines, filters and other passive components, active devices
4. Utilize knowledge about the measurements to be done at microwaves
5. Able to illustrate the various parameters and explain about the characteristics of the various waveguide components
6. Able to define the basic concepts of microwave tubes & Scattering Matrix

#### (18EC0429) INFORMATION THEORY AND CODING

Course Outcomes:

After the completion of the course, student will be able to

- Explain the concept of information.
- Analyse the concept of entropy and error control coding .
- Determine channel capacity.
- Apply coding techniques to define channel capacities and properties using Shannon's Theorems.
- Construct efficient codes for data on imperfect communication channels.
- Analyse error correction and detection in receiver section.

#### (18EC0430) SCIENTIFIC COMPUTING

Course Outcomes:

On successful completion of this course, the student will be able to

- Illustrate the significance of computing methods, their strengths and application areas.
- Solve the scientific computing of system of linear equations and Eigen values and singular values in real life situations.
- Apply the scientific computing of system of Non - linear equations and Interpolation for engineering problems.
- Demonstrate the knowledge of scientific methods for solving Numerical Integration and Differentiation for engineering problems.
- Solve the ordinary differential equations with initial conditions by using scientific techniques with engineering applications.
- Evaluate the partial differential equations by using scientific techniques with engineering applications.

### (18CE0127) ELEMENTS OF ROAD TRAFFIC SAFETY

Course Outcomes:

On successful completion of this course, the student will be able to

- Identify the causes for road accidents and can implement measures to prevent road accidents
- Describe traffic regulations and implement parking methods
- Classify different traffic signal and can design traffic signal system
- List and illustrate various traffic signs
- List and discuss various road markings
- Discuss importance of street lighting and classify various street lighting system

### (18EE0234) INDUSTRIAL INSTRUMENTATION

Course Outcomes:

On successful completion of this course, the student will be able to

- Identify and explain the types of errors occurring in measurement systems.
- Differentiate among the types of data transmission and modulation techniques.
- Apply digital techniques to measure voltage, frequency and speed.
- Analyse the working principles of different Signal Analyzers and Digital meters.
- Understand the operation of several types of transducers.
- Choose suitable Transducers for the measurement of non-electrical quantities.

### (18ME0307) NON-CONVENTIONAL ENERGY RESOURCES

Course Outcomes:

At the end of this course, the student will be able to

- State various sources of Energies, its availability and explain the importance of them by observing the global energy scenario.
- Distinguish the types of solar energy tapping devices and describe the method of harnessing the solar energy.
- Summarize the Wind energy systems and elucidate the impact of it in environmental aspects.
- Describe the Biomass conversion process and list out various bioenergy applications.
- Interpret the knowledge of renewable energies such as tidal energy, OTEC, Fuel cell, etc. for effective construction of Hybrid systems.
- Identify numerous applications renewable energy resources and illustrate its harnessing technologies.

### (18CS0517) PYTHON PROGRAMMING

Course Outcomes:

On successful completion of this course, the student will be able to

- Solve the problems using control structures, input and output statements.
- Summarize the features of lists, tuples, dictionaries, strings and files
- Experience the usage of standard libraries, objects, and modules
- Solve the problems using Object Oriented Programming Concepts

- Build the software for real time applications using python
- Install various Python packages

#### (18HS0814) INTELLECTUAL PROPERTY RIGHTS

Course Outcomes:

On successful completion of the course, students will be able to:

- Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights
- Identify different types of intellectual properties, ownership rights and the scope of the protection
- Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work
- Able to identify, apply, and assess ownership rights, registration processes for IP rights
- To discern the approaches for intellectual property management and intellectual property audits
- Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level

#### (18EC0421) ANTENNAS AND WAVE PROPAGATION LAB (Virtual Lab)

Course Outcomes:

On successful completion of the course, students will be able to:

- Understand parametric equations for the calculation in the far field region.
- Analyze Antenna model for various VHF, UHF.
- Learn pattern multiplication principle for array antennas.
- Understand the relation between various antennas and their parameters .
- Calculate Microwave Antennas parameters.
- Applications of the various practical antenna.

#### (18EC0422) MICROCONTROLLER AND APPLICATIONS LAB

Course Outcomes:

On successful completion of this course, students will be able to

- Familiar with keil programming environment
- Demonstrate arithmetic, logical and string operations using assembly language programming.
- Develop embedded C language programs for various applications using 8051 microcontroller.
- Explore the provided example code and online resources for extending knowledge about the capabilities of the 8051 microcontrollers
- Test, debug, and deploy the 8051 microcontroller-based systems
- Design and develop own microprocessor/microcontroller-based solutions for the real- world problems



## (18HS0842) APTITUDE PRACTICES

### Course Outcomes:

On successful completion of this course, the student will be able to

- Develop the subtle way of approaching in the candidate.
- Acquired the decision making with in no time.
- Implement logical thinking during professional tenure.
- Improve knowledge on problem solving.
- Understand problems on coding and decoding.
- Apply the knowledge on the concept of reasoning in real life.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**Department of Computer Science and Engineering**

**I B.Tech – I Sem (CSE)**

(20HS0830) ALGEBRA AND CALCULUS

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to:

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- Utilize mean value theorems to real life problems.
- Familiarize with functions of several variables which is useful in optimization.
- Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems.
- Interpret the physical meaning of different operators such as gradient, curl and divergence.
- Apply Fundamental Theorem of Line Integrals, Green's Theorem, Stokes' Theorem, or Divergence Theorem to evaluate integrals.

(20HS0849) APPLIED PHYSICS

**COURSE OUTCOMES**

On successful completion of this course, student will be able to

- Analyze the differences between interference and diffraction with applications.
- Explain concepts of free electron theory and energy bands in solids and assess the EM wave propagation in non-conducting medium by using Maxwell Equations.
- Explain the basic principles and properties of Lasers and Optical Fibers.
- Identify the applications of semiconductors in electronic devices
- Explain the basic properties and applications of superconductors in various fields.
- Illustrate methods for synthesis and characterization of nanomaterials and apply basic principles of nanomaterials in various engineering applications.

(20EE0250) PRINCIPLES OF ELECTRICAL ENGINEERING

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Apply concepts of KVL/KCL in solving DC circuits
- Apply the network theorems to simple circuits
- Analyze single phase AC circuits consisting of series and RL-RC-RLC combination
- Illustrate the principles and operation of DC Generators & Motors
- Understand the principles and operation of Transformers & Induction Motor
- Understand the different types of instruments

## (20CS0501) C PROGRAMMING AND DATA STRUCTURES

### COURSE OUTCOMES

On successful completion of this course, the student will be able to

- Recognize the programming elements of C language
- Select the control structure for solving the problem
- Apply modular approach for solving the problem
- Solve mathematical problems using C Programming language
- Develop the applications using stacks and queues
- Construct the linked lists for various applications and perform sorting techniques

## (20EC0445) BASIC ELECTRONICS ENGINEERING

### COURSE OUTCOMES

On successful completion of this course, the student will be able to

- Demonstrate the characteristics of PN Junction Diode, Rectifiers, Filters, BJT, JFET and MOSFET.
- Analyze numerical and analytical problems in Rectifiers, Filters, and Transistor biasing circuits.
- Design and develop electronic circuits such as Rectifiers with and without filters and Transistor biasing circuits.
- Solve engineering problems and arrive at solutions relating to electronic devices and circuits.
- Identify a suitable semiconductor device and transistor for any given specification.
- Select suitable technique for Device modeling.

## (20HS0851) APPLIED PHYSICS LAB

### COURSE OUTCOMES

On successful completion of this course, student will be able to

- Operate various optical instruments.
- Estimate wavelength of laser and particles size using laser.
- Plot the intensity of the magnetic field of induction along the axis of circular coil carrying current with distance.
- Evaluate the acceptance angle of an optical fiber and numerical aperture.
- Determine energy loss by B-H curve.
- Evaluate rigidity modulus of a given wire.

## (20EE0252) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

### COURSE OUTCOMES

On successful completion of this course, the student will be able to

- Students will understand all the fundamental components about electrical engineering and electronics engineering.
- Make electrical connections by wires of appropriate ratings.
- Understand the usage of common electrical and electronic measuring instruments.
- Understand the basic characteristics of transformers and electrical machines.

## (20CS0502) C PROGRAMMING AND DATA STRUCTURES LAB

### COURSE OUTCOMES:

On Successful completion of this course, the student will be able to

- Read, understand and trace the execution of programs written in C language
- Develop C programs for simple applications making use of basic constructs, arrays and strings
- Develop C programs involving functions, recursion, pointers, and structures
- Select the data structure appropriate for solving the problem
- Illustrate the working of stack and queue
- Implement searching and sorting algorithms

I B.Tech – II Sem (CSE)

## (20HS0835) PROBABILITY & STATISTICS

### COURSE OUTCOMES

On successful completion of this course, the student will be able to:

- A good understanding of the laws of probability axioms and rules.
- Understanding of moments of discrete and continuous random variables as well as be familiar with common named discrete and continuous random variables.
- Calculate and interpret the correlation between two variables.
- Calculate the simple linear regression equation for a set of data.
- Have acquired ability to participate effectively in group discussions.
- Have developed ability in writing in various contexts.
- Have acquired a proper level of competence for employability.

## (20HS0802) APPLIED CHEMISTRY

### COURSE OUTCOMES

At the end of the course student will be able to:

- Apply Nernst equation for calculating electrode and cell potentials
- Illustrate the molecular orbital energy level diagram of different molecular species
- Explain the different types of polymers and their synthesis.
- Synthesize of plastics, elastomers, conducting polymers and their applications in our daily life
- Comprehend the principles and applications of spectroscopies.
- Acquire spotlight to the nano materials and basic engineering materials used in academics, industry and daily life.

## (20HS0810) COMMUNICATIVE ENGLISH

### COURSE OUTCOMES

On successful completion of this course, the student will be able

- To understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information.
- To ask and answer general questions on familiar topics and introduce oneself/others.

- To employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information.
- To recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs.
- To form sentences using proper grammatical structures and correct word forms.
- To use effective sentence structure for their professional activities.

### (20ME0301) ENGINEERING GRAPHICS

#### COURSE OUTCOMES

At the end of the course, the student will be able to

- Interpret the engineering drawing fundamentals to draw the curves like ellipse, cycloid and Involutives.
- Know the projection of points and implement the same in the construction of projection of lines and planes.
- Recognize the basic solids like cylinders, cones, prisms and pyramids and sketch the projections of them.
- Explain the sectional views of Right regular Solids and Apply visualization skills in developing new products.
- Understand the basic principles of isometric and Orthographic Projections
- Construct the isometric and orthographic projections of simple objects.

### (20CS0503) DIGITAL LOGIC DESIGN

#### COURSE OUTCOMES

At the end of this course, the student will be able to

- Compare various Number systems and implement Boolean Algebra operations
- Design and implement Combinational and Sequential logic circuits
- Implement Analog to Digital conversion and Digital to Analog conversion
- Design and develop sequential logic circuits
- Understand the working of logic families and logic gates
- Implement the given logical problem using PLDs

### (20HS0803) APPLIED CHEMISTRY LAB

#### COURSE OUTCOMES(COs)

On successful completion of this course, student will be able to

- Develop and perform analytical chemistry techniques to address the water related problems (for e.g., hardness, alkalinity present in water) technically.
- Prepare advanced polymer materials
- Estimate the Iron in cement
- Handle electro-analytical instruments like digital conductivity meter and potentiometer to perform neutralization, precipitation and redox titrations respectively.
- Think innovatively and improve the creative skills that are essential for solving engineering problems

- At the end of the course the students learn the alkalinity, acidity and viscosity of the any solutions.

#### (20HS0811) COMMUNICATIVE ENGLISH LAB

##### COURSE OUTCOMES(COs)

On successful completion of this course, the student will be able to

- Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
- Apply communication skills through various language learning activities.
- Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
- Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
- Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
- Use effective communicative approaches by preparing job application, report and other kinds of writing correspondences.

#### (20ME0302) WORKSHOP PRACTICE LAB

##### COURSE OUTCOMES(COs)

Upon Completion of the course the students will be able to

- Describe the different types of wood and carpentry joints.
- Produce Tapered Tray and Conical funnel using sheet metal.
- Understands about Fitting and Electrical Wiring.
- Identify various peripherals of a computer.
- Explain the procedure to install MS Windows & Linux.
- Understand about Productivity tools & Networking.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**DEPARTMENT OF CSIT**

I B.Tech. – I Sem.

(20EE0250) PRINCIPLES OF ELECTRICAL ENGINEERING

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. Apply concepts of KVL/KCL in solving DC circuits
2. Apply the network theorems to simple circuits
3. Analyze single phase AC circuits consisting of series and RL-RC-RLC combination
4. Illustrate the principles and operation of DC Generators & Motors
5. Understand the principles and operation of Transformers & Induction Motor
6. Understand the different types of instruments

(20CS0501) C PROGRAMMING AND DATA STRUCTURES

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. Recognize the programming elements of C language
2. Select the control structure for solving the problem
3. Apply modular approach for solving the problem
4. Solve mathematical problems using C Programming language
5. Develop the applications using stacks and queues
6. Construct the linked lists for various applications and perform sorting techniques

(20EC0445) BASIC ELECTRONICS ENGINEERING

COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. Demonstrate the characteristics of PN Junction Diode, Rectifiers, Filters, BJT, JFET and MOSFET.
2. Analyze numerical and analytical problems in Rectifiers, Filters, and Transistor biasing circuits.
3. Design and develop electronic circuits such as Rectifiers with and without filters and Transistor biasing circuits
4. Solve engineering problems and arrive at solutions relating to electronic devices and circuits.

5. Identify a suitable semiconductor device and transistor for any given specification.

#### (20HS0851) APPLIED PHYSICS LAB

##### COURSE OUTCOMES

On successful completion of this course, student will be able to

1. Operate various optical instruments.
2. Estimate wavelength of laser and particles size using laser.
3. Plot the intensity of the magnetic field of induction along the axis of circular coil carrying current with distance.
4. Evaluate the acceptance angle of an optical fiber and numerical aperture.
5. Determine energy loss by B-H curve.
6. Evaluate rigidity modulus of a given wire.

#### (20EE0252) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

##### COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. Students will understand all the fundamental components about electrical engineering and electronics engineering.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the usage of common electrical and electronic measuring instruments.
4. Understand the basic characteristics of transformers and electrical machines.

#### (20CS0502) C PROGRAMMING AND DATA STRUCTURES LAB

##### COURSE OUTCOMES:

On Successful completion of this course, the student will be able to

1. Read, understand and trace the execution of programs written in C language
2. Develop C programs for simple applications making use of basic constructs, arrays and strings
3. Develop C programs involving functions, recursion, pointers, and structures
4. Select the data structure appropriate for solving the problem
5. Illustrate the working of stack and queue
6. Implement searching and sorting algorithms

#### (20HS0835) PROBABILITY & STATISTICS

##### COURSE OUTCOMES

On successful completion of this course, the student will be able to:



1. A good understanding of the laws of probability axioms and rules.
2. Understanding of moments of discrete and continuous random variables as well as be familiar with common named discrete and continuous random variables.
3. Calculate and interpret the correlation between two variables.
4. Calculate the simple linear regression equation for a set of data.
5. Have acquired ability to participate effectively in group discussions.
6. Have developed ability in writing in various contexts.
7. Have acquired a proper level of competence for employability.

I B.Tech – II Sem.

(20HS0802) APPLIED CHEMISTRY

#### COURSE OUTCOMES

At the end of the course student will be able to:

1. Apply Nernst equation for calculating electrode and cell potentials
2. Illustrate the molecular orbital energy level diagram of different molecular species
3. Explain the different types of polymers and their synthesis.
4. Synthesise of plastics ,elastomers, conducting polymers and their applications in our daily life
5. Comprehend the principles and applications of spectroscopies.
6. Acquire spotlight to the nanomaterials and basic engineering materials used in academics, industry and daily life.

(20HS0810) COMMUNICATIVE ENGLISH

#### COURSE OUTCOMES

On successful completion of this course, the student will be able

1. To understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information.
2. To ask and answer general questions on familiar topics and introduce oneself/others.
3. To employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information.
4. To recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs.
5. To form sentences using proper grammatical structures and correct word forms.
6. To use effective sentence structure for their professional activities.

(20ME0301) ENGINEERING GRAPHICS

## COURSE OUTCOMES

At the end of the course, the student will be able to

1. Interpret the engineering drawing fundamentals to draw the curves like ellipse, cycloid and Involutés.
2. Know the projection of points and implement the same in the construction of projection of lines and planes.
3. Recognize the basic solids like cylinders, cones, prisms and pyramids and sketch the projections of them.
4. Explain the sectional views of Right regular Solids and Apply visualization skills in developing new products.
5. Understand the basic principles of isometric and Orthographic Projections 6. Construct the isometric and orthographic projections of simple objects.

## (20CS0503) DIGITAL LOGIC DESIGN

### COURSE OUTCOMES

At the end of this course, the student will be able to

1. Compare various Number systems and implement Boolean Algebra operations
2. Design and implement Combinational and Sequential logic circuits
3. Implement Analog to Digital conversion and Digital to Analog conversion
4. Design and develop sequential logic circuits
5. Understand the working of logic families and logic gates
6. Implement the given logical problem using PLDs

## (20HS0803) APPLIED CHEMISTRY LAB

### COURSE OUTCOMES(COs)

On successful completion of this course, student will be able to

1. Develop and perform analytical chemistry techniques to address the water related problems (for e.g., hardness, alkalinity present in water) technically.
2. Prepare advanced polymer materials
3. Estimate the Iron in cement
4. Handle electro-analytical instruments like digital conductivity meter and potentiometer to perform neutralization, precipitation and redox titrations respectively.
5. Think innovatively and improve the creative skills that are essential for solving engineering problems

6. At the end of the course the students learn the alkalinity, acidity and viscosity of the any solutions.

#### (20HS0811) COMMUNICATIVE ENGLISH LAB

##### COURSE OUTCOMES(COs)

On successful completion of this course, the student will be able to

1. Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
2. Apply communication skills through various language learning activities.
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
5. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
6. Use effective communicative approaches by preparing job application, report and other kinds of writing correspondences.

#### (20ME0302) WORKSHOP PRACTICE LAB

##### COURSE OUTCOMES(COs)

Upon Completion of the course the students will be able to

1. Describe the different types of wood and carpentry joints.
2. Produce Tapered Tray and Conical funnel using sheet metal.
3. Understands about Fitting and Electrical Wiring.
4. Identify various peripherals of a computer.
5. Explain the procedure to install MS Windows & Linux.
6. Understand about Productivity tools & Networking.

#### (20HS0816) INDIAN CONSTITUTION

##### COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. Explain the key concepts of political economy.
2. Analyse the significant developments in the political ideologies.
3. Describe the salient features of the constitution of India interpret, integrate and critically.
4. Analyse the political economy of Indian international relations and gain knowledge in Judiciary system.
5. Apply their knowledge and skills acquired to write various competitive examinations.
6. Analyse the constitutional rights in relating to Practical life.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**DEPARTMENT OF AGRICULTURAL ENGINEERING**

**IB.Tech –ISem.**

(20HS0830)ALGEBRA ANDCALCULUS

(Common to All branches)

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**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Develop the use of matrix algebra techniques that is needed by engineers for practical applications.*
2. *Utilize mean value theorem to solve all life problems.*
3. *Familiarize with functions of several variables which is useful in optimization.*
4. *Learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional coordinate systems.*
5. *Interpret the physical meaning of differential operators such as gradient, curl and divergence.*
6. *Apply Fundamental Theorem of Line Integrals, Green's Theorem, Stokes' Theorem, or Divergence Theorem to evaluate integrals.*

**(20HS0848)ENGINEERING PHYSICS**

(Common to CE & AGE)

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**COURSE OUTCOMES**

On successful completion of this course, student will be able to

1. *Analyze the differences between interference and diffraction with applications.*
2. *Apply the Bragg's Law for crystal structure for the determination by X-rays.*
3. *Explain applications of acoustics and ultrasonics in various engineering fields.*
4. *Explain the importance of various mechanical properties of solids.*
5. *Explain the basic properties and applications of superconductors in various fields.*
6. *Illustrate methods for synthesis and characterization of nanomaterials and apply basic principles of nanomaterials in various engineering applications*

**(20ME0351)BASIC ELECTRICAL & MECHANICAL ENGINEERING**

## **COURSE OUTCOMES**

*On successful completion of this course, the students will be able to*

- 1. State various laws in Electrical Engineering and explain the operation of networks*
- 2. Recognize the importance of different network theorems and explicate its applications in two port networks.*
- 3. Interpret the principle operation of DC motors and derive an EMF equation for the transformers.*
- 4. Classify various casting and metal joining processes in the manufacturing processes.*
- 5. Distinguish the types of machines in the manufacturing and elucidate the machining operations.*
- 6. Categorize the automobile engines and refrigeration & Air-conditioning systems.*

## **(20CS0501) C PROGRAMMING and DATA STRUCTURES**

## **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- 1. Recognize the programming elements of C language*
- 2. Select the control structure for solving the problem*
- 3. Apply modular approach for solving the problem*
- 4. Solve mathematical problems using C Programming language*
- 5. Develop the applications using stacks and queues*
- 6. Construct the linked lists for various applications and perform sorting techniques*

## **(20ME0303) BASIC THERMODYNAMICS**

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## **COURSE OUTCOMES**

*On successful completion of the course, the students will be able to*

- 1. State and explain the open and closed systems as well as develop and apply continuity equation for them.*
- 2. Describe the Basic concepts of thermodynamics such as temperature, pressure, system, Properties, process, state, cycles and equilibrium.*
- 3. Explain the Basic laws of thermodynamics and their applications.*
- 4. Interpret the Concepts of enthalpy, entropy and other thermodynamic properties of ideal gas Process.*
- 5. Analyze Thermodynamic cycles and behavior of pure substances, usage of steam tables and Mollier chart in solving steam related problems.*
- 6. Summarize various types of boilers, their construction, working and their applications*

(20HS0850)ENGINEERINGPHYSICSLAB  
(Common to CE & AGE)

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**COURSE OUTCOMES**

On successful completion of this course, student will be able to

1. Operate various optical instruments.
2. Estimate wavelength of laser and particle size using laser.
3. Plot the intensity of the magnetic field of induction along the axis of circular coil carrying current with distance.
4. Evaluate the acceptance angle of an optical fiber and numerical aperture.
5. Determine energy loss by B-H curve.
6. Evaluate rigidity modulus of a given wire

(20ME0352)BASIC ELECTRICAL & MECHANICAL ENGINEERING LAB  
(Common to CE & AGE)

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**COURSE OUTCOMES**

*Students undergoing this course can*

1. *List few Basics in Electrical Engineering.*
2. *Explain steps in Pattern making, Casting & Moulding.*
3. *Produce a Lap & Butt joint using Arc welding.*
4. *Carry out Drilling & Tapping operation on a given workpiece.*
5. *Describe Cylindrical & Surface grinding operation.*
6. *Understand about Shaping & Slotting Operation*

(20CS0502)C PROGRAMMING and DATA STRUCTURES LAB  
(Common to CE, CSC, CSM, CIC, CSIT & AGE)

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**COURSE OUTCOMES:**

On successful completion of this course, the student will be able to

1. *Read, understand and trace the execution of programs written in C language*
2. *Develop C programs for simple applications making use of basic constructs, arrays and strings*
3. *Develop C programs involving functions, recursion, pointers, and structures*
4. *Select the data structure appropriate for solving the problem*

5. Illustrate the working of stack and queue
6. Implement searching and sorting algorithms

IB.Tech – IISem.

**(20HS0831) DIFFERENTIAL EQUATIONS AND COMPLEX ANALYSIS**  
(Common to CE, EEE, ME, ECE & AGE)

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**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Classify the differential equations with respect to their order and linearity.
2. Solve the differential equations related to various engineering fields.
3. Identify solution methods for partial differential equations that model physical processes.
4. Students will become familiar with 3-dimensional coordinate systems and also learn the utilization of special functions.
5. Understand the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations.
6. Recognize and apply the Cauchy's integral formula and the generalized Cauchy's integral formula (relationship between the derivative and the contour integral of a function).

**(20HS0804) ENGINEERING CHEMISTRY**

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**COURSE OUTCOMES**

At the end of the course student will be able to:

1. Explain the principles of reverse osmosis and electro dialysis.
2. Apply Nernst equation for calculating electrode and cell potentials.
3. Differentiate between thermoplastics and thermosetting plastics.
4. Explain the setting and hardening of cement and concrete phase.
5. Explain the synthesis of colloids with examples.
6. Acquire spotlight to the nanomaterials and basic engineering materials used in academics, industry and daily life.

(20HS0810) COMMUNICATIVE  
ENGLISH (Common to CE, CSE, CSIT, CSM, CIC  
& AGE)

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## COURSE OUTCOMES

On successful completion of this course, the student will be able

1. *To understand social or transactional dialogue spoken by native speakers of English and identify the context, topic, and pieces of specific information.*
2. *To ask and answer general questions on familiar topics and introduce oneself/others.*
3. *To employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information.*
4. *To recognize paragraph structure and be able to match beginnings/endings/headings with paragraphs.*
5. *To form sentences using proper grammatical structures and correct word forms.*
6. *To use effective sentence structure for their professional activities*

(20ME0301) ENGINEERING GRAPHICS  
(Common to all branches)

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## COURSE OUTCOMES

At the end of the course, the student will be able to

1. *Interpret the engineering drawing fundamentals to draw the curves like ellipse, cycloid and involutes.*
2. *Know the projection of points and implement the same in the construction of projection of lines and planes.*
3. *Recognize the basic solids like cylinders, cones, prisms and pyramids and sketch the projections of them.*
4. *Explain the sectional views of Right regular Solids and Apply visualization skills in developing new products.*
5. *Understand the basic principles of isometric and Orthographic Projections*
6. *Construct the isometric and orthographic projections of simple objects*

(20CE0102) ENGINEERING MECHANICS  
(Common to CE, ME & AGE)

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## COURSE OUTCOMES

On successful completion of this course, the student will be able to



1. Explain basic principles of statics, laws of friction and can apply them for various force systems
2. Describe the equilibrium conditions and analyze various types of frames
3. Describe the principals associated with centroid, centre of gravity, moment of inertia and apply these principles evaluate them for various two dimensions geometric sections
4. Explain fundamental principles of deformable bodies and compute various types of stress, strain and elastic constants
5. Analyze thin and thick cylinders subjected to internal and external forces for stress
6. Describe shear force and bending moment for statically determinate beams for various loading conditions and draw shear force and bending moment diagrams

### (20HS0805)ENGINEERING CHEMISTRY LAB

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#### COURSE OUTCOMES

On successful completion of this course, student will be able to

1. Develop and perform analytical chemistry techniques to address the water related problems (fore.g., hardness, alkalinity present in water) technically.
2. Prepare advanced polymer materials
3. Estimate the Iron in cement
4. Handle electro-analytical instruments like digital conductivity meter and potentiometer to perform neutralization, precipitation and redox titrations respectively.
5. Think innovatively and improve the creative skills that are essential for solving engineering problems.
6. At the end of the course the students learn the alkalinity, acidity and viscosity of the any solutions.

(20HS0811) Communicative English Lab  
(Common to CE, CSE, CSIT, CSM, CIC & AGE)

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#### COURSE OUTCOMES

On successful completion of this course, the student will be able to

1. Remember and understand the different aspects of the English language proficiency with the emphasis on LSRW skills.
2. Apply communication skills through various language learning activities.
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professional settings.
5. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

6. Use effective communicative approaches by preparing job application, report and other kinds of writing correspondences.

### **(20ME0302) WORKSHOP PRACTICE LAB**

(Common to all branches)

#### **COURSE OUTCOMES**

*Upon Completion of the course the students will be able to*

1. Describe the different types of wood and carpentry joints.
2. Produce Tapered Tray and Conical funnel using sheet metal.
3. Understand about Fitting and Electrical Wiring.
4. Identify various peripherals of a computer.
5. Explain the procedure to install MS Windows & Linux.
6. Understand about Productivity tools & Networking.

(20HS0816) Indian Constitution

(Common to All Branches)

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#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Explain the key concepts of political economy.
2. Analyse the significant developments in the political ideologies.
3. Describe the salient features of the constitution of India interpret, integrate and critically.
4. Analyse the political economy of India in international relations and gain knowledge in Judiciary system.
5. Apply their knowledge and skills acquired to write various competitive examinations.
6. Analyse the constitutional rights relating to Practical life.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Master of Business Administration**

**I MBA – I Semester**

**(20MB9001) MANAGEMENT & ORGANIZATIONAL BEHAVIOUR**

**Course Outcomes:**

After the completion of course Students will be able to:

- Able to describe the basic principles, levels, skills of management and management theories and apply the concepts in real world.
- Analyze the various managerial functions to be performed and decision making in different contexts.
- Recognize, differentiate and assess for an individual, the concept of perception, values, attitudes and personality.
- Comprehend the various theories of motivation, leadership, and explore group dynamics for the benefit of the organizations.
- Apply leadership skills in different organizational contexts and lead the people.
- Improve and develop strategies for organizational change and development, and resolutions for conflict management.

**(20MB9002) ACCOUNTING FOR MANAGERS**

**Course Outcomes:**

After the completion of course Students will be able to:

- Develop and understand the nature and purpose of financial statements in relationship to decision making.
- Determine the useful life and value of the depreciable assets.
- Recognize the relationship between the financing, investing and dividend decisions of the firm during the given point of time.
- Explain how cost volume profit analysis is to be applied by managers to answer various operating decisions, such as what level sales required to break even, how many units of Products are to be sold in order to earn a target level of profit.
- Gain an insight to a broad range of cost accounting concepts and their terminology.
- Identify, measure, and accumulate direct and indirect costs, how to find out variances of material and labour and introduction to job costing systems, budgeting, cost-volume-profit relationships, and relevant costing.

**(20MB9003) BUSINESS AND CYBER LAWS**

**Course Outcomes:**

After the completion of course Students will be able to:

- Gain an insight into various laws in the country to regulate business aspects
- Identify the legal principles in making contractual agreements.
- Recognize the importance of business law in economic, political and on social context.
- Analyze the legal issues involved in the formation and winding up of a company.
- Explain to compute Income Tax and various forms of Taxes.

- Get good exposure on different Cyber laws and Cyber Crimes.

### **(20MB9004) BUSINESS STATISTICS FOR MANAGERS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Implement managerial applications of statistical methods in business problems
- Measure a central value of an observation and variation of an observation with its central value
- Gain better numerical understanding and its key applications to make valid findings and conclusions of data that has collected through different sources.
- Relate all possible kinds of relationships of dependent variables with independent variables
- Formulate hypothesis and test the same with tools of hypothesis testing to draw a proper conclusions about population.
- Comprehend various statistical tools and apply them in business research to make better decisions.

### **(20MB9005) MANAGERIAL ECONOMICS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Assess the importance of micro economics in business management
- Assess the roles of managers as economists in firms
- Analyze the internal and external decisions to be made by managers
- Analyze the demand and supply conditions and assess the position of a company
- Design competitive strategies, including costing, pricing, product differentiation, according to the natures of products and the structures of the markets.
- Analyze real-world business problems with a systematic theoretical framework.

### **(20MB9006) MANAGEMENT INFORMATION SYSTEMS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the importance of information system in decision making.
- Determine information system requirements for all management levels by describing the differences between various types of information systems.
- Apply probability theory in decision making situations.
- Apply an ERP system to manage a company.
- Implement and evaluate all aspects management information systems..
- Critically and comparatively evaluate technical descriptions of computer hardware and software

### **(20MB9007) BUSINESS COMMUNICATION**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Apply business communication strategies and principles to prepare effective communication for domestic and international business situations.
- Utilize the skill of writing business letters, memos, general warning, and caution and danger letters in an organization.
- Analyze the verbal and nonverbal communications and lead the people effectively.

- Deliver an effective oral business presentation. Communicate via electronic mail, Internet, and other technologies.
- Select appropriate organizational formats and channels used in developing and presenting business messages.
- Select appropriate organizational formats to prepare resume, selecting a career goal and to market their self.

### **(20HS0858) COMMUNICATIVE ENGLISH LAB FOR MANAGERS**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
- Apply communication skills through various language learning activities.
- Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
- Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
- Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
- Use effective communicative approaches by preparing job application, report and other kinds of writing correspondences.

#### **I MBA – II Semester**

### **(20MB9008) HUMAN RESOURCE MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding of the concept of human resource management and its relevance in organizations.
- Explain the current theory and practice of recruitment and selection. This includes but is not limited to the supply of human resource and the advantages and disadvantages of external and internal recruiting.
- Assess the relevant recruitment and selection, and performance appraisal methods to be used in different contexts.
- Develop, implement, and evaluate compensation, employee orientation, training, and development programs.
- Demonstrate the significance of contemporary issues such as diversity management, talent management and so on to both employers and employees
- Analyze core issues, Policies and surrounding employee relation and legal issues

### **(20MB9009) FINANCIAL MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate the applicability of the concept of Financial Management; understand its objectives and role of a Financial Manager.
- Analyze and evaluate the investment decisions.

- Manage the working capital requirements of a firm
- Apply the Leverage and EBIT EPS Analysis associated with financial data of the firm
- Demonstrate an understanding of the Cost of capital.
- Analyze the short term solvency (working capital) position of a Firm.

### **(20MB9010) MARKETING MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate strong conceptual knowledge in the functional area of marketing management.
- Develop an understanding of various facets of Marketing management
- Demonstrate the ability to take decisions and plan, develop, execute and control marketing strategies
- Ensure various marketing programs for the attainment of organizational marketing goals.
- Demonstrate analytical skills in identification and resolution of problems pertaining to marketing management.
- Apply various marketing activities in an organization to keep in line with the social marketing and marketing audit.

### **(20MB9011) BUSINESS RESEARCH METHODS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop understanding on various kinds of business research concepts.
- Gain knowledge on Research process and hypothesis development with different research design.
- Demonstrate adequate knowledge on sampling procedure and data collection methods.
- Apply knowledge of measurement & scaling techniques as well as the quantitative data analysis for research problems.
- Assess the importance of Research Report writing in systematic way.
- Apply the knowledge of research methods in business decisions.

### **(20MB9012) OPERATIONS MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Identify the elements of operations management and various transformation processes to enhance productivity and competitiveness.
- Analyze and evaluate various facility alternatives and their capacity decisions.
- Develop a balanced line of production & scheduling and sequencing techniques in operation environments
- Develop aggregate capacity plans and MPS in operation environments.
- Plan and implement suitable materials handling principles and practices in the operations.
- Plan and implement suitable quality control measures in Quality Circles to TQM.

### **(20MB9013) OPERATIONS RESEARCH**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Recognize the characteristics of different types of decision-making environments

- Apply appropriate decision making approaches and tools to be used in different environments.
- Build and solve Transportation Models and Assignment Models.
- Design new simple models, like: CPM, MSPT to improve decision –making
- Develop critical thinking and objective analysis of decision problems.
- Implement practical cases, by using TORA, WinQSB

### **(20MB9014)ADVANCED STUDIES ON INDIAN ECONOMY & POLICY**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Analyze the characteristics of Indian economy and sectorial contribution towards economy in the historic period and also in the current scenario.
- Familiarize with the various components of business environment and able to assess the dynamics of the environment.
- Recognize the industrial policies that have made significant contribution to the growth of the Indian economy
- Appreciate and assess the impact government policies towards the business.
- Analyze the policies towards international trade, role of export-import bank, and the components balance of payments that cause disequilibrium.
- Gain an understanding of the framework of WTO and its role along with other international organizations that influence global trade.

### **(20MC9146) COMPUTER AND INFORMATION SYSTEMSLAB**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate ability to create documents and Excel sheets for information storage
- Develop the documentation of using MS-Word.
- Sort the data and apply the mathematical calculation using MS-Excel.
- Develop the business presentation using MS-PowerPoint
- Gain an understanding of techniques of Google search engine.
- Create web pages for simple Business Application.

### **(19HS0815) HUMAN VALUES AND PROFESSIONAL ETHICS FOR MANAGER (AUDIT COURSE)**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the moral issues in a society to live in harmony in the society
- Maintain professional, personal ethics and avoid discriminatory practices.
- Handle ethical dilemmas in various functional disciplines and live in balance with environment
- Realize the significance of mutual trust and abiding by the code of conduct in the organizations and as well in the society.
- Gain an insight into ethics, responsibilities, code of conduct in organizations.

- Develop appropriate technologies and management patterns to create harmony in professional as well as personal life

## **II MBA – I Semester**

### **(20MB9015) BUSINESS ETHICS AND CORPORATE GOVERNANCE**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Apply various ethical principles in business and corporate social responsibility practices
- Recognize how personal ethics can influence behavior and apply in decision making
- Explain the ethical challenges facing the various functional departments
- Identify the organizational and cultural variables that impact ethical judgment
- Analyze various ethical codes in corporate governance
- Identify organizational policies and systems that employ ethical conduct

### **(20MB9016) ENTREPRENEURSHIP DEVELOPMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Discern distinct entrepreneurial traits and identify the successful elements of successful entrepreneurial ventures
- Consider the legal and financial conditions for starting a venture and to assess the opportunities and constraints for new ventures
- Design strategies for the successful implementation of ideas
- Comprehend the evaluation of business opportunity from the prospective of an investor
- Identify the most suitable sources of finance for start-ups
- Write and execute their own business plan

### **(20MB9017) SPIRITUAL MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the values and the importance of value education in a society.
- Gain an understanding towards spirituality, and discern to the challenges of value adoption.
- Appreciate the major religions and the sources of values and understand the divine concept.
- Handle the principles of integrity, character development and live in balance with environment
- Realize the significance of meditation and emotional maturity for the code of conduct in the organizations and as well in the society
- Develop environmental awareness and maintain and assess personal progress to create harmony in professional as well as personal life

### **(20MB9018) BASICS OF BUSINESS PROCESS OUTSOURCING**

#### **Course Outcomes:**

After the completion of course Students will be able to:



1. Develop an understanding about the basics of business process outsourcing and the challenges of Off shoring.
2. Analyze the opportunities, issues and problems, components that control the business process outsourcing industry.
3. Demonstrate the ability to handle the aspects of health care BPOs and financial services BPOs.
4. Realize the significance of outsourcing and assessing the new trends in the BPO organizations
5. Develop appropriate technologies and management patterns to create careers in BPOs.
6. Realize the new opportunities in various other sectors that can offer BPOs.

### **(20MB9019) AGRI-BUSINESS MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Understand the fundamentals of management with reference to agribusiness
- Acquaint with agricultural contribution towards Indian economy
- Realize the significance of environment affecting agribusiness and recognize the various sources of finance towards agri business
- Apply the managerial functions and its applications with reference to agribusiness
- Learn the concepts and process of Agricultural Marketing and Cooperation
- Get knowledge about the recent developments in Agribusiness Management

### **(20MB9020) EXPORT AND IMPORT MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the theories of international trade, balance of trade and adjustment mechanisms.
- Get an insight into various instruments that control the international trade and avoid discriminatory practices
- Realize the significance of export marketing, contracts and the role of promotion councils
- Handle the payment methods, risks and various financing strategies in export and import process
- Recognize the different agencies involved in EXIM process and their role in the international trade
- Observe and explore the international environmental factors, international institutions that control the trade.

### **(20MB9021) INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about investment management and trading securities
- Examine and value the major investment vehicles and strategies to allocate funds
- Make decisions of allocation and selection of assets based on trade-off between risk and return, risk mitigating tools and investment avenues.

- Define the objectives in constructing and managing a portfolio and learn to create an investment policy statement.
- Develop knowledge of modern portfolio theory and effect of diversification on investment portfolios
- Gain knowledge to measure and evaluate portfolio performance and to manage the risk.

### **(20MB9022) SALES AND DISTRIBUTION MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an understanding about the roles and responsibilities of the Sales Managers
- Manage and enhance the sales force productivity and performance.
- Get an insight towards distribution channels, their organization structures and to make value addition to channels.
- Plan and implement an effective sales strategy for their organizations.
- Design and implement distribution channel strategy.
- Manage the Channels efficiency and effectiveness across countries

### **(20MB9023) PERFORMANCE MANAGEMENT SYSTEMS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an insight towards performance management and performance appraisal.
- Compare and contrast various organizational performance management programs and best practices and define attributes of effective performance management systems.
- Assess how increased employee involvement can contribute to effective performance and coach employees to identify career paths and resources available to support individual development.
- Practically experience a number of tools which are critical to the new performance management systems.
- Realize the value of and drawbacks of modern performance management systems such as 360, MBO conducted in the organizations.
- Develop an understanding towards the issues involved in effective performance management

### **(20MB9024) ENTERPRISE RESOURCE PLANNING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Make basic use of Enterprise software, and its role in integrating business functions
- Analyze the strategic options for ERP identification and adoption.
- Develop and design the modules used in ERP systems
- Create reengineered business processes for successful ERP implementation.
- Customize the existing modules of ERP systems.
- Examine the places where formal development approaches of ERP systems can be fruitful and where they may not be so helpful.

## **(20MB9025) RISK MANAGEMENT AND INSURANCE**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the Principles, essential features and objectives of risk management.
- Gain knowledge of the range of financial and financial related risks facing organizations.
- Examine the role of public policy including social insurance in personal financial planning and risk management.
- Determine approach to risk management through risk identification, risk measurement and risk management (or mitigation)
- Identify, understand operational risk and how to manage it.
- Assess significance of insurance policies and calculation of insurance premiums for living and non – living objects.

## **(20MB9026) ADVERTISING AND SALES PROMOTION MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about various types of advertising and its forms.
- Realize the significance of advertising agency and the client agency relationship through selection of media
- Handle advertising budget and measure the effectiveness of advertising.
- Comprehend the values and ethics in advertising and apply in practice
- Identify various suitable sales promotion tools and techniques for various groups
- Organize and measure the effectiveness of sales promotion campaigns.

## **(20MB9027) KNOWLEDGE MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the key theories and models that inform knowledge management
- Critically apply theory to organisations in order to identify and justify effective knowledge management strategies and activities
- Access and evaluate essentials relating to knowledge management
- Communicate clearly and implement effectively varying formats and technologies
- Design problem solutions based upon research findings and critical assessment of current theory and practice
- Develop an insight towards the future of knowledge management from industry perspective

## **(20MB9028) DATA WAREHOUSING AND MINING**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an understanding towards Data Warehouse fundamentals, Data Mining Principles

- Design data warehouse with dimensional modeling and apply OLAP operations.
- Identify appropriate data mining algorithms to solve real world problems
- Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining
- Describe complex data types with respect to spatial and web mining.
- Apply and select suitable methods for data analysis.

### **(20MB9029) FINANCIAL MARKETS AND SERVICES**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate an awareness of the current structure and regulation of the Indian financial services sector.
- Apply concepts relevant to financial markets and financial institutions, such as the flow of funds, levels of interest rates and interest rate differentials
- Identify the functions of financial markets and institutions and examine their impact on the level of interest rates and interest differentials.
- Describe the instruments, participants and operation of the money market and role of intermediaries in the primary market
- Explore the integration of international financial markets and analyze the implications for financial managers.
- Evaluate and create strategies to promote financial products and services

### **(20MB9030) CONSUMER BEHAVIOUR**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate how knowledge of consumer behaviour can be applied to marketing.
- Identify and explain factors which influence consumer behaviour.
- Relate internal dynamics such as personality, perception, learning motivation and attitude to the choices consumers make.
- Realize the principal factors that influence consumers as individuals and decision makers with an application to the buying decision process.
- Develop marketing strategies that are consumer based and create and enhance customer
- Discern the concept of Consumerism and legislative responses to consumerism, and marketer responses to consumer issues

### **(20MB9031) TRAINING AND DEVELOPMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the role of training and development in human resources management.
- Describe the psychology of the learning process on which training is based.
- Analyze the training needs of an organization.
- Assess, design, access and implement various methods, techniques and sources of training.

- Evaluate the value of the training once completed from the individual employee and the organization's viewpoint.
- Develop an appropriate training strategy for today's organization

### **(20MB9032) SUPPLY CHAIN MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Appreciate the evolution and identify the role of supply chain management in the economy
- Identify and evaluate the drivers of supply chain management
- Analyze the importance of make or buy decisions and identify appropriate suppliers
- Appraise the importance of supply chain networks
- Assess the risk associated with supply chain practices and take better decisions
- Familiarize with and apply various computer based supply chain optimization tools

### **(20MB9033) COST AND MANAGEMENT ACCOUNTING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the role of cost accounting in the business management of manufacturing and non- manufacturing companies.
- Apply accounting methods of cost calculation and interpret cost accounting statements.
- Analyze and evaluate information for cost ascertainment, planning, control and decision making
- To know the various stock valuation methods adopted by various business organisations.
- Gain an understanding between the relationship between cost accounting, financial accounting and management accounting role in decision making.
- Prepare a budget and use budgets for performance evaluation after flexing the budget.

### **(20MB9034) PRODUCT AND BRAND MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an insight into the fundamental concepts of product and brand development
- Use the brand positioning framework to develop a brand, keep it relevant, expand a brand internationally, and reposition a brand
- Use tools and metrics to measure branding and interpret brand performance
- Recognize the importance of using branding strategies in an organization.
- Develop an understanding about the differences in branding to various sectors
- Assess and apply branding strategies to various products across different sectors.

## **(20MB9035) HUMAN RESOURCE PLANNING**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about how to plan for human resources and implement techniques of man power forecasting and inventorying
- Analyze the role of recruitment and selection in relation to the organization's business
- Competency to recruit, select and appraise the performance of the employees
- Handle employee issues such as employee separation and evaluate new trends in managing the staff in organizations
- Appraise succession plans and critical staffing objectives and evaluate the complexities of downsizing issues and the role of HR planning in the process of downsizing
- Develop appropriate technologies and management patterns to improve business

## **(20MB9036) E – BUSINESS**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the E- Markets and E- business infrastructure and trends
- Identify various procurement methods, their benefits and risks and assess different options for integration of organizations' information systems with e-procurement suppliers.
- Analyze different types of portal technologies and deployment methodologies commonly used in the industry for security and reliability of E- business.
- Analyze the effectiveness of network computing and cloud computing policies in a multi-location organization.
- Analyze real business cases regarding their e-business strategies and transformation processes and choices.
- Integrate theoretical frameworks with business strategies.

## **(20MB9037) INDUSTRY ANALYSIS AND REPORT PRESENTATION**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an understanding of the dynamics of a specific industry.
- Compare various issues particular to an industry.
- Develop cross-functional perspective of the functioning of a business enterprise and an industry.
- Develop awareness about the future prospective problems based on secondary source of data.
- Learn and examine the trends of growth or decline in industry.
- Analyze the issues of an industry and an enterprise with respect to set basic parameters

## **(20MB9038) BUSINESS SIMULATION LAB**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the EXCEL lessons
- Get familiarize with basic to intermediate skills for using Excel in the classroom vis-à-vis Business Applications
- Hands on experience on MS Excel Utilities

- Create solutions for Data Management and Reporting
- Gain an understanding about the SPSS and experts in handling data files and carry out basic statistical analysis
- Test basic hypothesis using t tests, Chi Square tests and ANOVA.

## **IIMBA – II Semester**

### **(20MB9039) STRATEGIC MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Describe major theoretical concepts, background work and research output in the field of strategic management.
- Develop an understanding of the strategic management process and the functional strategies
- Conduct analysis using various tools and frameworks to make strategic decisions
- Explain the basic concepts, principles and practices associated with strategy formulation and implementation
- Analyze various strategies and explore appropriate strategic implementation at business and corporate levels
- Analyze and evaluate critically real life company situations and develop creative solutions, using a strategic management perspective

### **(20MB9040) GREEN BUSINESS MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate an understanding of comprehensive systemic analysis across both physical and behavioural dimensions involving society, the environment, and the economy.
- Analyze the role of environmental sustainability in the promotion of comprehensive justice and equity.
- Gain an insight towards the basic sustainability concepts of evolutionary processes, inter-generational debt, socio-political adaptation, climate change, ecosystem services, and environmental justice
- Articulate a comprehensive world view that integrates diverse approaches to sustainability.
- Realize the significance of environmental reporting and green product management
- Identify how globalized processes impact socio ecological systems. Develop appropriate technologies and management patterns to create harmony with the environment

### **(20MB9041) WORLD TRADE ORGANIZATION & INTELLECTUAL PROPERTY RIGHTS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP
- Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development
- Identify activities and constitute IP infringements and the remedies available to the IP owner

- Describe the precautions steps to be taken to prevent infringement of proprietary rights in products and technology development.
- Be familiar with the processes of Intellectual Property Management (IPM) and various approaches for IPM and conducting IP and IPM auditing and explain how IP can be managed as a strategic resource and suggest IPM strategy.
- Be able to anticipate and subject to critical analysis arguments relating to the development and reform of intellectual property right institutions and their likely impact on creativity and innovation.

### **(20MB9042) CROSS CULTURAL MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Appreciate the critical role of culture in international business and the importance of managing cultural differences
- Analyze the interacting spheres of culture including organizational culture, professional culture, national culture, and industry culture.
- Discern the influence of culture on different functions of management including communication, negotiation, marketing, leadership, motivation, human resource management and teams.
- Display an understanding of cultural difference in interactions with different nationalities and an awareness of and sensitivity to cross-cultural issues.
- Understand and explain issues of cultural awareness when conducting international business
- Build mind-set and skill-set of a competent leader who appreciates and leverages diversity in talents and organizations s/he works with

### **(20MB9043) INNOVATIVE TECHNOLOGY MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Account for the importance of technological development and innovation for economic growth and increased competitiveness on a firm level
- Critically discuss a firm's need to have a strategic and integrated approach to be able to successfully manage innovation and technical development,
- Analyse complex innovation processes in firms both internally and externally.
- Explore and better manage the effects of new technology on people and work systems
- Demonstrate that the effective management of technological innovation requires the integration of people, processes and technology
- Recognize opportunities for the commercialization of innovation

### **(20MB9044) ORGANIZATIONAL CULTURE & TEAMWORK**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the concepts in the field of management and develop skills to apply the concepts for business problems
- Describe strategies used by managers to create and maintain a consistent organizational culture



- Recognize the role of management in communicating and teaching organizational culture to employees and subordinates across borders
- Understanding and manipulating organisational/corporate culture to engender greater organisational flexibility and productivity
- Demonstrate an understanding of how to uphold international negotiations
- Demonstrate self-awareness, sensitivity, and openness to diverse people and cultures

### **(20MB9045) FINANCIAL DERIVATIVES**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the various financial derivative securities (Futures, Forwards and Options).
- Describe standard derivative contracts, their properties and functionality.
- Analyze the role and relationship between forward and futures prices.
- Apply scientific methods for valuation of options and other derivatives, in continuous and discrete time.
- Interpret and apply risk measures that are commonly used in risk management.
- Describe how swaps can reduce market risks and use a simulation to assess a risk hedging strategy based on interest rate swaps

### **(20MB9046) SERVICES MARKETING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding understand the characteristics of services, understand consumer behavior in services, align service design and standards, delivering service, managing services promises
- To segment markets for services and create value in the market for new services
- Implement pricing and promotion strategies for services
- Focus on the role of marketing communication and set communication strategies for service marketing
- Plan and execute the delivery of services based on the requirement.
- Develop appropriate strategies for marketing of the services

### **(20MB9047) ORGANIZATIONAL CHANGE AND DEVELOPMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding and appreciation of the various concepts of organizational development
- Learn how to apply some of the key concepts and tools organizational development and change leadership and management.
- Discuss and analyze diagnostic tools used to assess organizational effectiveness.

- Identify major types of organizational development interventions.
- Demonstrate how to evaluate organizational development interventions
- Apply human resource intervention techniques in different management scenarios.

### **(20MB9048) DATA COMMUNICATION AND NETWORK ANALYSIS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the concept of Data communication and networks, layered architecture and their applications
- Evaluate data communication link considering elementary concepts of data link layer protocols for error detection and correction.
- Analyse and Set up protocol designing issues for Communication networks.
- Apply various network layer techniques for designing subnets and supernets and analyse packet flow on basis of routing protocols.
- Estimate the congestion control mechanism to improve quality of service of networking application
- Understand and design application layer protocols and internet applications such as network security

### **(20MB9049) INTERNATIONAL FINANCIAL MANAGEMENT COURSE OUTCOMES**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Analyse, apply and evaluate information within the global financial environment of foreign exchange to solve problems and make informed decisions.
- Review the problems of dealing in foreign currency and the advantages and disadvantages of overseas funding
- Demonstrate the use of foreign exchange derivatives and other methods to manage foreign exchange exposure and risk
- Describe the issues pertaining to cross-border investment decisions and financing MNCs
- Analyse the complexities associated with management of cost of funds in the capital Structure in MNCs
- Analyse, evaluate and synthesize both quantitative and qualitative financial information to influence problem solving and decision making

### **(20MB9050) INTERNATIONAL MARKETING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the major issues related to international marketing
- To assess an organization's ability to enter and analyse various strategies to enter and compete in international markets
- Identify and analyse opportunities within international marketing environments

- Handle new product development and branding in international markets
- Realize the factors that affect the distribution channels and structures in international markets and take appropriate decisions
- Develop an understanding towards the procedures and documentation in the export and import process in the country and apply in practice

### **(20MB9051) INTERNATIONAL HUMAN RESOURCE MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about importance of Human resource at international level and also identify the differences between domestic and international human resource management
- To understand and assess the various cultural and human variables that influence in the workplace.
- Understand the nature, sources and different methods for recruiting people at international level and apply them along with compensation of human resources based on their skills.
- Perform the functional roles of HRM in International context especially in recruitment and selection, performance management, training, learning and development and repatriation.
- Apply different appraisal methods and trainings that are available for International staffing.
- Assess about the industrial relations in other nations and also to manage people in different locations.

### **(20MB9052) CORPORATE INFORMATION MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Define an information system from both a technical and business perspective and distinguish between computer literacy and information systems literacy
- Identify the major management challenges to building and using information systems in organizations
- Identify managerial risks related to information system organization processing and utilizing
- Explain how enterprise systems and industrial networks create new efficiencies for businesses
- Apply outsourcing of business activities and manage the risk and relationship with outsourcing agencies
- Highlight the role of projects in modern day business organizations and sensitize the complexities of project management.

### **(20MB9053) SEMINAR ON CONTEMPORARY ISSUES OF MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the issues in the business enterprises across various industrial sectors
- Practice and maintain communication, logical and analytical skills learnt in the MBA program
- Construct new ability to practice new problem solving skills and use these skills in personal life.

- Demonstrate necessary skills to handle day-to-day managerial responsibilities, such as making speeches, giving effective presentations and maintaining one's poise in private and public
- Develop proactive thinking to perform effectively in the dynamic socio economic business systems
- Learn the etiquette essentials to perform in various communication roles as business managers

### **(20MB9054) PROJECT WORK & VIVA VOCE**

#### **Course Outcomes:**

- Plan, and engage in, an independent and sustained critical investigation and evaluation of a chosen research topic relevant to environment and society
- Systematically identify relevant theory and concepts, relate these to appropriate methodologies and evidence, apply appropriate techniques and draw appropriate conclusions
- Engage in systematic discovery and critical review of appropriate and relevant information sources
- Appropriately apply qualitative and/or quantitative evaluation processes to original data
- Understand and apply ethical standards of conduct in the collection and evaluation of data and other resources
- Communicate research concepts and contexts clearly and effectively both in writing and orally

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Master of Computer Applications**

**I MCA – I Semester**

**(20HS0836)DISCRETE MATHEMATICS**

**COURSE OUTCOMES:**

On successful completion of this course, the student will be able to

1. Write an argument using logical notation and determine if the argument is or is not valid.
2. Demonstrate the ability to write and evaluate a proof for outline the basic structure of and give examples of each proof technique described.
3. Understand the basic principles of sets and operations in sets.
4. Demonstrate an understanding of relations and functions and be able to determine their properties.
5. Determine when a function is 1-1 and "onto".
6. Demonstrate different traversal methods for trees and graphs.
7. Model problems in Computer Science using graphs and trees.

**(20MC9101)COMPUTER ORGANIZATION**

**COURSE OUTCOMES:**

1. Able to design digital circuits by simplifying the Boolean functions
2. Able to understand the organization and working principle of computer hardware components
3. Able to understand mapping between virtual and physical memory
4. Acquire knowledge about multiprocessor organization and parallel processing
5. Able to understand the importance of the hardware-software interface.
6. Able to trace the execution sequence of an instruction through the processor.

**(20MC9102)DATA STRUCTURES**

**COURSE OUTCOMES:**

1. Learn how to use data structure concepts for realistic problems.
2. Ability to identify appropriate data structure for solving computing problems in C language.
3. Ability to solve problems independently and think critically.
4. Able to search and sort the elements in graphs and trees.
5. Ability to solve linked list problems.
6. Ability to solve queues and hash tables.

**(20MC9103)OPERATING SYSTEMS**

**COURSE OUTCOMES:**

1. Able to understand the operating system components and its services
2. Implement the algorithms in process management and solving the issues of IPC
3. Able to demonstrate the mapping between the physical memory and virtual memory

4. Able to understand file handling concepts in OS perspective
5. Able to understand the protection of system.
6. Able to understand the operating system components and services with the recent OS

#### **(20MC9104)OBJECTORIENTEDPROGRAMMINGTHROUGHHC++**

##### **COURSE OUTCOMES:**

1. Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
2. Understand fundamentals of object-oriented programming in C++, including defining classes, invoking methods, using class libraries, etc.
3. Debugging and running the program
4. Have the ability to write a computer program to solve specified problems.
5. Able to do the I/O Operations
6. Able to do the C++ Inheritance & Exception Handling concepts.

#### **(20MC9105)DATASTRUCTURESUSINGC LAB**

##### **COURSE OUTCOMES:**

1. Learn how to use data structure concepts for realistic problems.
2. Ability to identify appropriate data structure for solving computing problems in C language.
3. Ability to solve problems independently and think critically.
4. Able to search and sort the elements in graphs and trees.
5. Ability to solve linked list problems.
6. Ability to solve queues and hash tables.

#### **(20MC9106)OBJECTORIENTEDPROGRAMMINGTHROUGHHC++LAB**

##### **COURSE OUTCOMES:**

1. Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
2. Understand fundamentals of object-oriented programming in C++, including defining classes, invoking methods, using class libraries, etc.
3. Debugging and running the program
4. Have the ability to write a computer program to solve specified problems.
5. Able to do the I/O Operations
6. Able to do the C++ Inheritance & Exception Handling concepts

#### **(20MC9107)P.C.SOFTWARE LAB**

##### **COURSE OUTCOMES:**

1. Able to disassemble and assemble the PC back to working condition.
2. Able to know installation of softwares.
3. Able to understand mapping between virtual and physical memory.
4. Able to know Software troubleshooting and Hardware Troubleshooting.
5. Able to work onMSOffice tools.

### **(20MC9108)COMPUTERNETWORKS**

#### **COURSE OUTCOMES:**

1. Able to trace the flow of information from one node to another node in the network
2. Able to Identify the components required to build different types of networks
3. Able to understand the functionalities needed for data communication into layers
4. Able to choose the required functionality at each layer for given application
5. Able to understand the working principles of various application protocols
6. Acquire knowledge about security issues and services available

### **(20MC9109)JAVAPROGRAMMING**

#### **COURSE OUTCOMES:**

1. Students who have completed this course able to:
2. Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
3. Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
4. Have the ability to write a computer program to solve specified problems.
5. Able to do the java collection framework programs
6. Able to develop Applet programs.
7. Work with GUI, Event handling mechanism.

### **(20MC9110)COMPUTERGRAPHICS**

#### **COURSE OUTCOMES:**

1. Gain proficiency in 3D computer graphics API programming
2. Able to draw line, circle and ellipse using algorithms
3. Enhance the perspective of modern computer system with modeling, analysis and interpretation of 2D and 3D visual information.
4. Able to transform the 2D and 3D objects
5. Able to apply methods for detecting visual surface.
6. Able to design Animation for the objects.

### **(20MC9111)DATABASE MANAGEMENTSYSTEM**

#### **COURSE OUTCOMES:**

1. Understand the basic concepts of the database and data models.
2. Design a database using ER diagrams and map ER into Relations and normalize the relations.
3. Acquire the knowledge of query evaluation to monitor the performance of the DBMS.
4. Ability to execute various SQL Commands.
5. Develop a simple database applications using normalization.
6. Acquire the knowledge about different special purpose databases and to critiquehowtheydiffer from traditional databasesystems.

## **(20MC9112)SOFTWAREENGINEERING**

### **COURSE OUTCOMES:**

1. Get an insight into the processes of software development
2. Able to understand the problem domain for developing SRS and various models of software engineering
3. Able to Model software projects into high level design using DFD diagrams
4. Able to Measure the product and process performance using various metrics
5. Able to Evaluate the system with various testing techniques and strategies
6. Able to apply metrics to evaluate the software

## **(20MC9113)JAVAPROGRAMMINGLAB**

### **COURSE OUTCOMES:**

1. After completion of this course, the students would be able to
2. Understand programming language concepts, particularly Java and object-oriented concepts, data types.
3. Effectively create and use objects from predefined class libraries
4. Apply decision and iteration control structures to implement algorithms
5. Implement interfaces, inheritance, and polymorphism as programming techniques.
6. Able to write recursive algorithms.
7. Implement Java collection frame work as programming techniques.

## **(20MC9114)COMPUTERGRAPHICS LAB**

### **COURSE OUTCOMES:**

1. Gain proficiency in 3D computer graphics API programming
2. Able to draw line, circle and ellipse using algorithms
3. Enhance the perspective of modern computer system with modeling, analysis and interpretation of 2D and 3D visual information.
4. Able to transform the 2D and 3D objects
5. Able to apply methods for detecting visual surface.
6. Able to design Animation for the objects.

## **(20MC9115)DATABASE MANAGEMENTSYSTEMLAB**

### **.COURSE OUTCOMES:**

1. Able to master the basic concepts and understand the applications of database systems.
2. Able to construct an Entity-Relationship (E-R) model andRelational Algebra.
3. Understand and apply database normalization principles.
4. Able to construct SQL queries to perform CRUD operations on database. (Create, Retrieve, Update, Delete).
5. Understand the usage of triggers.
6. Ableto executethepl/sql programs.



## **(20HS0863) PROFESSIONAL COMMUNICATION SKILLS**

### **COURSE OUTCOMES:**

On successful completion of this course, the student will be able to

1. Flair in Writing and felicity in written expression
2. Enhancing job required skills for getting success in their professions
3. Improving Effective Speaking Abilities for their business or professional correspondence
4. prepare effective Interview techniques to get job in the present scenario
5. Using the appropriate skills in all kinds of professional activities
6. Use effective communicative approaches by preparing job application, report and other kinds of spoken and written correspondences.

## **(20MC9116)WEB TECHNOLOGIES**

### **COURSE OUTCOMES:**

Student is able to:

1. Design and work with HTML5 and CSS applications.
2. Usage of javascript functions and objects.
3. Do the server side programming, maintain sessions.
4. Establish the DB connections and access the data.
5. Ability to work on Java Server Page
6. DesignpagesusingPHP andAJAX.

## **(20MC9117)MOBILEAPPLICATIONDEVELOPMENT**

### **COURSE OUTCOMES:**

1. Students understood the aspects of mobile programming that make it unique from programming for other platforms.
2. Students can design and develop sophisticated mobile interfaces.
3. Students program mobile applications for the Android operating system by use basic features.
4. Able to work on advanced phone features.
5. Students understood sending and receiving messages.
6. Abilityto deploy applications to theAndroid marketplacefordistribution.

## **(20MC9118)DATA WAREHOUSINGAND DATAMINING**

### **COURSE OUTCOMES:**

Upon Completion of the course, the students will be able to

1. Preprocess the data for mining applications
2. Apply the association rules for mining the data
3. Cluster the high dimensional data for better organization of the data
4. Able to apply the data mining for text and multimedia.
5. Evolve Multidimensional Intelligent model from typical system
6. Evaluatevariousminingtechniques oncomplexdataobjects

**(20MC9119)SOFTWARETESTING  
(PROGRAMMEELECTIVE– I)**

**COURSE OUTCOMES:**

1. Test the software by applying testing techniques to deliver a product free from bugs
2. Evaluate the web applications using bug tracking tools.
3. Investigate the scenario and the able to select the proper testing technique
4. Explore the test automation concepts and tools
5. Deliver quality product to the clients by way of applying standards such as TQM, Six Sigma
6. Evaluate the estimation of cost, schedule based on standard metrics

**(20MC9120)ARTIFICIALINTELLIGENCE  
(PROGRAMMEELECTIVE– I)**

**COURSE OUTCOMES:**

At the end of this course:

1. Student should have a knowledge and understanding of the basic concepts of AI including Search.
2. Student can able to solve optimization problems.
3. Student can solve the Game Playing problems.
4. Student can able to use to planning and learning techniques
5. Student should be able to use this knowledge and understanding of appropriate principles and guidelines to synthesise solutions to tasks in AI and to critically evaluate alternatives.
6. Studentcanhaveabilityto usethe expertsystem

**(20MC9121)DISTRIBUTEDSYSTEMS  
(PROGRAMMEELECTIVE–I)**

**COURSE OUTCOMES:**

After completion of this course, the student is:

1. Able to explain what a distributed system is, why you would design a system as a distributed system, and what the desired properties of such systems are;
2. Able to solve inter process communication problems.
3. Able to list the principles underlying the functioning of distributed systems, describe the problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of their solutions;
4. Able to recognize how the principles are applied in contemporary distributed systems, explain how they affect the software design, and be able to identify features and design decisions that may cause problems;
5. Able to design a distributed system that fulfills requirements with regards to key distributed systems properties (such as scalability, transparency, etc.), be able to recognize when this is not possible, and explain why
6. Able to build distributed software and higher – level middleware and languages.

**(20MC9122)LINUX PROGRAMMING  
(PROGRAMME ELECTIVE– I)**

**COURSE OUTCOMES:**

1. Work confidently in Linux environment.
2. Work with different text processing commands
3. Work with files and directories in linux.
4. Work with shell script to automate different tasks as Linux administration.
5. Able to communicate with processes and memory.
6. Work confidently with the socket.

**(20MC9123)NETWORKSECURITY  
(PROGRAMME ELECTIVE– I)**

**COURSE OUTCOMES:**

1. Understand the most common type of cryptographic algorithm
2. Understand the Public-Key Infrastructure
3. Understand network security in transport layer.
4. Understand security protocols for protecting data on networks
5. Understand vulnerability assessments and the weakness of using passwords for authentication
6. Be able to configure simple firewall architectures

**(20MC9124)HUMAN COMPUTERINTERACTION  
(PROGRAMME ELECTIVE– II)**

**COURSE OUTCOMES:**

1. Find innovative ways of interacting with computers
2. Help the disabled by designing non-traditional ways of interacting
3. Able to use system menus and windows.
4. Use cognitive psychology in the design of devices for interaction
5. Able to apply models from cognitive psychology.
6. Able to perform effectively on menus and windows

**(20MC9125)ADVANCEDPROGRAMMING(PYTHON&RLANGUAGES)  
(PROGRAMME ELECTIVE– II)**

**COURSE OUTCOMES:**

At the end of the course the student will be able to:

1. Making Software easily right out of the box.
2. Experience with an interpreted Language.
3. Prior Introduction to testing software
4. Ability to Work on a real life Project, implementing R Analytics to create Business Insights.
5. Ability to analyze the data and results using R, a flexible and completely Cross - platform.
6. Ability to use a wide range of analytical methods and produce presentation quality graphics.

**(20MC9126)INTERNETOFTHINGS  
(PROGRAMME ELECTIVE– II)**

**COURSE OUTCOMES:**

1. Ability to combine sensors, servos, robotics, Arduino chips, and more with various or the Internet,
2. Ability to create interactive, cutting-edge devices.
3. Better idea of the overview of necessary steps to take the idea of IOT concept through production
4. Ability to apply techniques for writing Embedded Code
5. Ability to manage memory and performance of battery life
6. Ability to design a printed circuit boards.

**(20MC9127)E-COMMERCE**

**COURSE OUTCOMES:**

1. Recognize the impact of Information and Communication technologies, especially of the Internet in business operations
2. Recognize the fundamental principles of e-Business and e-Commerce
3. Distinguish the role of Management in the context of e-Business and e-Commerce
4. Able to manage electronic payments
5. They can know the added value, risks and barriers in the adoption of e-Business and e-Commerce
6. Examine applications of e-Commerce in relation to the applied strategic.

**(20MC9128)BLOCKCHAIN TECHNOLOGY  
(PROGRAMME ELECTIVE– II)**

**COURSE OUTCOMES:**

1. Explain design principles of Bitcoin and Ethereum.
2. Explain the Simplified Payment Verification protocol.
3. List and describe differences between proof-of-work and proof-of-stake consensus.
4. Interact with a blockchain system by sending and reading transactions.
5. Design, build, and deploy a distributed application.
6. Evaluate security, privacy, and efficiency of a given blockchain system.

**(20MC9129)WEB TECHNOLOGIES LAB**

**COURSE OUTCOMES:**

1. Student is able to:
2. Design and work with HTML5 and CSS applications.
3. Usage of javascript functions and objects.
4. Do the server side programming, maintain sessions.

5. Establish the DB connections and access the data.
6. Ability to work on Java Server Page
7. Design pages using PHP and AJAX

### **(20MC9130)MOBILEAPPLICATIONDEVELOPMENTLAB**

#### **COURSE OUTCOMES:**

1. Students understood the aspects of mobile programming that make it unique from programming for other platforms.
2. Students can design and develop sophisticated mobile interfaces.
3. Students program mobile applications for the Android operating system by use basic features.
4. Able to work on advanced phone features.
5. Students understood sending and receiving messages.
6. Ability to deploy applications to the Android marketplace for distribution.

### **(20MC9131)DATAWAREHOUSINGAND DATAMININGLAB**

#### **COURSE OUTCOMES:**

After undergoing the course students will be able to

1. Synthesize the data mining fundamental concepts and techniques from multiple perspectives.
2. Develop skills and apply data mining tools for solving practical problems
3. Advance relevant programming skills.
4. Gain experience and develop research skills by reading the data mining literature.

### **(20HS0842)APTITUDE PRACTICES**

#### **COURSE OUTCOMES:**

On successful completion of this course, the student will be able to

1. Develop the subtle way of approaching in the candidate.
2. Acquired the decision making with in no time.
3. Implement logical thinking during professional tenure.
4. Improve knowledge on problem solving.
5. Understand problems on coding and decoding.
6. Apply the knowledge on the concept of reasoning in real life.

### **(20MC9132)CLOUD COMPUTING**

#### **COURSE OUTCOMES:**

1. Compare the strengths and limitations of cloud computing
2. Identify the architecture, infrastructure and delivery models of cloud computing
3. Choose the appropriate cloud player, Programming Models and approach.
4. Able to work on various cloud services.
5. Address the core issues of cloud computing such as security, privacy and Interoperability
6. Design Cloud Services and Set a private cloud

**(20MC9133) CYBER SECURITY  
(PROGRAMME ELECTIVE–III)**

**COURSE OUTCOMES:**

After learning the course the students should be able to:

1. Understand cyber-attack and System Vulnerability Scanning.
2. Understand the tools in network defense.
3. Knowledge on cyber laws.
4. Able to protect themselves and ultimately society from cyber-attacks.
5. Knowledge on Web application tools.
6. Understand Cyber Crimes and types.

**(20MC9134) MACHINE LEARNING  
(PROGRAMME ELECTIVE–III)**

**COURSE OUTCOMES:**

The student will be able to:

1. Identify the machine learning algorithms which are more appropriate for various types of learning tasks in various domains
2. Implement machine learning algorithms on real datasets
3. Implement decision tree learning.
4. Demonstrate knowledge on Bayesian Learning.
5. Able to apply models of hidden markov.
6. Demonstrate linear models for Regression

**(20MC9135) SOFTWARE PROJECT MANAGEMENT  
(PROGRAMME ELECTIVE– III)**

**COURSE OUTCOMES:**

1. Understand the activities during the project scheduling of any software application.
2. Learn the risk management activities and the resource allocation for the projects.
3. Can apply the software estimation and recent quality standards for evaluation of the software projects.
4. Understand the flow and interactive process.
5. Acquire knowledge and skills needed for the construction of highly reliable software project.
6. Able to create reliable, replicable cost estimation that links to the requirements of project planning and managing

**(20MC9136) .NET TECHNOLOGIES  
(PROGRAMME ELECTIVE– III)**

**COURSE OUTCOMES:**

1. Aware of .net framework components.
2. Creating simple data binding applications in VB using ADO.Net connectivity.
3. Able to create a web form application using c#.

4. Performing Database operations for windows form.
5. Able to create a web applications.
6. Creating user interactive webpages.

**(20MC9137) BIO – INFORMATICS  
(PROGRAMME ELECTIVE–III)**

**COURSE OUTCOMES:**

The students will be able to:

1. Describe the contents and properties of the most important bioinformatics databases, perform text- and sequence-based searches.
2. Analyze and discuss the results in light of molecular biological knowledge
3. Explain the major steps in pairwise and multiple sequence alignment.
4. Explain the principle for, and execute pairwise sequence alignment by dynamic programming
5. Able to apply methods of photo genetics.
6. Predict the secondary and tertiary structures of protein sequences.

**(20MC9138) NEURAL NETWORKS & FUZZY LOGIC  
(PROGRAMME ELECTIVE–IV)**

**COURSE OUTCOMES:**

1. To Expose the students to the concepts of feed forward neural networks
2. To provide adequate knowledge about feedback networks.
3. To teach about the concept of fuzziness involved in various systems. To provide adequate knowledge about fuzzy set theory.
4. To provide comprehensive knowledge of fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm.
5. To provide adequate knowledge of application of fuzzy logic control to real time systems.

**(20MC9139) IMAGE PROCESSING  
(PROGRAMME ELECTIVE–IV)**

**COURSE OUTCOMES:**

1. Able to enhance images using enhancement techniques.
2. Able to restore images using restoration techniques and methods used in digital image processing
3. Able to transform the image in digital image processing.
4. Able to image enhancement techniques used in digital image processing.
5. Able to compress images using compression techniques used in digital image processing
6. Able to segmentation of images using digital image processing.

**(20MC9140) DESIGN PATTERNS  
(PROGRAMME ELECTIVE-IV)**

**COURSE OUTCOMES:**

1. Students demonstrate a thorough understanding of patterns and their underlying principles
2. Students know what design pattern to apply to a specific problem
3. Students demonstrate what tradeoffs need to be made when implementing a design pattern
4. Able to draw UML diagrams for different patterns.
5. Students can able draw class diagrams for different patterns.
6. Students will be able to use design patterns when developing software

**(20MC9141) BIG DATA ANALYTICS  
(PROGRAMME ELECTIVE-IV)**

**COURSE OUTCOMES:**

The students will be able to:

1. Work with big data platform and analyze the big data analytic techniques for useful business applications.
2. Design efficient algorithms for mining the data from large volumes.
3. Analyze the HADOOP technologies associated with big data analytics
4. Analyze the Map Reduce technologies associated with big data analytics
5. Explore on Big Data applications Using Pig and Hive
6. Understand the fundamentals of various big data analysis techniques

**(20MC9142) ENTERPRISE RESOURCE PLANNING  
(PROGRAMME ELECTIVE-IV)**

**COURSE OUTCOMES:**

After completing this course, student will be able to

1. Classify different processes of the organization and relationship among all processes.
2. Examine systematically the planning mechanisms in an enterprise, and identify all components in an ERP system and the relationships among the components;
3. To describe the Generic Model of ERP and General ERP Implementation Methodology.
4. To apply the concept of ERP.
5. To apply the concepts of CRM and ERP
6. To demonstrate knowledge of SAP and Oracle Apps.



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Masters of Technology**  
**Department of Civil Engineering (R20)**  
**STRUCTURAL ENGINEERING**

**I M.Tech - I Semester**

**( 20HS0823) RESEARCH METHODOLOGY AND IPR**

**COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Explain the key concepts and issues in research and basic framework of research process.
2. Formulate appropriate research problem and implement suitable research design for the research problem.
3. Identify various sources of information for literature review and data collection.
4. Develop an understanding of ethics in conducting applied research and make use of components of scholarly writing in report preparation.
5. Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP.
6. Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development.

**(20CE1001) ADVANCED STRUCTURAL ANALYSIS**

**COURSE OUTCOMES**

On Successful completion of this course, the student shall be able to

1. Ascertain the indeterminacy of frames, trusses by idealization
2. Analyse continuous beam by Stiffness & flexibility matrix methods
3. Analyse Rigid Jointed frames by Stiffness & flexibility matrix methods
4. Analyse Pin Jointed trusses by Stiffness & Flexibility matrix methods
5. Formulate global & element stiffness matrix, by direct stiffness method
6. Realize Equation solution Techniques

**(20CE1002) ADVANCED SOLID MECHANICS**

**COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Understand Two dimensional analysis of stress and strain
2. Understand Three dimensional analysis of stress and strain
3. Comprehend the concept of pure bending, gravity loading etc
4. Inculcate the habit of researching and practicing in the field of elasticity
5. Enhance the competency level
6. Develop compatibility conditions, equilibrium through homogeneity

## **(20CE1008) THEORY OF THIN PLATES AND SHELLS**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Explain the behavior of plates for UDL, hydrostatic, concentrated load cases
2. Perform the pure bending of rectangular, circular plates and Derive Its deflection theories
3. Analyze the behavior of simply supported rectangular plates under different load conditions
4. Analyze the plates using Navier's method for concentrated load
5. Define the solution of shells by Using various analytical methods
6. Apply the numerical techniques to Perform the behavior of Cylindrical shells

## **(20CE1009) THEORY AND APPLICATIONS OF CEMENT COMPOSITES**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Formulate constitutive behaviour of composite materials - Ferro cement, SIFCON and Fibre Reinforced Concrete - by understanding their strain- stress behaviour
2. Classify the materials as per orthotropic and anisotropic behaviour.
3. Understand the mechanical properties of materials and able to suggest according to need in the field.
4. Estimate strain constants using theories applicable to composite materials.
5. Analyse and design structural elements made of cement composites.
6. the use of various sources to design cement-based materials with tailor-made properties

## **(20CE1010) THEORY OF STRUCTURAL STABILITY**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Analyze elastic and inelastic buckling of bars
2. Understand the various numerical methods for treatment of stability problems and buckling of rectangular cross-sectional beams and plates
3. Mathematical treatment of stability problems.
4. To acquaint with basic principles relating to stability of structures.
5. To acquaint students with the Elastic and in-elastic Buckling behavior of structures.
6. An appreciation of the fundamental basis of design rules concerned with structural instability.

## **(20HS0837) ANALYTICAL AND NUMERICAL METHODS FOR STRUCTURAL ENGINEERING**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Have acquired ability to participate effectively in group discussions
2. Have developed ability in writing in various contexts

3. Have acquired a proper level of competence for employability
4. Have acquired computational skills to solve real world problems in engineering
5. Create programming code and present numerical results in an informative way
6. Apply numerical methods to obtain approximate solutions to mathematical problems

### **(20CE1011) STRUCTURAL HEALTH MONITORING**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Identify the probable reasons for the deterioration of various structural members.
2. Diagnose the distress in the structure understanding the causes and factors.
3. Assess the health of structure using static field methods.
4. Assess the health of structure using dynamic field tests.
5. Use an appropriate health monitoring technique and demolition technique.
6. Assess the structural health monitoring using electrical resistance and electromagnetic techniques

### **(20CE1012) STRUCTURAL OPTIMIZATION**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Use the optimization tools for the design of structures effectively
2. Solve problems of linear and non-linear optimization methods
3. Solve problems of geometric and dynamic optimization methods
4. Use approximate concepts and stochastic optimization methods
5. Understand the concept of optimality criteria methods
6. To be familiar with genetic algorithm and simulated annealing

### **(20CE1003) TECHNICAL SEMINAR**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Can collect relevant material on the chosen topic from various sources
2. Can comprehend the subject material collected and can prepare a technical write up
3. Can develop writing and presentation skills.
4. Will be able to interact with people and can participate in healthy debates.
5. Will be helpful in more understanding and subject learning.

### **(20CE1004) ADVANCED CONCRETE LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Design high grade concrete and study the parameters affecting its performance.
2. Conduct Non Destructive Tests on existing concrete structures.
3. Apply engineering principles to understand behavior of structural elements.
4. Understand and apply the proper testing requirements for cement.

5. Be able to test the behavior of special concretes
6. Can understand the effect of various admixtures on the properties of fresh and hardened concrete

### **(20HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Familiarize students with the key concepts of linguistics and develop awareness of the latest trends in language study.
2. Lead to a greater understanding of the human communicative action through an objective study of language.
3. Know and appreciate the location of literature within humanities.
4. Gain knowledge of research methods in literary studies and advanced knowledge of literature in the English language and literary theory.
5. Carry out an independent, limited research project under supervision, in accordance with applicable norms, ideals and conditions for literary research.
6. Improve common and basic scholarly requirements of logical and empirical rigor.

### **I M.Tech - II Semester**

### **(20CE1005) FEMINSTRUCTURAL ENGINEERING**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Obtain an understanding of the fundamental theory of the FEA method
2. Develop the ability to generate the governing FE equations for systems governed by partial differential equations
3. Develop shape functions for bar and beam elements
4. Understand global, local and natural coordinates
5. Understand the formulation of 1-dimensional & 2-dimensional elements
6. Compute the stiffness matrix for Iso-parametric elements.
7. Analyze plane stress and plane strain problems

### **(20CE1006) STRUCTURAL DYNAMICS**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Identify different types of vibrations under SDOF system.
2. Evaluate impact of degree of freedom on vibration of structures
3. Find response of free and forced vibration (harmonic and periodic) of SDOF system
4. Find natural frequency and mode shapes of MDOF system
5. Find natural frequency and mode shapes of simple beams with different end conditions
6. Determine natural frequency and mode shapes by using Stodola method & Holzer method

## **(20CE1013)ADVANCEDSTEELDESIGN**

### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Analyze and design simple bolted and welded connections.
2. Analyze the strength and design beam-column connections
3. Design steel framing system and connections of an industrial building.
4. Design roof systems, purlins and bracings subjected to lateral wind loads.
5. Design and analyse steel girder and truss bridges as per IS 800:2007.
6. They also know the plastic analysis.

## **(20CE1014) DESIGN OF FORMWORK**

### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Understand the necessity and types of form work for various structures of civil Engineering and select proper type of form work, accessories and materials required.
2. Design the form work for various structural elements like beam, slab, column, wall and foundation.
3. Design the form work for special structures like shells, retaining walls, bridges, Silos, bunkers & watertank.
4. Understand the working of flying form work like tunnel forms, slip forms and table forms.
5. The students will be able to Judge the form work failures and assess the form work issues in multi – storey building construction through case studies.
6. Judge the form work failures from case studies.

## **(20CE1015) DESIGN OF HIGH RISE STRUCTURES**

### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Analyze design and detail Transmission/ TV tower, Mast and Trestles with different loading conditions.
2. Analyse design and detail the RC and Steel Chimney.
3. Analyse design and detail the tall buildings subjected to different loading conditions using relevant codes.
4. Analysis and design of dynamic approach OF STRUCTURAL DESIGN USING IS Code provisions
5. Analysis and design of the various horizontal load transfer systems.
6. Know the structural systems for future generation buildings.

## **(20CE1016) DESIGN OF MASONRY STRUCTURES**

### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Understand the masonry design approaches.
2. Analyse Reinforced Masonry Members.
3. Determine interactions between members.
4. Determine shear strength and ductility of Reinforced Masonry members
5. Check the stability of wall
6. Perform elastic and in elastic analysis of masonry walls.

## **(20CE1017) DESIGN OF ADVANCED CONCRETE STRUCTURES**

### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Estimation of crack width and Redistribution of moments in Reinforced concrete beam.
2. Design of deep beams, ribbed (voided) slabs.
3. Design of Grid floors, flat slabs.
4. Design of plain concrete walls.
5. Design of shear walls.
6. Design of R.C. beams and slabs to satisfy the limit state of serviceability by determining the short term and long term deflection.

## **(20CE1018) ADVANCED DESIGN OF FOUNDATIONS**

### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Decide the suitability of soil strata for different projects.
2. Design shallow foundations deciding the bearing capacity of soil.
3. Analyze and design the pile foundation.
4. Understand analysis methods for well foundation
5. Design deep foundation satisfying bearing capacity and settlement requirements.
6. Design and analysis of retaining walls and sheet piles under static loads.

## **(20CE1019) SOIL STRUCTURE INTERACTION**

### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Understand soil structure interaction concept and complexities involved.
2. Evaluate soil structure interaction for different types of structure under various conditions of loading and subsoil characteristics.
3. Prepare comprehensive design oriented computer programs for interaction problems based on theory of sub grade reaction such as beams, footings, raft etc.
4. Analyze different types of frame structure founded on stratified natural deposits with linear and non-linear stress-strain characteristics

5. Evaluate action of group of piles considering stress-strain characteristics of realsoils.
6. Idealize soil response in order to analyze and design foundation elements subjected to different loadings.

### **(20CE1020)DESIGNOFINDUSTRIALSTRUCTURES**

#### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Explain various types of industrial structures and its design methodologies
2. Design bunkers, silo.
3. Design chimney and towers.
4. Design various industrial floors.
5. Design rectangular water tank.
6. Design of staging.

### **(20CE1007) STRUCTURAL DESIGN LAB**

#### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

At the end of the course, students will be able to

1. Design and Detail all the Structural Components of Frame Buildings.
2. Design and Detail complete Multi-Storey Frame Buildings

### **(20HS0838)NUMERICAL ANALYSIS LAB**

#### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Find roots of non-linear equations by Bisection method and Newton's method.
2. Do curve fitting by least square approximations
3. Solve the system of linear equations using gauss - elimination/ gauss-seidal iteration/
4. Gauss- Jordan method
5. Integrate numerically using trapezoidal and Simpson's rules
6. Find numerical solution of ordinary differential equations by Euler's method, Runge-Kutta method.
7. Use numerical methods to solve engineering problems.

### **(20HS0829) CONSTITUTION OF INDIA**

#### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Explain the key concepts of political economy.
2. Analyse the significant developments in the political ideologies.
3. Describe the salient features of the constitution of India.
4. Interpret, integrate and critically.

5. Analyse the political economy of Indian international relations and gain knowledge in Judiciary system.
6. Apply their knowledge and skills acquired to write civil service examinations

## **II M.Tech - I Semester**

### **(20CE1021) DESIGN OF PRESTRESSED CONCRETE STRUCTURES**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Discuss about the historical development and its principles of prestressed concrete
2. Analyze the methods of prestressing and its losses
3. Predict the deflection and its importance in Prestressed concrete
4. Define flexural, shear & torsional resistance in prestressed concrete
5. Discuss and analyze composite members in prestressed concrete
6. Analysis and design of statically indeterminate beams

### **(20CE1022) ANALYSIS OF LAMINATED COMPOSITE PLATES**

#### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Analyze the rectangular composite plates using the analytical solutions
2. Analyze the composite plates using advanced finite element method
3. Precisely the various numerical methods for the stress analysis
4. Analyze the discretion of classical plates theory by using spatial approximations
5. Develop the finite element method by stiffness matrix & Numerical integration
6. Analyze the computation of stresses by using rectangular laminated plates

### **(20CE1023) FRACTURE MECHANICS OF CONCRETE STRUCTURES**

#### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Describe the Basics Concepts of Fracture Mechanics & its Mechanism
2. Identify and classify cracking of concrete structures based on fracture mechanics.
3. Perform Stresses at Crack Tip and different Criteria involved
4. Explain the fatigue and fatigue crack grow rate
5. Describe the basic concepts of CTOD and COD
6. Explain the fracture resistance of material

### **(20CE1024) DESIGN OF PLATES AND SHELL**

#### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Analyze and design thin plates with deflection
2. Analyze and design of laterally loaded, uniformly loaded circular plates
3. Analyze and design thin shells using approximate solutions



4. Analyze different types of plates (rectangular and circular) under different boundary connections by various classical methods and approximate methods
5. Analyze and design of prismatic folded plate system
6. Analyze and design of doubly curved shells

### **(20HS0824) BUSINESS ANALYTICS**

#### **COURSE OUTCOMES**

On successful completion of this course, the student shall be able to

1. Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization
2. Design alternatives to solve business problems utilizing quantitative analysis, critical thinking and sound ethical decision making
3. Summarize, process and transform data for obtaining meaningful conclusions
4. Interpret data using latest data analytics tools to address organizational problems
5. Organize and critically apply the concepts and methods of business analytics
6. Assess decision problems and build models for creating solutions using business analytical tools

### **(20ME3026) INDUSTRIAL SAFETY**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Explain the Points of factories act 1948 for health and safety.
2. Define the term Cost & its relation with replacement economy.
3. Recognize the Concept of Wear, Corrosion and its Prevention methods.
4. Understand the Concept of sequence of fault finding activities and the importance of decision tree.
5. Elaborate the importance of scheduled preventive maintenance of mechanical and electrical equipment.
6. Distinguish between Periodic and Preventive maintenance of equipments.

### **(20ME3027) ADVANCES IN OPERATIONS RESEARCH**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student shall be able to

1. On completion of this course, the student shall be able to
2. Create mathematical models of the real time situations.
3. Implement Transportation and Assignment problems to solve in real time industry
4. Choose the best strategy of Game and capable of identifying the suitable queuing theory
5. Enumerate fundamental techniques and apply it to solve various optimization areas
6. Investigate, study, Apply knowledge in Replacement models and
7. Understand the Inventory control Models

## **(20ME3028) COMPOSITE MATERIALS**

### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Explain the Fundamental concept of composite materials.
2. Classify different types of composite materials.
3. Describe the Fabrication and processing of composite materials.
4. Illustrate the Methods of preparation of Metal matrix Composites and polymer matrix composites.
5. Discuss about the Mechanical behavior of composite materials.
6. Explain the application of composite materials.

## **(20EE2128) WASTE TO ENERGY**

### **COURSE OUTCOMES**

On successful lcompletion of this course, the student will be able to

1. Analyse agro based, forest residue and industrial waste conversion processes.
2. Manufacture of Pyrolytic oils and gases
3. Manufacture of charcoal, yields and applications
4. Understand various types of gasifiers operation
5. Understand inclined and fluidized bed combustors operation
6. Understand types of biogas plants and biomass energy programme in India

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**

**(AUTONOMOUS)**

**Control Systems (M.Tech)**

**Department of Electrical and Electronics Engineering (EEE)**

**IM.Tech -ISem.(CS)**

**(20HS0823) RESEARCH METHODOLOGY AND INTELLECTUAL  
PROPERTY RIGHTS**

**COURSE OUTCOMES**

1. Recognize appropriate research problem, errors in selecting a research problem, Scope and objectives of research problem.
2. Critically assess research methods pertinent to technology innovation research.
3. Identify, explain, compare, and prepare the key elements of a research proposal/report.
4. Skill to understand the need of intellectual property rights, IPR protection to inventors.
5. Develops procedural knowledge to Legal System and solving the problem relating to intellectual property rights for further research work and investment in R&D.

**(20EE2001) MATHEMATICAL METHODS IN CONTROL SYSTEMS**

**COURSE OUTCOMES**

Students will be able to

1. Apply matrix properties and functions to a given problem
2. Use eigenvalues and eigenvectors
3. Analyze responses of linear systems to any given input signal
4. Understand Probability and Random variables
5. Determine response of linear systems for stochastic inputs
6. Apply mathematical methods to control systems

**(20EE2002) NON-LINEAR SYSTEMS**

**COURSE OUTCOMES**

Students will be able to

1. Understand the properties of nonlinear systems
2. Explore tools for stability analysis
3. Evaluate control problems with significant nonlinearities
4. Identify the design problem
5. Able to distinguish between the control strategies
6. Correlate between design parameters and the system performance

## **(20EE2003)ROBOTICSANDAUTOMATION**

### **COURSE OUTCOMES**

Students will be able to

1. Understand basic concepts of Robotics
2. Obtain forward, reverse kinematics and dynamics model of the industrial robot arm
3. Propose control law for a given application
4. Synthesize control law for a given application
5. Classify robots
6. Decide specifications depending on the applications

## **(20EE2004)DIGITALCONTROLSYSTEMS**

### **COURSE OUTCOMES**

Students will be able to

1. Understand the advantages of digital systems over analog systems
2. Model digital filters and systems
3. Analyse digital systems in time domain
4. Analyse digital systems in frequency domain
5. Model and analyse digital systems in state space representation
6. Design controllers for digital systems in state space representation

## **(20EE2005)NON-LINEARCONTROL SYSTEMS**

### **COURSE OUTCOMES**

Students will be able to

1. Distinguish linear and nonlinear control systems.
2. Distinguish absolute stability and relative stability
3. Understand the Lyapunov stability.
4. Application of deeper ideas from mathematics and specifically from geometry to engineering problems
5. Analyse nonlinear controllers with the aid of software tools
6. Design nonlinear controllers with the aid of software tools

## **(20EE2006)SYSTEMS BIOLOGY**

### **COURSE OUTCOMES**

Students will be able to

1. Understand and apply mathematical models to design a particular system
2. Apply feed-forward loop to design a biological control system

## **(20EE2122)SCADA SYSTEM AND APPLICATIONS**

### **COURSE OUTCOMES**

1. Can able to work with PLC
2. Can able to work with SCADA
3. Know different components in PLC and SCADA
4. Can Understand how PLC and SCADA help in power system automation
5. Able to understand the functioning of different hardware component in SCADA
6. Can able to understand the applications of SCADA in different industries

## **(20EE2007)DESIGN ASPECTS IN CONTROL SYSTEMS**

### **COURSE OUTCOMES**

Students will be able to

1. Understand the system modelling.
2. Implement tuning procedures on controllers
3. Design compensators
4. Implement pole placement design
5. Model a control system given its parameters
6. Decide gains of the controllers like PI, PID in a given control system

## **(20HS0818)ENGLISH FOR RESEARCH PAPER WRITING**

### **COURSE OUTCOMES**

1. To recognize and demonstrate the style and conventions of research writing.
2. To improve the clarity and coherence of their written proposal.
3. Able to use a variety of sentence patterns.
4. To enhance their revision and proofreading skills.
5. To use effective strategies and techniques to construct their academic projects.

## **IM.Tech – II Sem.(CS)**

## **(20EE2010)OPTIMAL CONTROL THEORY**

### **COURSE OUTCOMES**

Students will be able to

1. Understand optimal design of controllers
2. Understand the application of calculus of variation to optimal design
3. Combine the mathematical methods used in optimal control to derive the solution to variations of the problems studied in the course
4. Understand constraint specification in control problem
5. Use the standard algorithms for numerical solution of optimal control problems and use Matlab to solve fairly simple but realistic problems
6. Integrate the tools learnt during the course and apply them to more complex problems

## **(20EE2011)INDUSTRIALAUTOMATION**

### **COURSE OUTCOMES**

Students will be able

1. Identify potential areas for automation and justify need for automation
2. Select suitable major control components required to automate a process or an activity
3. Translate and simulate a real time activity using modern tools
4. Able to discuss the benefits of automation.
5. Identify suitable automation hardware for the given application.
6. Recommend appropriate modeling and simulation tool for the given manufacturing application.

## **(20EE2012)ADVANCEDCONTROL SYSTEMS**

### **COURSE OUTCOMES**

Students will be able to

1. Apply the concepts of linear algebra and their applications to control system
2. Analyze the system dynamics
3. Understand Lyapunov stability theory
4. Design linear quadratic controller
5. Implement Pole placement design.
6. Able to design compensators

## **(20EE2013)ADVANCEDROBOTICS**

### **COURSE OUTCOMES**

Students will be able to

1. Understand mathematical methods for modeling and control of Robotic manipulator
2. Understand spatial descriptions and transformation
3. Able to design a robotic control
4. Able to apply non-linear techniques to any control problem
5. Able to model mobile robot
6. Understand robot programming and language systems

## **(20EE2014)ADAPTIVELEARNINGCONTROLSYSTEMS**

### **COURSE OUTCOMES**

1. Students will be able to
2. Understand detailed knowledge of classical system identification and the development
3. Understand properties of various methods in system identification
4. Understand detailed knowledge of on-line parameter estimation
5. Understand knowledge of adaptive control systems and their development and properties
6. Understand the development and properties of adaptive control systems.

7. Understand knowledge of methods and tools for stability analysis of adaptive systems

### **(20EE2015) MODEL REDUCTION IN CONTROL SYSTEMS**

#### **COURSE OUTCOMES**

Students will be able to

1. Apply model reduction techniques for a given control design problem
2. Design control loops for all techniques
3. Know modern methods
4. Apply SMC for model reduction
5. Understand higher order sliding mode control
6. Understand MOR for nonlinear systems

### **(20EE2116) ADVANCED DIGITAL SIGNAL PROCESSING**

#### **COURSE OUTCOMES**

Students will be able to

- Gain knowledge about the time domain and frequency domain representations as well as analysis of discrete time signals and systems
- Study the design techniques for IIR and FIR filters and their realization structures.
- Acquire knowledge about the finite word length effects in implementation of digital filters.
- Acquire knowledge about the various linear signal models and estimation of power spectrum of stationary random signals
- Design of optimum FIR and IIR filters
- Analyse of finite word length effects

### **(20HS0829) CONSTITUTION OF INDIA**

#### **COURSE OUTCOMES**

1. Explain the key concepts of political economy
2. Analyse the significant developments in the political ideologies
3. Describe the salient features of the constitution of India and interpret, integrate and critically
4. Analyse the political economy of Indian international relations and gain knowledge in Judiciary system
5. Apply their knowledge and skills acquired to write various competitive examinations
- 6.

**M.Tech, II Year 1<sup>st</sup> Semester (CS)**

### **(20EE2021) MACHINE LEARNING TECHNIQUES**

#### **COURSE OUTCOMES**

Students will be able to

1. Distinguish between, supervised, unsupervised and semisupervised learning
2. Apply the appropriate machine learning strategy for any given problem
3. Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem
4. Design systems that use the appropriate graph models of machine learning
5. Modify existing machine learning algorithms to improve classification efficiency

### **(20EE2022) STOCHASTIC CONTROL**

#### **COURSE OUTCOMES**

Students will be able to

1. Apply design of stochastic models for a given system
2. Design stochastic stability problems
3. Design linear and non-linear filtering systems

### **(20EE2023) COMPUTATIONAL METHODS**

#### **COURSE OUTCOMES**

Students will be able to

1. Know the concept and steps of problem solving - mathematical modelling, solution and implementation
2. Knowledge and understanding of, and the ability to use, mathematical techniques
3. Understand and apply mathematical reasoning

### **(20HS0824) BUSINESS ANALYTICS**

#### **COURSE OUTCOMES:**

Students will be able to:

1. Design, device, and query relational databases for operative data.
2. Design, implement, populate and query data warehouses for informational data.
3. To integrate very large datasets to make business decisions.
4. Evaluate the use of data from acquisition through cleansing, warehousing, analytics, and visualization to the ultimate business decision.
5. Evaluate the key concepts of business analytics.
6. Determine when to implement relational versus document oriented database structures.

### **(20ME3026) INDUSTRIAL SAFETY**

#### **COURSE OUTCOMES:**

Students undergoing this course are able to

1. Understand the points of factories act 1948 for health and safety.
2. Understand the cost & its relation with replacement economy.



3. Understand the concepts of Wear and Corrosion Prevention
4. Understand the concepts of sequence of fault finding activities
5. Understand the Program and schedule of preventive maintenance of mechanical and electrical equipment.
6. Understand the Periodic Maintenance of Equipments

### **(20ME3027) ADVANCES IN OPERATIONS RESEARCH**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

- Create mathematical models of real time situations.
- Implement Transportation and Assignment problems to solve in real time industry
- Choose the best strategy of Game and capable of identifying the suitable queuing theory
- Enumerate fundamental techniques and apply it to solve various optimization areas
- Investigate, study, Apply knowledge in Replacement models and
- Understand the Inventory control Models

### **(20CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**

#### **COURSE OUTCOMES:**

Student can access the present value and future value for money

- Student can apply the principals of Benefit & Cost Analysis and
- Break-Even comparison
- Student can calculate the depreciation cost for construction equipment and can estimate the cost for construction equipment
- Can prepare profit and loss, balance sheet etc

### **(20ME3028) COMPOSITE MATERIALS**

#### **COURSE OUTCOMES**

Upon completion of this course, the students will have an overview of

1. Fundamental concept of composite materials.
2. Different types of composite materials.
3. Fabrication and processing of composite materials.
4. MMC & CMC
5. Mechanical behavior of composite materials.
6. Application of composite materials.

### **(20EE2128) WASTE TO ENERGY**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Analyse agro based, forest residue and industrial waste conversion processes.

2. Manufacture of Pyrolytic oils and gases
3. Manufacture of charcoal, yields and applications
4. Understand various types of gasifier operation
5. Understand inclined and fluidized bed combustor operation
6. Understand types of biogas plants and biomass energy programme in India

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**

**Power Electronics (M.Tech)**

**Department of Electrical and Electronics Engineering (EEE)**

**IM.Tech-I Sem.**

**(20HS0823) RESEARCH METHODOLOGY AND DIPR**

**COURSE OUTCOMES:**

After the completion of the course, student would be able to:

- Explain the key concepts and issues in research and basic framework of research process.
- Formulate appropriate research problem and implement suitable research design for the research problem.
- Identify various sources of information for literature review and data collection.
- Develop an understanding of ethics in conducting applied research and make use of components of scholarly writing in report preparation.
- Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP.
- Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development.

**(20EE2101) ELECTRIC DRIVE SYSTEMS**

**COURSE OUTCOMES:**

Students will be able to:

1. Knowledge about the dynamic behavior of rotating machines.
2. Able to understand equivalent circuit of synchronous machines.
3. To understand various practical issues of different machines.
4. To learn about the basic concepts of AC/DC machine modeling.
5. To analyze various methodologies in small signal machine modeling.
6. To learn the performance and dynamic modeling of synchronous machines

**(20EE2103) ADVANCED POWER ELECTRONIC CIRCUITS**

**COURSE OUTCOMES:**

Students will be able to:

1. Knowledge about analysis and design of Load Commutated CSI and PWM CSILearn analysis and design of series Inverters.
2. Acquire knowledge about analysis and design of Switched Mode Rectifiers, APFC,
3. Knowledge about DC-DC converters & resonant converters design
4. Select appropriate phase shifting converter for a multi-pulse converter and operation

5. Select appropriate phase shifting converter for a multi-pulse converter
6. Select appropriate phase shifting converter for a multi-pulse converter

#### **(20EE2104) OPTIMAL AND ADAPTIVE CONTROL**

#### **COURSE OUTCOMES:**

Students will be able to:

1. Knowledge in the mathematical area of calculus of variations so as to apply the same for solving optimal control problems.
2. Problem formulation, performance measure and mathematical treatment of optimal Control problems.
3. Acquire knowledge on solving optimal control design problems by taking into
4. Consideration the physical constraints on practical control systems.
5. To obtain optimal solutions to controller design problems taking into consideration the Limitation on control energy in the real practical world.
6. Apply constrained optimization to various physical systems.
- 7.

#### **(20EE2105) POWER QUALITY**

#### **COURSE OUTCOMES:**

Students will be able to:

1. Acquire knowledge about the harmonics, harmonic introducing devices and effect of harmonics on system equipment and loads
2. Develop analytical modeling skills needed for modeling and analysis of harmonics in network and components
3. Introduce the student to active power factor correction based on static VAR compensators and its control techniques
4. Introduce the student to series and shunt active power filtering techniques
5. The students will be able to identify the power quality problems, causes and suggest suitable mitigating techniques.
6. Ability to study about the various Active Passive power filters.

#### **(20EE2107) STATIC VAR CONTROLLER AND HARMONIC FILTERING**

#### **COURSE OUTCOMES**

Students will be able to:

1. Acquire knowledge about the fundamental principles of Passive and Active Reactive Power Compensation
2. Obtain schemes at Transmission and Distribution level in Power Systems.
3. To introduce the student to various single phase and three-phase Static VAR Compensation schemes and their controls
4. To develop analytical modelling skills needed for modelling and analysis of such Static VAR

5. To compare Controlling methods of DVR
6. To design suitable converter topology for applications.

**(19EE2108) PWM CONVERTERS AND APPLICATIONS**

**COURSE OUTCOMES:**

Students will be able to:

1. Knowledge concepts and basic operation of PWM converters, including basic circuit operation and design
2. Learn the steady-state and dynamic analysis of PWM converters along with the applications like solid state drives and power quality.
3. Able to recognize and use the following concepts and ideas: Steady-State and transient modelling and analysis of power converters with various PWM techniques.
4. Model the PWM Converters and Induction motor drives
5. Apply various compensation techniques for the converters
6. Ability to simulate the PWM technique on converter topologies
- 7.

**(20EE2109) ENERGY AUDITING, CONSERVATION & MANAGEMENT**

**COURSE OUTCOMES:**

After completion of the course the students should be able to:

1. Conduct energy auditing and evaluate energy audit results
2. Carry out motor energy audit
3. Students should be able to understand the good lighting system design and practice
4. Analyse demand side management concepts through case study
5. Students should be able to calculate depreciation and payback calculation
6. To predict management of energy systems

**(20HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Familiarize students with the key concepts of linguistics and develop awareness of the latest trends in language study.
2. Lead to a greater understanding of the human communicative action through an objective study of language.
3. Know and appreciate the location of literature within humanities.
4. Gain knowledge of research methods in literary studies and advanced knowledge of literature in the English language and literary theory.
5. Carry out an independent, limited research project under supervision, in accordance

with applicable norms, ideals and conditions for literary research.

6. Improve common and basic scholarly requirements of logical and empirical rigor.

**IM.Tech –II Sem.**

### **(20EE2112) POWER ELECTRONIC CONVERTERS**

#### **COURSE OUTCOMES:**

Students will be able to:

1. To understand the various power semiconductor devices.
2. Obtain the knowledge on various conversion techniques of power semiconductor devices
3. Design controllers for dc-dc converters for DC-DC applications
4. To simulate the behavior of single phase and three phase Inverters
5. To solve the problems on inverter control techniques
6. Apply the mathematical modelling skill on the converter topologies.

### **(20EE2113) DIGITAL CONTROL OF POWER ELECTRONICS AND DRIVE SYSTEMS**

#### **COURSE OUTCOMES:**

Students will be able to:

1. Design static Scherbius and Kramer drives to implement slip power recovery schemes
2. Implement synchronous motor drives with fixed frequency and variable frequency sources
3. Obtain Knowledge on speed control schemes for Brushless D.C. motors and Permanent Magnet Synchronous motors.
4. To understand the concept Control of Wound-field Synchronous motor and SRM drives.
5. Apply the mathematical skills to solve the vector control of PMSM.
6. To know the control and operation of PMBDCM drive scheme

### **(20EE2114) SWITCHED MODE AND RESONANT CONVERTERS**

#### **COURSE OUTCOMES:**

1. Acquire knowledge about the principles of operation of non-isolated and isolated hard-switched DC-DC converters
2. Acquire knowledge on various loss components in a switched mode converter and choice of switching frequency with a view towards design of such converters
3. Analyse the harmonics of line commutated rectifiers
4. Understand and analyse the concept of resonant converter
5. To develop the mathematical transfer function of SMPS
6. Analyse the dynamics of switching converter

### **(20EE2115) INDUSTRIAL LOAD MODELLING AND CONTROL**

#### **COURSE OUTCOMES:**

Students will be able to:

1. Knowledge about load control techniques in industries and its application.
2. Different types of industrial processes and optimize the process using tools like LINDO and LINGO.
3. Apply load management to reduce demand of electricity during peak time.
4. Apply different energy saving opportunities in industries
5. The students should gain a workable knowledge in analyzing Electric Drive Systems
6. Able to Forecast the Integrated Load management of industry.

### **(20EE2116) ADVANCED DIGITAL SIGNAL PROCESSING**

#### **COURSE OUTCOMES :**

Students will be able to:

1. Portray the fundamentals of Digital Signal Processing.
2. Depict the concepts and applications of Motor control signal processors
3. Knowledge about the time domain and frequency domain representations as well as analysis of discrete time signals and systems.
4. Study the design techniques for IIR and FIR filters and their realization structures.
5. Acquire knowledge about the finite word length effects in implementation of digital filters.
6. Compare the various linear signal models and its algorithms

### **(20EE2117) ADVANCED MICRO-CONTROLLER BASED SYSTEMS**

#### **COURSE OUTCOMES**

Students will be able to:

1. Learn how to program a processor in assembly language and develop an advanced processor based system.
2. Learn configuring and using different peripherals in a digital system.
3. Compile and debug a Microprocessor Program.
4. Generate an executable file and use it.
5. Obtain knowledge on the embedded boards
6. Obtain a skill to identify the suitable controller for the application.

### **(20EE2118) DISTRIBUTED GENERATION**

#### **COURSE OUTCOMES**

Students will be able to:

1. To understand the planning and operational issues related to Distributed Generation.
2. Acquire Knowledge about Distributed Generation Learn Micro-Grids.
3. Relate the conventional power generation and distributed generation
4. Analyze the concept of distributed generation and installation
5. Explicate the concept of AC/DC microgrids
6. Analyze power quality issues and control operation of micro grid

### **(20EE2119)SMARTGRIDS**

#### **COURSE OUTCOMES:**

Students will be able to:

1. Understand the difference between smart grid & conventional grid.
2. Apply knowledge on smart metering concepts to industrial and commercial installations.
3. Formulate solutions in the areas of smart substations, distributed generation and wide area measurements.
4. Explicate the need of smart grid technology.
5. Analyse the power quality issues in smart grid
6. Describe the concept of smart grid communication technologies

### **(20HS0829)CONSTITUTION OF INDIA**

#### **COURSE OUTCOMES**

1. Explain the key concepts of political economy
2. Analyse the significant developments in the political ideologies
3. Describe the salient features of the constitution of India interpret, integrate and critically
4. Analyse the political economy of Indian international relations and gain knowledge in Judiciary system
5. Apply their knowledge acquired to write various competitive examinations
6. Apply knowledge on society on their rights

#### **IIM.Tech –ISem**

### **(20EE2123)SCADA SYSTEM AND APPLICATIONS**

#### **COURSE OUTCOMES**

Students will be able to:

1. Describe the basic tasks of Supervisory Control Systems (SCADA) as well as their typical applications.
2. Acquire knowledge about SCADA architecture, various advantages and disadvantages of each system.
3. Knowledge about single unified standard architecture IEC 61850.
4. To learn about SCADA system components: remote terminal units, PLCs, intelligent electronic devices, HMI systems, SCADA server.
5. Learn and understand about SCADA applications in transmission and distribution sector, industries etc.
6. Knowledge about various system components and communication protocols of SCADA system and its applications.



## **(20EE2124)FACTSANDCUSTOMPOWERDEVICES**

### **COURSE OUTCOMES:**

Students will be able to:

1. Acquire knowledge about the fundamental principles of Passive and Active Reactive Power Compensation Schemes at Transmission and Distribution level in Power Systems.
2. Learn various Static VAR Compensation Schemes like Thyristor/GTO Controlled.
3. To compare the Reactive Power Compensation techniques
4. . To develop analytical modeling skills needed for modeling and analysis of such Static VAR Systems
5. Demonstrate the use of SVC to mitigate power system problems
6. Suggest suitable techniques for coordinating various FACTS devices

## **(20EE2125)HVDC TRANSMISSION SYSTEMS**

### **COURSE OUTCOMES:**

Students will be able to:

1. Choose intelligently AC and DC transmission systems for the dedicated application(s).
2. Identify the suitable two-level/multi-level configuration for high power converters.
3. Select the suitable protection method for various converter faults.
4. Demonstrate the modern trends in planning of HVDC system
5. Design AC and DC filters to eliminate Harmonics
6. Model HVDC systems for Digital Dynamic Simulation and demonstrate the grounding of HVDC systems.

## **(20HS0824)BUSINESS ANALYTICS**

### **COURSE OUTCOMES:**

After the completion of the course, student would be able to:

1. Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.
2. Design alternatives to solve business problems utilizing quantitative analysis, critical thinking and sound ethical decision making.
3. Summarize, process and transform data for obtaining meaningful conclusions
4. Interpret data using latest data analytic tools to address organisational problems
5. Organize and critically apply the concepts and methods of business analytics
6. Assess decision problems and build models for creating solutions using business analytical tools.

## **(20ME3026)INDUSTRIAL SAFETY**

### **COURSE OUTCOMES:**

Students undergoing this course are able to

1. Understand the points of factory act 1948 for health and safety.
2. Understand the cost & its relation with replacement economy.
3. Understand the concepts of Wear and Corrosion Prevention
4. Understand the concepts of sequence of fault finding activities
5. Understand the Program and schedule of preventive maintenance of mechanical and electrical equipment.
6. Understand the Periodic Maintenance of Equipments

### **(20ME3027) ADVANCES IN OPERATIONS RESEARCH**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Create mathematical models of real time situations.
2. Implement Transportation and Assignment problems to solve in real time industry
3. Choose the best strategy of Game and capable of identifying the suitable queuing theory
4. Enumerate fundamental techniques and apply it to solve various optimization areas
5. Investigate, study, Apply knowledge in Replacement models and
6. Understand the Inventory control Models

### **(20CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Summarise the concept of strategic cost management, strategic cost analysis – target costing, lifecycle costing and Kaizen costing and the cost drive concept.
2. Describe the decision-making; relevant cost, differential cost, incremental cost and opportunity cost, objectives of a costing system.
3. Summarise the meaning and different types of project management and project execution, detailed engineering activities.
4. Understand the project contracts,
5. Describe the cost behaviour and profit planning types and contents, Bar charts and Network diagram.
6. Analyse by using quantitative techniques for cost management like PERT/CPM.

### **(20ME3028) COMPOSITE MATERIALS**

#### **COURSE OUTCOMES**

Upon completion of this course, the students will have an overview of

1. Fundamental concept of composite materials.
2. Different types of composite materials.
3. To understand the Fabrication and processing of composite materials.

4. Comparison of MMC & CMC
5. Apply knowledge on Mechanical behaviour of composite materials.
6. Application of composite materials.

**(20EE2128) WASTE TO ENERGY**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Analyse agro-based, forest residue and industrial waste conversion processes.
2. Manufacture of Pyrolytic oils and gases
3. Manufacture of charcoal, yields and applications
4. Understand various types of gasifier operation
5. Understand inclined and fluidized bed combustor operation
6. Understand types of biogas plants and biomass energy programmes in India

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**M.Tech (Thermal Engineering)**

**Department of Mechanical Engineering**

**M. Tech. – I Semester (T.E)**

**(20HS0823) RESEARCH METHODOLOGY AND IPR**

**COURSE OUTCOMES**

At the end of this course, students will be able to

1. Explain the key concepts and issues in research and basic framework of research process.
2. Formulate appropriate research problem and implement suitable research design for the research problem.
3. Identify various sources of information for literature review and data collection.
4. Develop an understanding of ethics in conducting applied research and make use of components of scholarly writing in report preparation.
5. Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP.
6. Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development.

**(20ME3101) THERMODYNAMICS AND COMBUSTION**

**COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the concepts of transient flow analysis and real gas mixture
2. Describe the concepts of Chemical composition
3. Have a broad knowledge on chemical equilibrium
4. Have a broad knowledge on the concepts of Nerst heat theorem
5. Identify the applications of the fuel cells and magneto hydro dynamic generators.
6. Describe the concepts of PVC

**(20ME3102)ADVANCED FLUID DYNAMICS**

**COURSE OUTCOMES**

Students undergoing this course can will able to

1. Derive the Governing equations in Fluid dynamics using integral and differential approaches.
2. Describe Potential flows and the characteristics of Internal flows
3. Explain about laminar boundary layers and find solution methodology for boundary layer equations.
4. Summarize turbulent flow and derive governing equations of turbulent flow.
5. Conduct fluid flow experiments and identify the sources of errors in that
6. Analyse the data received in experiments

**(20ME3112) NUCLEAR ENGINEERING**

**COURSE OUTCOMES**

Upon completion of the course the student will be able to

1. State the Power production from fission process and list out the fertile materials used for the process
2. Derive diffusion equation for neutron transportation and explain the importance of slow neutrons in power production
3. Deduce solution for multi group diffusion equations in one region and multi region reactors
4. Distinguish the type of reactors and identify the best suitable site for the construction of reactor
5. Explicate the Neutron life cycle in thermal reactor and derive an equation for point kinematics in hours
6. Evaluate the temperature distribution in boiling regime using heat transfer equation explain the importance of Radioactive Waste Disposal.

### **(20ME3113) ENERGY CONSERVATION AND MANAGEMENT**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the Importance of Initiation, Organizing and Managing, Energy Management Programs
2. Critical assessment of energy usage and Importance of energy management
3. Analyze the Concepts of Energy auditing of the Investment projects
4. Understand the Relevant international standards and laws for establishing a power plant
5. Explain the Need of Energy Consultant in Planning and future strategies in power sector
6. Identify the Significance of various alternate energy resources and its energy storage and Control systems

### **(20ME3114) ENERGY MANAGEMENT IN THERMAL SYSTEMS**

#### **COURSE OUTCOMES**

On completion of the course the Students will be able to

1. Explain an overview of energy, its importance and conservation
2. Perform audit the power plants by considering various important parameters
3. Understands the usage of energy in various thermal utilities
4. Identify the method of energy transmission and its protection
5. Know about financial analysis techniques for attaining payback periods
6. Recognize the importance of numerous Energy Efficiency factors for achieving breakeven point in energy sectors

### **(20ME3115) AIR-CONDITIONING SYSTEM DESIGN**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the Parameters influencing the Effective Temperature for comfort Air conditioning
2. Classify the Air – conditioning systems like summer, winter and year round A/C Systems
3. Explain the Terms used in Air-Conditioning and the importance of bypass factor in the design of A/C system
4. Describe the working of Humidification and dehumidification equipment used for attaining required Conditions
5. Illustrate the function of grills, diffusers, fans and blowers for proper air distribution
6. Design the Air conditioning duct design for effective air distribution with less noise

## **(20ME3116) JET PROPULSION AND ROCKETRY**

### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Analyze the Gas turbine cycle and the influence of various design parameters on the Performance of the turbine
2. Explain the fundamentals of jet propulsion and importance of nozzles in improving the Performance
3. Describe the concept of thermo chemistry of combustion products
4. Identify the Importance of solid propulsion systems with various solid propellants
5. Formulate the heat transfer analysis in the liquid propellant rocket engines
6. Understand the concepts of thermodynamic flow analysis of Jet Propulsion

## **(20ME3117) FUELS AND COMBUSTION**

### **COURSE OUTCOMES**

On successful Completion of this course, the student will be able to

1. State the characteristics of fuels and explain the importance of the fuel constituents by observing the fuel analysis.
2. Describe different types of solid & liquid fuels used in combustion by analyzing the properties of fuels
3. Implement the knowledge of different gaseous fuels in combustion process for deriving an equation for the chemical kinematics of the combustion
4. Interpret the combustion principles in explaining the flame propagation and flame stability.
5. Distinguish the types of combustion equipment used in coal burning and also explicate the importance of air pollution control.
6. Discuss about burning velocities of fuels and compute the velocities at various factors affecting the burning

## **(20ME3103) THERMAL ENGINEERING LAB**

### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Demonstrate the Performance of Heat Exchangers & Flame propagation analysis of Gaseous fuel.
2. Explain the Heat Balance sheet and emissions of an Engine
3. Have a broad knowledge on VCR engine
4. Differentiate between the performance analysis of Heat Pipe and Air Conditioning unit
5. Identify the importance of air compressor in industries
6. Calibrate the Temperature measurement apparatus

## **(20ME3104) COMPUTER AIDED ANALYSIS LAB**

### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the Analysis of a truss member under loading.
2. Explain the concepts of Tapered plate under transverse load.
3. Describe concepts of the flow of incompressible gas through an S-bend for laminar flow.
4. Design the air flow over a simple geometry (aero foil) in a wind.
5. Apply the basic principle of analysis to solve and demonstrate 1D and 2D heat transfer with conduction and convection boundary conditions.

6. Explain the applications of CFD

### **(20HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Familiarize students with the key concepts of linguistics and develop awareness of the latest trends in language study
2. Understanding of the human communicative action through an objective study of language
3. Know and appreciate the location of literature within humanities
4. Knowledge of research methods in literary studies and advanced knowledge of literature in the English language and literary theory
5. Formulate an independent, limited research project under supervision, in accordance with applicable norms, ideals and conditions for literary research.
6. Improve common and basic scholarly requirements of logical and empirical rigor.

### **(20ME3105) ADVANCED HEAT TRANSFER**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Describe the various modes of heat transfer.
2. Differentiate between different flow process of forced and free convection
3. Have a broad knowledge on Pool Boiling and Nusselt's theory
4. Distinguish between LMTD and NTU Methods
5. Explain the Radiant heat exchange in grey, non-grey bodies
6. Understand the Steady State Heat Flow

### **(20ME3106) STEAM ENGINEERING**

#### **COURSE OUTCOMES**

Upon completion of the course the student will be able to

1. Describe the combustion process in boilers and interpret the importance of adiabatic flame temperature in combustion.
2. Derive an equation for economic thickness of Insulation for maximum heat savings in the steam lining design
3. Distinguish the types of refractory materials and determine the best refractory for reducing waste minimization
4. Asses the steam distribution and leakages in steam piping and list out the steam based equipment used
5. Explain the performance evaluation methods of boilers and the factors affecting on it
6. Illustrate the phenomenon of the control and monitoring of devices used for boiler waste minimization

### **(20ME3118) REFRIGERATION AND CRYOGENICS**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the Working principle of multistage compression systems for producing lower temperatures
2. Design, selection of evaporators, condensers, control systems
3. Different types of refrigerants to phase out CFCs .
4. Explain the Concept of insulation in the cryogenic systems

5. Describe Liquefaction process of various gases
6. Identify Effect of lower temperatures on the properties of the metals

### **(20ME3119 ) DESIGN OF HEAT EXCHANGERS**

#### **COURSE OUTCOMES**

On completion of the course the Students will be able to

1. Explain Heat exchangers and its classification.
2. Carryout heat exchanger analysis and describe fouling.
3. Design and Analyze double pipe heat exchangers.
4. Construct and analyze the Compact heat exchangers.
5. Understands about Mechanical design, simulation & optimization of heat exchangers.
6. Describe about different types of Design methodologies

### **(20ME3120) CRYOGENIC ENGINEERING**

#### **COURSE OUTCOMES**

Upon completion of this course, the student will be able to

1. List out the material properties of cryogenic materials and explain the applications of them in cryogenic Industry
2. State the basic principles of liquefaction of cryogenic fluid systems and implement this knowledge in the production of lower temperatures.
3. Distinguish various methods of separation of cryogenic gases and apply the same in the purification of cryogenic gases
4. Analyze the numerous types of refrigeration principles and differentiate the cryogenic refrigerators
5. Interpret several cryogenic fluid storage systems and identify the best methods of handling cryogenic fluids with insulations and instrumentation
6. Evaluate the design aspects of Cryogenic Storage systems and compare the heat transfer at various Insulation levels.

### **(20ME3121) COMPUTATIONAL FLUID DYNAMICS**

#### **COURSE OUTCOMES**

Students undergoing this course will be able to

1. Analyze the Experimental and hyperbolic equations of CFD
2. Explain the Concept of FDM, FVM Methodology for solving the problems
3. Describe the Flow domains, mesh and their importance.
4. Derive Diffusion Equation, Convection Equation.
5. Differentiate Staggered & Non Staggered Grid Systems.
6. Formulate Partial Differential Equations for CFD

### **(20ME3122) MODELLING OF I.C ENGINES**

#### **COURSE OUTCOMES**

Students undergoing this course will be able to

1. Learn the Approaches of modeling, model building and integration methods
2. Formulate the Thermodynamic models of CI engines.
3. Explain the Concept of fuel spray behavior, turbulent interactions.
4. Illustrate the Mathematical models of SI Engines



5. Design the Modeling of charging systems.
6. Describe Wall Heat transfer Correlations

### **(20ME3123) INSTRUMENTATION FOR THERMAL ENGINEERING**

#### **COURSE OUTCOMES**

Students undergoing this course will be able to

1. Get the knowledge on characteristics of instruments and measuring Instruments
2. Acquire knowledge on microprocessor and element of micro computer
3. Knowledge on Measurement of Physical Quantities instruments
4. Measure the advance technique instruments
5. Acquire knowledge on Measurement analyzers
6. Describe about different types of Measurement Analyzers

### **(20ME3107) COMPUTATIONAL FLUID DYNAMICS LAB**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Explain the Experimental and hyperbolic equations.
2. Describe the Geometry modeling and Grid Generation.
3. Describe the Methodology of computational fluid dynamics.
4. Illustrate both flow physics and mathematical properties of governing N-S Equations and define proper boundary conditions for solution.
5. Usage of CFD software to model relevant engineering flow problems and analyze the CFD results.
6. Formulate the Simulation in Fin by Natural Convection process

### **(20ME3108) THERMAL ENGINEERING LAB (VIRTUAL LAB)**

#### **COURSE OUTCOMES**

On completion of the course the students will be able to

1. Gains brief knowledge on rise of Taylor bubble and gas-liquid two phase flow through vertical conduit..
2. Attain the familiarized with evaporation loss from cryogenic vessel and characteristics of air lift pump.
3. Learns about conductivity probes and signals & Natural circulation loop in two phase flow.
4. Knows about bubble formation and condensation.
5. Understands about various performance parameters of I.C Engine.
6. Understand about Steam Condensation

### **(20HS0825) CONSTITUTION OF INDIA**

#### **COURSE OUTCOMES**

On successful completion of the course the students will be able to

1. Explain the key concepts of political economy
2. Analyse the significant developments in the political ideologies
3. Describe the salient features of the constitution of India interpret, integrate and critically
4. Analyse the political economy of Indian international relations and gain knowledge in Judiciary system
5. Apply their knowledge and skills acquired to write various competitive

Examinations

6. Explain the functions of Election commission

### **(20ME3124) DESIGN OF SOLAR AND WIND SYSTEMS**

#### **COURSE OUTCOMES**

On successful completion of the course the student will be able to

1. Explain the Solar radiation estimation and measurement, solar energy collectors
2. Describe the Concept of Nuclear reactor, nuclear waste disposal
3. Classify the Methods of wind energy conversion systems and Geothermal Energy
4. Express the Production, storage methods of Hydrogen
5. Describe the Direct energy conversion methods.
6. Importance of Nuclear Waste Disposal from power plants

### **(20ME3125) FINITE ELEMENT METHODS IN THERMAL ENGINEERING**

#### **COURSE OUTCOMES**

On successful completion of the course the Students will be able to

1. Formulate the experimental and basic equations.
2. Describe the problems on bar, analysis of beams and frames.
3. Discuss the boundary layer condition and Numerical integration.
4. Explain the Generalist heat conduction equation.
5. Illustrate the processes mesh generation, boundary conditions.
6. Analyze the Analysis of Frames & Beams

### **(20ME3126) THERMAL MEASUREMENTS AND PROCESS CONTROLS**

#### **COURSE OUTCOMES**

Upon completion of the course the Students will be able to

1. Understand the basic Instruments and general concepts.
2. Describe the working of different Pressure Measurement Instruments.
3. Illustrate different working of Flow measurement
4. Discuss about the Generalist Temperature Measurement Instruments.
5. Differentiate the difference of Velocity and density Measurement.
6. Describe the working of water level measuring Instruments

### **(20HS0824) BUSINESS ANALYTICS**

#### **COURSE OUTCOMES**

On successful completion of course student will be able to

1. Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.
2. Design alternatives to solve business problems utilizing quantitative analysis, critical thinking and sound ethical decision making.
3. Summarize, process and transform data for obtaining meaningful conclusions
4. Interpret data using latest data analytics tools to address organizational problems
5. Organize and critically apply the concepts and methods of business analytics

6. Assess decision problems and build models for creating solutions using business analytical tools.

### **(20CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**

#### **COURSE OUTCOMES**

At the end of the course, the students are able to

1. Summarize the concept of strategic cost management, strategic cost analysis – target costing, life cycle costing and Kaizen costing and the cost drive concept.
2. Describe the decision-making; relevant cost, differential cost, incremental cost and opportunity cost, objectives of a costing system.
3. Summarize the meaning and different types of project management and project

Execution, detailed engineering activities.

4. Understand the project contracts
5. Describe the cost behavior and profit planning types and contents, Bar charts and Network diagram.
6. Analyze by using quantitative techniques for cost management like PERT/CPM

### **(20EE2128) WASTE TO ENERGY**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Analyse agro based, forest residue and industrial waste conversion processes.
2. Describe the Manufacture of Pyrolytic oils and gases
3. Discuss about the methods of Manufacture of charcoal and its applications
4. Understand various types of gasifiers operation
5. Understand inclined and fluidized bed combustors operation
6. Understand types of biogas plants and biomass energy programme in India

### **(20ME3026) INDUSTRIAL SAFETY**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Explain the Points of factories act 1948 for health and safety.
2. Define the term Cost & its relation with replacement economy.
3. Recognize the Concept of Wear, Corrosion and its Prevention methods
4. Understand the Concept of sequence of fault finding activities and the importance of decision tree
5. Elaborate the importance of scheduled preventive maintenance of mechanical and electrical equipment.
6. Distinguish between Periodic and Preventive maintenance of equipments

### **(20ME3027) ADVANCES IN OPERATIONS RESEARCH**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Create mathematical models of the real time situations.
2. Implement Transportation and Assignment problems to solve in real time industry
3. Choose the best strategy of Game and capable of identifying the suitable queuing Theory

4. Enumerate fundamental techniques and apply it to solve various optimization

areas

5. Investigate, study, Apply knowledge in Replacement models and Inventory Control Models

6. Understand the Inventory control Models

### **(20ME3028) COMPOSITE MATERIALS**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Explain the Fundamental concept of composite materials.
2. Classify different types of composite materials.
3. Describe the Fabrication and processing of composite materials.
4. Illustrate the Methods of preparation of Metal matrix Composites and polymer matrix composites
5. Discuss about the Mechanical behavior of composite materials.
6. Explain the application of composite materials.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Computer Aided Design and Manufacturing**

**M. Tech. – I Semester (CAD&CAM)**

**(20HS0823) RESEARCH METHODOLOGY AND IPR**

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

1. Explain the key concepts and issues in research and basic framework of research process.
2. Formulate appropriate research problem and implement suitable research design for the research problem.
3. Identify various sources of information for literature review and data collection.
4. Develop an understanding of ethics in conducting applied research and make use of components of scholarly writing in report preparation.
5. Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP.
6. Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development.

**(20HS0840) COMPUTATIONAL METHODS**

**COURSE OUTCOMES**

On successful Completion of this course, students will be able to

1. Acquire ability to participate effectively in group discussions.
2. Develop ability in writing in various contexts.
3. Acquire a proper level of competence for employability.
4. Improve computational skills to solve real world problems in engineering.
5. Introduce the fundamentals of numerical and asymptotic computational methods, Including optimization, and apply these methods to engineering problems.
6. Apply advanced mathematics through multivariate calculus and differential equations.

**(20ME3001) COMPUTER INTEGRATED MANUFACTURING**

**COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Define manufacturing Systems, automation and need of interdisciplinary fields of CAD/CAM.
2. Describe the NC part programming and develop the manual part programming.
3. Operate different types of CNC /DNC machine and sort the manufactured parts using Group Technology.
4. Formulate and solve the problems in FMS and integrate the systems with CIM.
5. Interrelate the different systems like CAPP, MRP with CIM.
6. Design as suitable products that can be manufactured using CIM technology.

**(20ME3011) GEOMETRIC MODELING**

**COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the need for and different applications of geometric modeling techniques.
2. Know some of the technical solutions.
3. Able to apply the range of solutions to problems involving 3Dobjects.
4. Implement the knowledge being learned and shortens the overall Learning curve which is necessary to solve CAE problems that arise in engineering.
5. Familiarized with the computer graphics application in Design.
6. Know about Cubic splines and its applications in Automotive and Aviation Industries.

#### **(20ME3012) CNC TECHNOLOGY & PROGRAMMING**

##### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand fundamentals of NC/CNC.
2. Distinguish the product specification methods.
3. Learn Tooling for NC/CNC.
4. Maintain and Troubleshoot CNC Machine Tools.
5. Recall the need of design and manufacturing integration.
6. Explain about construction Features of CNC Machines.

#### **(20ME3013) ADDITIVE MANUFACTURING AND TOOLING**

##### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand history, concepts and terminology of additive manufacturing.
2. Apply the reverse engineering concepts for design development.
3. Explain the various types of additive manufacturing techniques.
4. Design and develop newer tooling models.
5. Analyse the cases relevant to mass customization and some of the important research challenges associated with AM and its data processing tools.
6. Understand about Solid Ground curing and its applications

#### **(20ME3014) QUALITY ENGINEERING AND MANUFACTURING**

##### **COURSE OUTCOMES**

At the end of this course the students

1. Know about quality engineering, its value and its economic impact on enforcement.
2. Understand importance of tolerance and its allocation in design of acomponent.
3. Aware of strategies adopted while parameter and tolerance designing.
4. Know steps involved in DOE and analysis of occurrence of variance.
5. Easily interpolate experimental results, analyze and get the conclusions.
6. Can understand about Quality Levels in various Industries.

#### **(20ME3015) COMPUTER AIDED PROCESS PLANNING**

##### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Distinguish the concepts of process planning applicable to manufacturing in consideration with production planning, concurrent engineering

2. Execute part design representations for process planning using different coding systems
3. Generate the structure of automated process planning system and uses the principle of generative and retrieval CAPP systems for automation
4. Implement logical design concepts for computer aided process planning systems
5. Design process planning systems using different software's
6. Create awareness about the implementation techniques for CAPP

### **(20ME3016) MECHANICAL BEHAVIOR OF MATERIALS**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Define and discuss the mechanical behavior of materials and analysis of fracture mechanism maps.
2. Describe the Material behavior under dynamic loads and design approaches.
3. Have a broad knowledge on different types of Material properties and its selection.
4. Use of modern metallic materials for engineering structure.
5. Elucidate the manufacturing methods of nonmetallic materials like polymers and other materials for Industrial and other applications.
6. Explain about Modern Metallic Materials and its applications.

### **(20ME3002) COMPUTER AIDED DESIGN LAB**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Be familiarize with computer aided drafting.
2. Draw the various components using CAD modeling software.
3. Sketch the plans of Automobile parts using software.
4. Develop sections and elevations for machine elements.
5. Illustrate the assembly of flange coupling.
6. Discuss about the concepts of geometric Modeling.

### **(20ME3003) COMPUTER MODELING LAB**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Demonstrate the different tools used in solid works software.
2. Have a broad knowledge on different types of -Riveted joint for Plates.
3. Differentiate between different types of Bolt & Nut and Piston.
4. Identify the applications of different types of Screw Jack and Connecting rod.
5. Have a broad knowledge on different types of Flange Coupling .
6. Describe about Propeller shaft

### **(20HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

#### **COURSE OUTCOMES**

On completion of the course the students will be able to

1. Familiarize students with the key concepts of linguistics and develop awareness of the latest trends in language study.
2. Lead to a greater understanding of the human communicative action through an objective study of language.

3. Know and appreciate the location of literature within humanities.
4. Gain knowledge of research methods in literary studies and advanced knowledge of literature in the English language and literary theory.
5. Carry out an independent, limited research project under supervision, in accordance with applicable norms, ideals and conditions for literary research, to a degree of academic excellence that satisfies common and basic scholarly requirements of logical and empirical rigor.
6. Use effective strategies and techniques to construct their academic projects.

#### **(20ME3004) FINITE ELEMENT METHODS**

##### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the concepts behind formulation methods in FEM.
2. Identify the application and characteristics of FEA elements such as bars, beams, plane and iso-parametric elements.
3. Develop element characteristic equation and generation of global equation.
4. Apply suitable boundary conditions to a global equation for bars, trusses, beams etc.
5. Understand the concepts of Nodes and elements.
6. Solving the problems related to Heat Transfer.

#### **(20ME3005) RAPID PROTOTYPING**

##### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Apply solid modeling concepts and techniques in RP.
2. Analyze and implement the different algorithms associated with STL file errors.
3. Calculate the layer thickness in different layering techniques.
4. Carry out design manipulations for the generation of support structure.
5. Identify, characterize and select the ideal materials for a given Rapid Prototyping system.
6. Understand the working principles of stereo lithography system.

#### **(20ME3017) ADVANCES IN MANUFACTURING TECHNOLOGY**

##### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Define and describe the fundamentals and principals of advanced manufacturing Technology.
2. Apply relevant theories to solve manufacturing problems.
3. Explain manufacturing processes via experimental and theoretical analyses.
4. Relate manufacturing theory to practice through laboratory experiments.
5. Improve a manufacturing process either working in a team or individually.
6. Describe about Surface processing Operations.

#### **(20ME3018) ADVANCED OPTIMIZATION TECHNIQUES**

##### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to



1. Explain the fundamental knowledge of Linear Programming and Dynamic Programming problems.
2. Use classical optimization techniques and numerical methods of optimization.
3. Describe the basics of different evolutionary algorithms.
4. Enumerate fundamentals of Integer programming technique and apply different Techniques to solve various optimization problems arising from engineering areas.
5. Investigate, study, develop, organize and promote innovative solutions for various applications.
6. Solve the Assignment Problems.

### **(20ME3019) PRODUCT LIFE CYCLE MANAGEMENT**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand history, concepts and terminology of PLM.
2. Apply the functions and features of PLM.
3. Analyse the case studies.
4. Understand PLM/PDM implementation approaches.
5. Integrate PLM/PDM with other applications.
6. Understand the PDM Infrastructure

### **(20ME3020) COMPUTER GRAPHICS**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Demonstrate the different computer hardware.
2. Describe the various properties of different algorithms.
3. Have a broad knowledge on different types of clipping algorithms & transformations.
4. Differentiate between different types of Rendering used in Industrial Application.
5. Identify the applications of different types of Shading Algorithms.
6. Explain about Raster Scan Graphics

### **(20ME3021) ROBOTICS**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Demonstrate knowledge of the relationship between mechanical structures of industrial robots and their operational workspace characteristics.
2. Apply spatial transformation to obtain forward kinematics equation of robot manipulators.
3. Solve inverse kinematics of simple robot manipulators.
4. Obtain the Jacobian matrix and use it to identify singularities.
5. Generate joint trajectory for motion planning.
6. Explain about Robot Kinematics.

### **(20ME3022) NON DESTRUCTIVE TESTING**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Provide better understanding of the principles of various Non-destructive testing

methods.

2. Able to select appropriate NDT method for testing of defects.
3. Understand the concept of liquid penetrant and magnetic particle testing.
4. Acquire knowledge of ultrasonic inspection techniques.
5. Acquire knowledge of recent techniques of NDT.
6. Describe about various non-destructive testing methods like Ultrasonic Testing.

**(20ME3006) MANUFACTURING ENGINEERING LAB ( VIRTUAL LAB)**

**COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the Concept of digital fabrication.
2. Design and fabrication of different types of circuit boards.
3. Distinguish between 3D scanning and 3D machining processes
4. Discuss about various methods and tools used in micro machining process.
5. Elaborate the Mechanism from Lazarenko's model.
6. Create molding and Casting of Polyurethane parts.

**(20ME3007) COMPUTER AIDED ANALYSIS LAB**

**COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Analyze the Analysis of a truss member under loading.
2. Discuss the Concepts of Analysis of Tapered plate under transverse load.
3. Explain the Flow of incompressible gas through an S-bend for laminar flow.
4. Formulate the Analysis of conductive heat transfer of different geometry 2D components.
5. Usage of MATLAB software for training and testing.
6. Understand the Heat Transfer Analysis in Different Geometry 2D Components.

**(20HS0825) CONSTITUTION OF INDIA**

**COURSE OUTCOMES**

On completion of the course the students will able to

1. Explain the key concepts of political economy.
2. Analyse the significant developments in the political ideologies.
3. Describe the salient features of the constitution of India interpret, integrate and

Critically.

4. Analyse the political economy of Indian international relations and gain knowledge in Judiciary system.
5. Apply their knowledge and skills acquired to write various competitive Examinations.
6. Acquire through knowledge on the constitution of India.

**(20ME3023) MECHATRONICS**

**COURSE OUTCOMES**

On successful completion of the course the students will be able to

1. Illustrate the usage of Mechatronics systems and Artificial intelligence for manufacturing sectors.
2. Explain the working principles and classification of sensors and transducers.

3. Describe the basic structure and operation of Microcontroller and Microprocessor
4. Interpret the basic structure and categorize the components used in Programmable logic controller.
5. Explain the Concept of Data Base Management System and its usage in CAD/CAM.
6. Elucidate about Transducers and its applications in real life.

#### **(20ME3024) MECHANICS OF COMPOSITES**

##### **COURSE OUTCOMES**

On completion of this course, the students will be able to

1. Elucidate the mechanical characteristics of composite materials.
2. Evaluate and estimate the micromechanical behavior of the materials.
3. Define the coordinate transformation of composite materials
4. Design the elastic behaviour on unidirectional composite materials.
5. Formulate of laminate composite materials and its behaviors.
6. Develop new methods of manufacturing composites.

#### **(20ME3025) INDUSTRIAL ROBOTICS AND EXPERT SYSTEMS**

##### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to:

1. Understand fundamentals of Robotics.
2. Provide better understanding of the principles of controlling the Robot motion.
3. Design robots and robotic work cells.
4. Acquire knowledge of write program for controlling the robots.
5. Apply artificial intelligence and expert systems in robotics.
6. Understand about Robot Kinematics.

#### **(20HS0824) BUSINESS ANALYTICS**

##### **COURSE OUTCOMES**

On successful completion of course student will be able to:

1. Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.
2. Design alternatives to solve business problems utilizing quantitative analysis, critical thinking and sound ethical decision making.
3. Summarize, process and transform data for obtaining meaningful conclusions
4. Interpret data using latest data analytics tools to address organizational problems
5. Organize and critically apply the concepts and methods of business analytics
6. Assess decision problems and build models for creating solutions using business analytical tools.

#### **(20CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**

##### **COURSE OUTCOMES**

On successful completion of the course, the student should be able to

1. Summarize the concept of strategic cost management, strategic cost analysis – target

costing, life cycle costing and Kaizen costing and the cost drive concept.

2. Describe the decision-making; relevant cost, differential cost, incremental cost and

opportunity cost, objectives of a costing system.

3. Summarize the meaning and different types of project management and project

execution, detailed engineering activities.

4. Understand the project contracts.

5. Describe the cost behavior and profit planning types and contents, Bar charts and

Network diagram.

6. Analyze by using quantitative techniques for cost management like PERT/CPM.

### **(20EE2128) WASTE TO ENERGY**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Analyse agro based, forest residue and industrial waste conversion processes.

2. Manufacture of Pyrolytic oils and gases.

3. Manufacture of charcoal, yields and applications.

4. Understand various types of gasifiers operation.

5. Understand inclined and fluidized bed combustors operation.

6. Understand types of biogas plants and biomass energy programme in India.

### **(20ME3026) INDUSTRIAL SAFETY**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Explain the Points of factories act 1948 for health and safety.

2. Define the term Cost & its relation with replacement economy.

3. Recognize the Concept of Wear, Corrosion and its Prevention methods.

4. Understand the Concept of sequence of fault finding activities and the importance of decision tree.

5. Elaborate the importance of scheduled preventive maintenance of mechanical and electrical equipment.

6. Distinguish between Periodic and Preventive maintenance of equipments.

### **(20ME3027) ADVANCES IN OPERATIONS RESEARCH**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Create mathematical models of the real time situations.

2. Implement Transportation and Assignment problems to solve in real time industry.

3. Choose the best strategy of Game and capable of identifying the suitable queuing Theory.

4. Enumerate fundamental techniques and apply it to solve various optimization

areas.

5. Investigate, study, Apply knowledge in Replacement models and Inventory Control Models.

6. Understand the Inventory control Models.

### **(20ME3028) COMPOSITE MATERIALS**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Explain the Fundamental concept of composite materials.
2. Classify different types of composite materials.
3. Describe the Fabrication and processing of composite materials.
4. Illustrate the Methods of preparation of Metal matrix Composites and polymer matrix composites.
5. Discuss about the Mechanical behavior of composite materials.
6. Explain the application of composite materials.

# SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

**M.Tech. (Electronics and Communication Engineering)**

**Specialization: Digital Electronics & Communication Systems**

**Regulation-R20**

**I M.Tech. – I Semester**

**(20HS0823) RESEARCH METHODOLOGY AND IPR**

## **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Recognize appropriate research problem, errors in selecting a research problem, Scope and objectives of research*
2. *Critically assess research methods pertinent to technology innovation research*
3. *Identify, explain, compare, and prepare the key elements of a research proposal/report*
4. *Skill to understand the need of intellectual property rights, IPR protection to inventors*
5. *Develop procedural knowledge to Legal System and solving the problem relating to intellectual property rights for further research work and investment in R & D*

**(20EC4001) ADVANCED DIGITAL SYSTEM DESIGN**

## **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Knowledge of digital integrated circuit hardware design.*
2. *Analyze and design combinational and sequential digital circuits.*
3. *Identify the requirements and specifications of the system required for a given application.*
4. *Able to learn the benefits and drawbacks of various design methods.*
5. *Test the performance of combinational and sequential digital circuits.*

**(20EC4002) ADVANCED DIGITAL SIGNAL PROCESSING**

## **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Know the analysis of discrete time signals.*
2. *To study the modern digital signal processing algorithms and applications.*
3. *Have an in-depth knowledge of use of digital systems in real time applications.*
4. *Apply the algorithms for wide area of recent applications in digital signal processing.*
5. *To study the modern filter design and implementation.*

**(20EC4003) ANTENNA and RADIATING SYSTEMS**  
**(Programme Elective –I)**

**COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Understanding the Basic Principles and Radiation of Antennas.*
2. *Recognizing Fundamental Parameters of Antennas.*
3. *Explain Dipole Antennas, Establish Mathematical Equations for Various Parameters of thin Linear Antenna.*
4. *Understanding the Various Types of Antenna Arrays.*
5. *Design Wire Antennas, Loop Antennas, Reflector Antennas, Lens Antennas, Horn Antennas and Micro Strip Antennas.*

**(20EC4004) DIGITAL COMMUNICATION TECHNIQUES**  
**(Programme Elective –I)**

**COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.*
2. *Perform the time and frequency domain analysis of the signals in a digital communication system.*
3. *Select the blocks in a design of digital communication system.*
4. *Analyze Performance of spread spectrum communication system.*
5. *Analyze Performance of OFDM communication system.*

**(20EC4005) DSP PROCESSORS & ARCHITECTURES**  
**(Programme Elective –I)**

**COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Understand the basics of Digital Signal Processing and transforms.*
2. *Able to distinguish between the architectural features of General purpose processors and DSP processors.*
3. *Understand the architectures of TMS320C54xx devices.*

4. *Able to write simple assembly language programs using instruction set of TMS320C54xx knowledge.*
5. *Can Interface various devices to DSP Processors.*

**(20EC4006) HIGH SPEED NETWORKS**  
**(Programme Elective –II)**

**COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Gets an in-depth knowledge of High-Speed Networks and TCP/IP protocols.*
2. *Knows about the security and network management.*
3. *Analyze the cause of congestion, traffic slow down and related factors for Quality of Service.*
4. *Understand about ATM and Frame relay.*
5. *Explain the major techniques involved, and networks & systems issues for the design and implementation of High-Speed networks.*

**(20EC4007) VOICE and DATA NETWORKS**  
**(Programme Elective – II)**

**COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Design a voice and data network.*
2. *Understand network terminology and network switching.*
3. *Understand about multiple access protocols.*
4. *Design a network with ip addresses and make subnets of the networks.*
5. *Understand quality of service in packet networks.*

**(20EC4008) WIRELESS SENSOR NETWORKS**  
**(Programme Elective – II)**

**COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Able to understand the basic WSN technology and supporting protocols, with emphasis.*
2. *Able to understand the sensor network hardware and operating systems.*
3. *Able to understand the sensor network protocols and addresses physical layer issues.*
4. *Able to understand and differentiate database management systems, data storage and Query processing.*
5. *Able to design and deploy the sensor networks.*



## **(20EC4009) ADVANCED DIGITAL SIGNAL PROCESSING LAB (Virtual Lab)**

### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Understand the handling of discrete/digital signals using MATLAB.*
2. *Understand the basic operations of Signal processing.*
3. *Analyze the spectral parameter of window functions.*
4. *Design IIR, and FIR filters for band pass, band stop, low pass and high pass filters.*
5. *Design the signal processing algorithm using MATLAB & VLAB.*

## **(20EC4010) ADVANCED DIGITAL SYSTEM DESIGN LAB**

### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Achieve Knowledge and Awareness of various components to design stable analog circuits.*
2. *Represent numbers and perform arithmetic operations.*
3. *Minimize the Boolean expression using Boolean algebra and design it using logic gates*
4. *Analyze and design combinational circuit.*
5. *Design and develop sequential circuits.*
6. *Translate real world problems into digital logic formulations using VHDL.*

## **(20HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *To recognize and demonstrate the style and conventions of research writing.*
2. *To improve the clarity and coherence of their written proposal.*
3. *Able to use a variety of sentence patterns.*
4. *To enhance their revision and proofreading skills.*
5. *To use effective strategies and techniques to construct their academic projects*

**I M. Tech. – II Sem.**

## **(20EC4011) WIRELESS COMMUNICATIONS**

### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *To understand the basics of Wireless Communication.*
2. *To motivate the students to pursue research in the area of wireless communication.*
3. *Analyze and design receiver and transmitter diversity techniques.*

4. *Analyze Multiuser Systems, SSMA, CDMA network planning.*
5. *Summarize the principles of MIMO and specifications of communication standards.*

### **(20EC4012) CODING THEORY & TECHNIQUES**

#### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Knowledge of properties and algorithms of linear block codes.*
2. *Apply coding theory and linear algebra in source coding and channel coding.*
3. *Understand various error control encoding and decoding techniques.*
4. *Knowledge of properties and algorithms of cyclic codes and convolution codes.*
5. *Analyze the performance of error control codes.*

### **(20EC4109) INTRODUCTION TO IoT (Programme Elective – III)**

#### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Discuss the world of current technologies.*
2. *Describe the major application areas of IoT.*
3. *Describe about the networking in IoT.*
4. *Apply the concepts of python programming in IoT.*
5. *Design & develop IoT applications using python.*

### **(20EC4013) ADAPTIVE SIGNAL PROCESSING (Programme Elective – III)**

#### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Comprehend adaptive system and functions.*
2. *Understand the design criteria for a linear adaptive processor.*
3. *Develop different adaptive modelling systems.*
4. *Understand the properties of Kalman filtering.*
5. *Understand the properties of Non-Linear Adaptive Filtering.*

### **(20EC4014) COGNITIVE RADIO (Programme Elective – III)**

#### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Demonstrate an understanding on software defined radio architecture and design principles.*
2. *Demonstrate an understanding on cognitive radio components, functions and capabilities.*
3. *Evaluate different spectrum sensing mechanisms in cognitive radio.*
4. *Analyse the spectrum management functions using cognitive radio systems and cognitive radio networks.*
5. *Demonstrate an understanding on cooperative communications.*

### **(20EC4015) IMAGE & VIDEO PROCESSING**

#### **(Programme Elective – IV)**

#### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Describe and use the principles of digital image and video processing to develop image processing algorithms.*
2. *Implement (for example with MATLAB) and assess the developed image processing algorithms.*
3. *Explain algorithm design choices using the principles of digital image/video processing.*
4. *Develop image processing algorithms for a given practical image/video processing problem.*
5. *Solve more advanced problems in all areas mentioned above*
6. *Identify and explain the challenges, propose possible solutions, and explain the chosen algorithm design.*

### **(20EC4016) PATTERN RECOGNITION AND MACHINE LEARNING**

#### **(Programme Elective – IV)**

#### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Able to understand the Bayesian approach to pattern recognition.*
2. *Able to Understand Linear Models for Regression and Classification.*
3. *Analyze the performance of neural networks.*
4. *Able to Understand Linear Discriminant Functions for Machine Learning.*
5. *Able to Understand Algorithm Independent Machine Learning.*

### **(20EC4017) DETECTION & ESTIMATION OF SIGNALS**

#### **(Programme Elective – IV)**

#### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *To enable the students to acquire the fundamental concepts of Signal Detection and Estimation.*
2. *To get familiarize with different Hypotheses in detection and estimation problems*
3. *Use classical and Bayesian approaches to formulate and solve problems for parameter estimation from noisy signals.*
4. *To introduce the methods of Detection and estimation of signals in white and non-white Gaussian noise.*
5. *To enable the students to understand the time varying waveform detection and its estimation.*

### **(20EC4018) ADVANCED COMMUNICATIONS LAB (Virtual Lab)**

#### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Understand the concepts behind various digital signaling schemes for fading channels.*
2. *Understand the concept of co-channel interference & Signal to Interference and Noise Ratio.*
3. *Understand the importance of Sectoring & Handoff.*
4. *Understand the impact of shadowing and path loss exponent on boundary coverage probability.*
5. *Understand the various Path losses that occur in real time.*

### **(20EC4019) IMAGE & VIDEO PROCESSING LAB**

#### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Examine various types of images, intensity transformations and applying various filtering techniques.*
2. *Identify the suitable image enhancement and restoration techniques based upon the application.*
3. *Show how higher-level image concepts such as edge detection, segmentation, representation can be implemented and used.*
4. *To manipulate both binary and grayscale digital images using morphological filters and operators to achieve a desired result.*
5. *Apply image processing algorithms in practical applications.*

### **(20HS0829) CONSTITUTION OF INDIA**

#### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Explain the key concepts of political economy*
2. *Analyse the significant developments in the political ideologies*
3. *Describe the salient features of the constitution of India interpret, integrate and critically*
4. *Analyse the political economy of Indian international relations and gain knowledge in Judiciary system*

5. *Apply their knowledge and skills acquired to write various competitive examinations*

## **II M.TechI Sem.**

### **(20EC4021 ) OPTICAL NETWORKS**

**(Programme Elective – V)**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Describe the various layers involved in network & Recall basic laws of optical physics.*
2. *Identify the necessity for using couplers and connectors in energy transmission.*
3. *Identify the various multiplexing the techniques.*
4. *Recall basic of multiplexers add/drop.*
5. *Identify different types of protection in SONET/SDH.*
6. *Explain the use of cost tradeoffs & Able to know the overview of access network.*

### **(20EC4213) TESTING & TESTABILITY**

**(Programme Elective – V)**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Understand the elementary concepts of Testing and Testability.*
2. *Understand different types of faults associated with logic circuits and types of testing by employing fault models to the logic circuits.*
3. *Get complete knowledge about different methods of simulation and algorithms associated with testing.*
4. *Analyze BIST concepts and design self-test at Board Level.*
5. *Analyze Memory Test Requirements for MBIST and Embedded Core Testing.*
6. *Apply the concepts in testing which can help them design a better yield in IC design.*

### **(20EC4022) RF AND MICROWAVE CIRCUIT DESIGN**

**(Programme Elective – V)**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Establish and develop the overall knowledge of RF and microwave circuits and devices and relation between different parameters.*

2. *Design impedance matching network for any transmission line or system and familiarity with passive microwave components.*
3. *Use Smith Chart in RF applications.*
4. *Model and analyze the characteristics of microwave semiconductor diodes and transistors.*
5. *Analyze and find applications and limitations of microwave tube Generators and Amplifiers.*
6. *Evaluate the Performance of RF active circuits through EDA tools.*

**(20HS0824) BUSINESS ANALYTICS**  
**(Open Elective)**

**COURSE OUTCOMES**

On successful completion of course, the student will be able to

7. *Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.*
8. *Design alternatives to solve business problems utilizing quantitative analysis, critical thinking and sound ethical decision making.*
9. *Summarize, process and transform data for obtaining meaningful conclusions*
10. *Interpret data using latest data analytics tools to address organisational problems*
11. *Organize and critically apply the concepts and methods of business analytics*
12. *Assess decision problems and build models for creating solutions using business analytical tools.*

**(20CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**  
**(Open Elective)**

**COURSE OUTCOMES**

On successful Completion of this course, the student will be able to

1. *Summarise the concept of strategic cost management, strategic cost analysis – target costing, life cycle costing and Kaizen costing and the cost drive concept.*
2. *Describe the decision-making; relevant cost, differential cost, incremental cost and opportunity cost, objectives of a costing system.*
3. *Summarise the meaning and different types of project management and project execution, detailed engineering activities.*
4. *Understand the project contracts,*
5. *Describe the cost behaviour and profit planning types and contents, Bar charts and Network diagram.*
6. *Analyse by using quantitative techniques for cost management like PERT/CPM.*

**(20EE2128) WASTE TO ENERGY**  
**(Open Elective)**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Analyse agro based, forest residue and industrial waste conversion processes.*

2. *Manufacture of Pyrolytic oils and gases*
3. *Manufacture of charcoal, yields and applications*
4. *Understand various types of gasifiers operation*
5. *Understand inclined and fluidized bed combustors operation*
6. *Understand types of biogas plants and biomass energy programme in India*

### **(20ME3121) INDUSTRIAL SAFETY**

**(Open Elective)**

#### **COURSE OUTCOMES(COs)**

On successful completion of this course, the student will be able to

7. *Explain the Points of factories act 2048 for health and safety.*
8. *Define the term Cost & its relation with replacement economy.*
9. *Recognize the Concept of Wear, Corrosion and its Prevention methods*
10. *Understand the Concept of sequence of fault finding activities and the importance of decision tree*
11. *Elaborate the importance of scheduled preventive maintenance of mechanical and electrical equipment.*
12. *Distinguish between Periodic and Preventive maintenance of equipments.*

### **(20ME3021) ADVANCES IN OPERATIONS RESEARCH**

**(Open Elective)**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. *Create mathematical models of the real time situations.*
2. *Implement Transportation and Assignment problems to solve in real time industry*
3. *Choose the best strategy of Game and capable of identifying the suitable queuing theory*
4. *Enumerate fundamental techniques and apply it to solve various optimization areas*
5. *Investigate, study, Apply knowledge in Replacement models and*
6. *Understand the Inventory control Models*

### **(20ME3022) COMPOSITE MATERIALS**

**(Open Elective)**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

7. *Explain the Fundamental concept of composite materials.*
8. *Classify different types of composite materials.*
9. *Describe the Fabrication and processing of composite materials.*
10. *Illustrate the Methods of preparation of Metal matrix Composites and polymer matrix composites*

- 11. Discuss about the Mechanical behavior of composite materials.*
- 12. Explain the application of composite materials.*



# SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY :: PUTTUR

(AUTONOMOUS)

**M.Tech. (Electronics and Communication Engineering)**

**Specialization: Embedded Systems**

**Regulation-R20**

**I M.Tech – I Sem.**

**(20HS0823) RESEARCH METHODOLOGY AND IPR**

## **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Recognize appropriate research problem, errors in selecting a research problem, Scope and objectives of research*
2. *Critically assess research methods pertinent to technology innovation research*
3. *Identify, explain, compare, and prepare the key elements of a research proposal/report*
4. *Skill to understand the need of intellectual property rights, IPR protection to inventors*
5. *Develop procedural knowledge to Legal System and solving the problem relating to intellectual property rights for further research work and investment in R & D*

**(20EC4101) EMBEDDED SYSTEM DESIGN**

## **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Apply and analyse the applications in various processors and domains of embedded system*
2. *Analyse and develop embedded hardware and software development cycles and tools.*
3. *Analyse and understand a microprocessor and core of the embedded system.*
4. *Analyse to understand different concepts of a RTOS, sensors, memory interface, and communication interface.*
5. *Solve real world problems by doing projects using embedded systems.*

**(20EC4102) SENSORS AND ACTUATORS**

## **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Describe basic laws and phenomena that define behaviour of sensors and actuator.,*
2. *Analyse various premises, approaches, procedures and results related to sensors and actuators.*
3. *Create analytical design and development solutions for sensors and actuator.*

4. *Conduct experiments and measurements in laboratory and on real components, sensors and actuators.*
5. *Describe development and application of sensors and actuators,*
6. *Take part in team work and be able to independently present various professional materials.*

**(20EC4103) STRUCTURAL DIGITAL SYSTEM DESIGN**  
**(Programme Elective-I)**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Understand structural functionality of different digital blocks*
2. *Represent their designs in ASM charts*
3. *Realize their designs in ASM charts*
4. *Represent their designs in different modelling styles by using VHDL*
5. *Understand concept of Micro program and issues related to micro programming*

**(20EC4209) FPGA ARCHITECTURES & APPLICATIONS**  
**(Programme Elective-I)**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Acquire Knowledge about Various Architectures and Device Technologies Of PLD's*
2. *Comprehend FPGA Architectures.*
3. *Describe FSM and Different FSM Techniques like Petrinets & Different Case Studies.*
4. *Acquire Knowledge on Hot Design Method*
5. *Analyze System Level Design and Their Application for Combinational and Sequential Circuits*

**(20EC4104) REAL TIME OPERATING SYSTEMS**  
**(Programme Elective-I)**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Summarize the issues in real time computing*
2. *Explain and give examples of real time operating systems.*
3. *Solve scheduling problems and can apply them in real time applications in industry.*
4. *Design an RTOS and will be able to interpret the feasibility of a task set to accomplish or not.*
5. *Analyse the situation of fault occurrence and will be able to apply solutions accordingly.*

**(20EC4105) EMBEDDED NETWORKING**  
**(Programme Elective-II)**

## **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Analyse the use of embedded networks in real time applications.*
2. *Analyse fundamentals of embedded communication protocols.*
3. *Apply the concepts of embedded Ethernet in embedded networking.*
4. *Apply the knowledge of wireless embedded networking in the design of network embedded systems.*

## **(20EC4011) WIRELESS COMMUNICATIONS (Programme Elective-II)**

## **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *To understand the basics of Wireless Communication.*
2. *To motivate the students to pursue research in the area of wireless communication.*
3. *Analyze and design receiver and transmitter diversity techniques*
4. *Analyze Multiuser Systems, SSMA, CDMA network planning.*
5. *Summarize the principles of MIMO and specifications of communication standards.*

## **(20EC4106) INTERNET PROTOCOLS (Programme Elective-II)**

## **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Independently understand basic computer network technology.*
2. *Understand and explain Data Communications System and its components.*
3. *Enumerate the layers of the OSI model and TCP/IP.*
4. *Identify the different types of network devices and their functions within a network*
5. *Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.*

## **(20EC4107) EMBEDDED SYSTEM DESIGN LAB**

## **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Experience with a set of tools for embedded systems programming and debugging.*
2. *Experience with implementing several embedded systems with particular focus on the interaction ARM-926 with RTOS devices.*
3. *Design products using ARM-CORTEX processor and various analog and digital ICs.*

## **(20EC4108) STRUCTURAL DIGITAL SYSTEM DESIGN LAB**

## **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Different modeling styles available in VHDL and Verilog and difference between them*
2. *Difference between Verilog and VHDL*
3. *Representation of different digital modules in different modelling styles available in VHDL and Verilog*

## **(20HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

**(Audit Course)**

## **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Familiarize students with the key concepts of linguistics and develop awareness of the latest trends in language study.*
2. *Lead to a greater understanding of the human communicative action through an objective study of language.*
3. *Know and appreciate the location of literature within humanities.*
4. *Gain knowledge of research methods in literary studies and advanced knowledge of literature in the English language and literary theory.*
5. *Carry out an independent, limited research project under supervision, in accordance with applicable norms, ideals and conditions for literary research.*
6. *Improve common and basic scholarly requirements of logical and empirical rigor.*

## **I M.Tech – II Sem.**

## **(20EC4109) INTRODUCTION TO IoT**

## **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Discuss the world of current technologies.*
2. *Describe the major application areas of IoT.*
3. *Describe about the networking in IoT.*
4. *Apply the concepts of python programming in IoT.*
5. *Design & develop IoT applications using python.*

## **(20EC4110) ADVANCED MICROCONTROLLERS**

## **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Describe the fundamentals of embedded systems*
2. *Describe the fundamentals of ARM Processors*
3. *Apply the knowledge of C & Assembly to program processor*
4. *Examine the architecture of MSP430 Processor.*
5. *Design applications based on MSP430 processors*

**(20EC4111) HARDWARE SOFTWARE CO-DESIGN**  
**(Programme Elective-III)**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Acquire the knowledge on various models*
2. *Explore the interrelationship between Hardware and software in embedded system*
3. *Acquire the knowledge of firmware development process and tools*
4. *Evaluate the requirements of programming Embedded Systems, related software architectures and tool chain for Embedded Systems.*
5. *Understand validation methods and adaptability*

**(20EC4213) TESTING & TESTABILITY**  
**(Programme Elective-III)**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Understand the elementary concepts of Testing and Testability.*
2. *Understand different types of faults associated with logic circuits and types of testing by employing fault models to the logic circuits.*
3. *Get complete knowledge about different methods of simulation and algorithms associated with testing.*
4. *Analyze BIST concepts and design self-test at Board Level.*
5. *Analyze Memory Test Requirements for MBIST and Embedded Core Testing.*

**(20EC4112) MICRO ELECTROMECHANICAL SYSTEMS**  
**(Programme Elective-III)**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Develop an understanding of microscale physics for use in designing MEMS system applications.*
2. *Understand concepts of basic MEM devices and systems.*
3. *Acquires knowledge on mechanical terms used in MEMS.*
4. *Understand the two terminal MEMS and its characteristics.*
5. *Design digital and analog applications in various silicon-based MEMS structures.*

**(20EC4201) VLSI TECHNOLOGY**  
**(Programme Elective-IV)**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Understands various parameters of MOSFET based logic circuits.*
2. *Draw layout of a given circuit.*
3. *Design and Analyze Combinational and sequential Circuits.*
4. *Floor Planning and Physical Design Flows.*
5. *Familiar with basics of Chip Design*

**(20EC4202) DIGITAL IC DESIGN**  
**(Programme Elective-IV)**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Understand Static and dynamic power consumption in Integrated Chips.*
2. *Design CMOS based Combinational circuits and Memory modules.*
3. *Demonstrate the delay and power consumption in BiCMOS circuits.*
4. *Design and Analyse Layout of given circuit interms of various parameters.*
5. *Able to mimic and implement simple subsystems design.*

**(20EC4008) WIRELESS SENSOR NETWORKS**  
**(Programme Elective-IV)**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Able to understand the basic WSN technology and supporting protocols, with emphasis.*
2. *Able to understand the sensor network hardware and operating systems.*
3. *Able to understand the sensor network protocols and addresses physical layer issues.*
4. *Able to understand and differentiate database management systems, data storage and Query processing.*
5. *Able to design and deploy the sensor networks.*

**(20EC4113) INTERNET OF THINGS LAB**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Identify the requirements for the real-world problems.*
2. *Conduct a survey of several available literatures in the preferred field of study.*
3. *Study and enhance software/ hardware skills.*

4. *Demonstrate and build the project successfully by hardware requirements, coding, emulating and testing.*
5. *Demonstrate an ability to work in teams and manage the conduct of the research study.*

### **(20EC4114) MICROCONTROLLERS & INTERFACING LAB**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Design and Implement basic circuits that are used in embedded systems.*
2. *Develop code using appropriate tools.*
3. *Test the circuit performance with standard benchmark circuits.*
4. *Provide solid foundation on interfacing the external devices to the processor according to the user requirements to create novel products and solutions for the real time problems*

### **(20HS0829) CONSTITUTION OF INDIA**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Explain the key concepts of political economy*
2. *Analyse the significant developments in the political ideologies*
3. *Describe the salient features of the constitution of India interpret, integrate and critically*
4. *Analyse the political economy of Indian international relations and gain knowledge in Judiciary system*
5. *Apply their knowledge and skills acquired to write various competitive examinations*

#### **II M.Tech. – I Sem.**

### **(20EC4002) ADVANCED DIGITAL SIGNAL PROCESSING**

**(Common to ES & DECS)**

**(Programme Elective-V)**

#### **COURSE OUTCOMES(COs)**

On successful completion of this course, the student will be able to

1. *Analyze the Discrete-time signals*
2. *Understand the digital Signal Processing algorithms and its applications*
3. *Apply the knowledge of usage of Digital systems in real time applications*
4. *Apply the algorithms for recent trend applications in Digital Signal Processing*
5. *Understand the modern filter design and their implementation*
6. *Able to understand the parametric method for estimation of power spectral density*

**(20EC4116) RADIO FREQUENCY IDENTIFICATION**  
**(Programme Elective-V)**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Understand the fundamentals of RFID technology.*
2. *Recognize the development history of RFID technology.*
3. *Understand the global privacy policy and regulations of RFID technology.*
4. *Analyze the impact of RFID in various sectors.*
5. *Describe various applications of RFID technology.*
6. *Analyze the implementation of RFID technology in various application areas.*

**(20EC4117) SYSTEM ON CHIP ARCHITECTURE**  
**(Programme Elective-V)**

**COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Design processors keeping area, power and speed as constraints and to Deepen CMOS VLSI design knowledge.*
2. *Design full custom/ semicustom/ standard cells for ASIC.*
3. *Implement both hardware and software solutions, formulate hardware/software tradeoffs, and perform hardware/software codesign.*
4. *Implement network on chip technologies.*
5. *Analyze memories using reconfigurable architectures for rapid prototyping*
6. *Analyze system on chip and board based systems.*

**(20HS0824) BUSINESS ANALYTICS**  
**(Open Elective)**

**COURSE OUTCOMES**

On successful completion of course, the student will be able to

13. *Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.*
14. *Design alternatives to solve business problems utilizing quantitative analysis, critical thinking and sound ethical decision making.*
15. *Summarize, process and transform data for obtaining meaningful conclusions*
16. *Interpret data using latest data analytics tools to address organisational problems*
17. *Organize and critically apply the concepts and methods of business analytics*
18. *Assess decision problems and build models for creating solutions using business analytical tools.*

**(20CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**  
**(Open Elective)**



## **COURSE OUTCOMES**

On successful Completion of this course, the student will be able to

7. *Summarise the concept of strategic cost management, strategic cost analysis – target costing, life cycle costing and Kaizen costing and the cost drive concept.*
8. *Describe the decision-making; relevant cost, differential cost, incremental cost and opportunity cost, objectives of a costing system.*
9. *Summarise the meaning and different types of project management and project execution, detailed engineering activities.*
10. *Understand the project contracts,*
11. *Describe the cost behaviour and profit planning types and contents, Bar charts and Network diagram.*
12. *Analyse by using quantitative techniques for cost management like PERT/CPM.*

## **(20EE2128) WASTE TO ENERGY**

**(Open Elective)**

## **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

7. *Analyse agro based, forest residue and industrial waste conversion processes.*
8. *Manufacture of Pyrolytic oils and gases*
9. *Manufacture of charcoal, yields and applications*
10. *Understand various types of gasifiers operation*
11. *Understand inclined and fluidized bed combustors operation*
12. *Understand types of biogas plants and biomass energy programme in India*

## **(20ME3121) INDUSTRIAL SAFETY**

**(Open Elective)**

## **COURSE OUTCOMES(COs)**

On successful completion of this course, the student will be able to

13. *Explain the Points of factories act 2048 for health and safety.*
14. *Define the term Cost & its relation with replacement economy.*
15. *Recognize the Concept of Wear, Corrosion and its Prevention methods*
16. *Understand the Concept of sequence of fault finding activities and the importance of decision tree*
17. *Elaborate the importance of scheduled preventive maintenance of mechanical and electrical equipment.*
18. *Distinguish between Periodic and Preventive maintenance of equipments.*

## **(20ME3021) ADVANCES IN OPERATIONS RESEARCH**

**(Open Elective)**

## **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. *Create mathematical models of the real time situations.*
2. *Implement Transportation and Assignment problems to solve in real time industry*
3. *Choose the best strategy of Game and capable of identifying the suitable queuing theory*
4. *Enumerate fundamental techniques and apply it to solve various optimization areas*
5. *Investigate, study, Apply knowledge in Replacement models and*
6. *Understand the Inventory control Models*

**(20ME3022) COMPOSITE MATERIALS**  
**(Open Elective)**

**COURSE OUTCOMES**

On successful completion of this course, the student will be able to

13. *Explain the Fundamental concept of composite materials.*
14. *Classify different types of composite materials.*
15. *Describe the Fabrication and processing of composite materials.*
16. *Illustrate the Methods of preparation of Metal matrix Composites and polymer matrix composites*
17. *Discuss about the Mechanical behavior of composite materials.*
18. *Explain the application of composite materials.*

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**

**(AUTONOMOUS)**

**M.Tech. (Electronics and Communication Engineering)**

**Specialization: VLSI**

**Regulation-R20**

**I M.Tech. – I Semester**

**(20HS0823) RESEARCH METHODOLOGY AND IPR**

**COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Recognize appropriate research problem, errors in selecting a research problem, Scope and objectives of research*
2. *Critically assess research methods pertinent to technology innovation research*
3. *Identify, explain, compare, and prepare the key elements of a research proposal/report*
4. *Skill to understand the need of intellectual property rights, IPR protection to inventors*
5. *Develop procedural knowledge to Legal System and solving the problem relating to intellectual property rights for further research work and investment in R & D*

**(18EC4201) VLSI TECHNOLOGY**

**COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Understands various parameters of MOSFET based logic circuit.*
2. *Draw layout of a given circuit.*
3. *Design and Analyze Combinational and sequential Circuits.*
4. *Floor Planning and Physical Design Flows.*
5. *Familiar with basics of Chip Design.*

**(18EC4202) DIGITAL IC DESIGN**

**COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *Understand Static and dynamic power consumption in Integrated Chips.*
2. *Design CMOS based Combinational circuits and Memory modules.*
3. *Demonstrate the delay and power consumption in BiCMOS circuits.*
4. *Design and Analyze Layout of given circuit in terms of various parameters.*

5. *Able to mimic and implement simple subsystems design.*

### **(20EC4203) ASIC DESIGN**

#### **(Programme Elective-I)**

#### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *Demonstrate VLSI tool-flow and appreciate FPGA architecture.*
2. *Understand the issues involved in ASIC design, including technology choice, design management, tool-flow, verification, debug and test, as well as the impact of technologyscaling on ASIC design.*
3. *Understand the algorithms used for ASIC construction*
4. *Understand the basics of System on Chip, On chip communication architectures like AMBA, AXI anutilizing Platform based design.*
5. *Appreciate high performance algorithms available for ASICs.*

### **(20EC4204) SYSTEM MODELLING & SIMULATION**

#### **(Programme Elective-I)**

#### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *Understand the topics in digital logic design.*
2. *Understand modeling and verification with Hardware Description Language.*
3. *Understand the tunning filtering.*
4. *Understand the signals and events.*
5. *Understand the simulation software.*

### **(20EC4101) EMBEDDED SYSTEM DESIGN**

#### **(Programme Elective-I)**

#### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *Apply and analyse the applications in various processors and domains of embedded system*
2. *To Analyse and develop embedded hardware and software development cycles and tools.*
3. *To Analyseand understand a microprocessor and core of the embedded system.*
4. *To Analyse to understand different concepts of a RTOS, sensors, memory interface, and communication interface.*
5. *To solve real world problems by doing projects using embedded systems.*

### **(20EC4205) VERILOG HDL**

### **(Programme Elective-I)**

#### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *Understand the basic concepts of Verilog HDL and write simple programs.*
2. *Design of Combinational and sequential logic circuits using user defined primitives, data types and operators.*
3. *Design and Simulate circuits using test vectors and to write the programs more effectively to reduce delay using Verilog tasks and directives.*
4. *Analyze Synthesis methodology of combinational and sequential logic and Finite State Machines.*
5. *Analyze MOS and CMOS circuits.*

### **(20EC4206)ANALOG IC DESIGN**

#### **(Programme Elective-II)**

#### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *Analyze the Advanced MOS Modeling concept and also learn the behavior of Current Mirrors.*
2. *Develop mathematical modeling of op-amps.*
3. *Analyze the design of MOS based sample and hold circuits.*
4. *Learn the design of data converters (ADC/DAC).*
5. *Analyze the concept of Over Sampling Converters.*

### **(20EC4015) IMAGE & VIDEO PROCESSING**

#### **(Common to DECS & VLSI)**

#### **(Programme Elective-II)**

#### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *Describe and use the principles of digital image and video processing to develop image processing algorithms.*
2. *Implement (for example with MATLAB) and assess the developed image processing algorithms.*
3. *Explain algorithm design choices using the principles of digital image/video processing.*
4. *Develop image processing algorithms for a given practical image/video processing problem.*
5. *Solve more advanced problems in all areas mentioned above*
6. *Identify and explain the challenges, propose possible solutions, and explain the chosen algorithm design.*

### **(20EC4207) DIGITAL ELECTRONIC CIRCUITS LAB (Virtual Lab)**

#### **COURSE OUTCOMES**

On Successful Completion of this Course ,the Student will be able to

1. *Convert different type of codes and number systems which are used in digital communication and computer systems.*
2. *Employ the codes and number systems converting circuits and Compare different types of logic families.*
3. *Analyse different types of digital electronic circuit using various mapping and logical tools.*
4. *simplified circuit using various mapping and mathematical methods.*
5. *Design different types of with and without memory element digital electronic circuits for particular operation.*

### **(20EC4208) DIGITAL IC DESIGN LAB**

#### **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Achieve Knowledge and Awareness of various components to design stable analog circuits.*
2. *Minimize the Boolean expression using Boolean algebra and design it using logic gates*
3. *Analyse and design combinational circuit.*
4. *Design and develop sequential circuits*
5. *Translate real world problems into digital logic formulations using VHDL.*

### **(20HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

#### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *To recognize and demonstrate the style and conventions of research writing.*
2. *To improve the clarity and coherence of their written proposal.*
3. *Able to use a variety of sentence patterns.*
4. *To enhance their revision and proofreading skills.*
5. *To use effective strategies and techniques to construct their academic projects.*

**I M.Tech – II Sem.**

### **(20EC4209) FPGA ARCHITECTURES & APPLICATIONS**

#### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *Acquire Knowledge about Various Architectures and Device Technologies Of PLD's*
2. *Comprehend FPGA Architectures.*
3. *Describe FSM and Different FSM Techniques like Petrinets & Different Case Studies.*
4. *Acquire Knowledge on Hot Design Method*
5. *Analyze System Level Design and Their Application for Combinational and Sequential Circuits*

## **(20EC4210) LOW POWER VLSI DESIGN**

### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *Analyze the low power MOSFET Device Behavior.*
2. *Analyze Low- Voltage Low Power CMOS /BiCMOS Logic Circuits.*
3. *Analyze and Design the Low Power Latches/Flipflops.*
4. *Learn Special Techniques for Low Power Clocks and Memories.*
5. *Analyze the Advanced Bi- CMOS Digital Circuits at low power.*

## **(20EC4211) NANO ELECTRONICS**

### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *Able to understand nanoelectronics holds the capacity for mass production of high-Quality nanodevices.*
2. *Able to analyze the scaling of transistors and other devices to smaller and smaller sizes, which has provided the basis for this exponential growth.*
3. *Able to analyze and design different types random access memories.*
4. *Able to analyze different mass storage devices which are useful in electronic gadgets.*
5. *Able to know in the near future from photonics, molecular electronics or revolutionary engineering solutions.*

## **(20EC4212) ALGORITHMS FOR VLSI DESIGN AUTOMATION**

**(Programme Elective-III)**

### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *To analyze & design Methodologies, Design Automation Tools and general-purpose methods for combinational optimization.*
2. *To analyze modeling and simulation of digital systems.*
3. *To analyze logic synthesis and verification of digital system's*
4. *To analyze high-level synthesis of digital systems.*
5. *To impart the knowledge about physical design automation of FPGA's and MCM's.*

## **(20EC4001) ADVANCED DIGITAL SYSTEM DESIGN**

**(Common to VLSI & DECS)**

**(Programme Elective-III)**

### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *To impart the knowledge about Design of digital systems and sequential circuit design*
2. *To impart the knowledge about Fault Modeling, Test Pattern generation and different methods for fault diagnosis of Combinational circuits.*
3. *Analyze D – Algorithm, PODEM, Random testing, Transition Count Testing, Signature Analysis and Testing for bridging faults for Test pattern generation of digital system design.*
4. *Analyze the functionality of sequential circuits using different fault diagnosis & test methods.*
5. *Analyze fault models, diagnosis methods of PLA Design and Asynchronous sequential circuits.*

### **(20EC4213) TESTING & TESTABILITY**

#### **(Programme Elective-IV)**

#### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *Understand the elementary concepts of Testing and Testability.*
2. *Understand different types of faults associated with logic circuits and types of testing by employing fault models to the logic circuits.*
3. *Get complete knowledge about different methods of simulation and algorithms associated with testing.*
4. *Analyze BIST concepts and design self-test at Board Level.*
5. *Analyze Memory Test Requirements for MBIST and Embedded Core Testing.*

### **(20EC4104) REAL TIME OPERATING SYSTEM**

#### **(Programme Elective-IV)**

#### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *Student will be able to summarize the issues in real time computing*
2. *Student will be able to explain and give examples of real time operating systems.*
3. *Student will be able to solve scheduling problems and can apply them in real time applications in industry.*
4. *Student can also design an RTOS and will be able to interpret the feasibility of a task set to accomplish or not.*
5. *Analyze the situation of fault occurrence and will be able to apply solutions accordingly.*

### **(20EC4214) SOLID STATE DEVICE MODELING AND SIMULATION**

#### **(Programme Elective-IV)**

#### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *Able to analyze the principles of basic device modeling*



2. Able to understand the changes introduced in the device models as well as contribute to the development of appropriate device models
3. Able to Analyze General Purpose Circuit Simulators
4. Able to Analyze mathematical techniques for device simulations
5. Able to Analyze Simulation of Semiconductor Devices

### **(20EC4215) MIXED SIGNAL LAB**

#### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. Model analog circuit with, simulate, synthesis in Micro wind.
2. Understand chip level issues and need of testability.
3. Design OP-AMP circuits for specified applications

### **(20EC4216) DIGITAL VLSI DESIGN LAB (VIRTUAL LAB)**

#### **COURSE OUTCOMES**

On Successful Completion of this Course the Student will be able to

1. Design and simulate list of combinational and sequential digital circuits using Modelism&Xilinx–VHDL language.
2. Understand the static and dynamic characteristics of CMOS Inverter.
3. Design and simulate the brawn array multiplier and ALU using Modelsim and Xilinx-Verilog Language.
4. Characterize Combinational circuits using Pass Transistor logic
5. Design & Analyse the sequential circuit
6. Design RAM and FSM using Questa software.

### **(20EC4216) DIGITAL VLSI DESIGN LAB (Virtual Lab)**

#### **COURSE OUTCOMES**

On Successful Completion of this Course the Student will be able to

1. Design and simulate list of combinational and sequential digital circuits using Modelism&Xilinx–VHDL language.
2. Understand the static and dynamic characteristics of CMOS Inverter.
3. Design and simulate the brawn array multiplier and ALU using Modelsim and Xilinx-Verilog Language.
4. Characterize Combinational circuits using Pass Transistor logic
5. Design & Analyse the sequential circuit
6. Design RAM and FSM using Questa software.

## **(20HS0829) CONSTITUTION OF INDIA**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

6. *Explain the key concepts of political economy*
7. *Analyse the significant developments in the political ideologies*
8. *Describe the salient features of the constitution of India interpret, integrate and critically*
9. *Analyse the political economy of Indian international relations and gain knowledge in Judiciary system*
10. *Apply their knowledge and skills acquired to write various competitive examinations*

### **II M.Tech.- I Sem.**

## **(20EC4218) SCRIPTING LANGUAGE FOR VLSI DESIGN AUTOMATION (Programme Elective-V)**

### **COURSE OUTCOMES**

On Successful Completion of this Course, the Student will be able to

1. *Develop the basic knowledge on data types of Perl*
2. *Design and revision of Perl scripts*
3. *Develop the knowledge of standard input , output and files in programming*
4. *Develop substantial knowledge on Modules and CGI Programming.*
5. *Debug the techniques appropriate for the Perl language*
6. *Compare and contrast different regular expressions using operators and control structures.*

## **(20EC4219) NANO MATERIALS AND NANOTECHNOLOGY**

### **(Programme Elective-V)**

### **COURSE OUTCOMES**

On Successful Completion of this Course the Student will be able to

1. *Define the basic concepts of semiconductor nanostructures.*
2. *Illustrate the various parameters and explain about the characteristics of the magnetic nanostructures.*
3. *Understand the measurements performed for Nano sensors.*
4. *Analyze the different actuators.*
5. *Design the nanoparticles for different application fields based on molecular electronics.*
6. *Design the different nanostructured and nanomaterials for different applications*

## **(20EC4008) WIRELESS SENSOR NETWORKS**

### **(Common to VLSI, DECS & ES)**

### **(Programme Elective-V)**

## **COURSE OUTCOMES**

On successful completion of course, the student will be able to

1. *Understand the basic concepts of wireless sensor networks, sensing, computing and communication tasks*
2. *Understand the radio standards and communication protocols adopted in wireless sensor networks*
3. *Describe and explain the hardware, software and communication for wireless sensor network nodes*
4. *Understand the architectures, features, and performance for wireless sensor network systems and platforms*
5. *Describe and analyze the specific requirements of applications in wireless sensor networks for energy efficiency, computing, storage and transmission*
6. *Design and deploy the sensor networks*

## **(20HS0824) BUSINESS ANALYTICS**

**(Open Elective)**

## **COURSE OUTCOMES**

On successful completion of course, the student will be able to

19. Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.
20. Design alternatives to solve business problems utilizing quantitative analysis, critical thinking and sound ethical decision making.
21. Summarize, process and transform data for obtaining meaningful conclusions
22. Interpret data using latest data analytics tools to address organisational problems
23. Organize and critically apply the concepts and methods of business analytics
24. Assess decision problems and build models for creating solutions using business analytical tools.

## **(20CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**

**(Open Elective)**

## **COURSE OUTCOMES**

On successful Completion of this course, the student will be able to

13. *Summarise the concept of strategic cost management, strategic cost analysis – target costing, life cycle costing and Kaizen costing and the cost drive concept.*
14. *Describe the decision-making; relevant cost, differential cost, incremental cost and opportunity cost, objectives of a costing system.*
15. *Summarise the meaning and different types of project management and project execution, detailed engineering activities.*
16. *Understand the project contracts,*
17. *Describe the cost behaviour and profit planning types and contents, Bar charts and Network diagram.*
18. *Analyse by using quantitative techniques for cost management like PERT/CPM.*

## **(20EE2128) WASTE TO ENERGY**

**(Open Elective)**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

13. *Analyse agro based, forest residue and industrial waste conversion processes.*
14. *Manufacture of Pyrolytic oils and gases*
15. *Manufacture of charcoal, yields and applications*
16. *Understand various types of gasifiers operation*
17. *Understand inclined and fluidized bed combustors operation*
18. *Understand types of biogas plants and biomass energy programme in India*

## **(20ME3121) INDUSTRIAL SAFETY**

**(Open Elective)**

### **COURSE OUTCOMES(COs)**

On successful completion of this course, the student will be able to

19. *Explain the Points of factories act 2048 for health and safety.*
20. *Define the term Cost & its relation with replacement economy.*
21. *Recognize the Concept of Wear, Corrosion and its Prevention methods*
22. *Understand the Concept of sequence of fault finding activities and the importance of decision tree*
23. *Elaborate the importance of scheduled preventive maintenance of mechanical and electrical equipment.*
24. *Distinguish between Periodic and Preventive maintenance of equipments.*

## **(20ME3021) ADVANCES IN OPERATIONS RESEARCH**

**(Open Elective)**

### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. *Create mathematical models of the real time situations.*
2. *Implement Transportation and Assignment problems to solve in real time industry*
3. *Choose the best strategy of Game and capable of identifying the suitable queuing theory*
4. *Enumerate fundamental techniques and apply it to solve various optimization areas*
5. *Investigate, study, Apply knowledge in Replacement models and*
6. *Understand the Inventory control Models*

## **(20ME3022) COMPOSITE MATERIALS**

**(Open Elective)**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. *Explain the Fundamental concept of composite materials.*
2. *Classify different types of composite materials.*
3. *Describe the Fabrication and processing of composite materials.*
4. *Illustrate the Methods of preparation of Metal matrix Composites and polymer matrix composites*
5. *Discuss about the Mechanical behavior of composite materials.*
6. *Explain the application of composite materials.*

*K. Sreedy*  
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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**Department of Civil Engineering**

**I B. Tech. – I Semester (C.E)**

**(19HS0848)ENGINEERINGPHYSICS**

**COURSE OUTCOMES**

After completing this course, students will be able to

1. **Explains** various terms related to Vectors & Scalars and Newton's laws of motion
2. **Apply** the principles of acoustics in designing of buildings
3. **Explains** the applications of ultrasonics in various engineering fields
4. **Explains** various terms related to waves and Oscillations
5. **Explains** the importance of various mechanical properties of materials
6. **Apply** the basic properties of nanomaterials in various engineering branches

**(19HS0830) ALGEBRA AND CALCULUS**

**COURSE OUTCOMES**

1. Develop the use of matrix algebra techniques that is needed by engineers for practical applications
2. Utilize mean value theorems to real life problems
3. Familiarize with functions of several variables which is useful in optimization
4. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems
5. Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions.

**(19HS0810) COMMUNICATIVEENGLISH**

**COURSE OUTCOMES**

1. To understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information
2. To employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information
3. To Participate in informal discussions and speak clearly on a specific topic or in general
4. To comprehend, discuss and respond to academic texts and use appropriate language for description and interpretation in writing
5. To form sentences using proper grammatical structures and correct word forms

### **(19CE0101) ENGINEERING MECHANICS**

#### **COURSE OUTCOMES**

1. Construct free body diagrams and develop appropriate equilibrium equations
2. Understand the concepts of friction and to apply in real life problems
3. Determine the centroid for composite sections
4. Determine the Moment of Inertia for composite sections

### **(19HS0852) ENGINEERING PHYSICS LAB**

#### **COURSE OUTCOMES**

The students will be able to

1. Operate various optical instruments
2. Estimate wavelength of laser and particles size using laser
3. Plot the intensity of the magnetic field of induction along the axis of circular coil carrying current with distance
4. Evaluate the acceptance angle of an optical fiber and numerical aperture
5. Determine energy loss by B-H curve

### **(19HS0811) COMMUNICATIVE ENGLISH LAB**

#### **COURSE OUTCOMES**

1. Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills
2. Apply communication skills through various language learning activities
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension
4. Evaluate and exhibit acceptable etiquette essential in social and professional Settings
5. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English

### **(19ME0301) WORKSHOP PRACTICE LAB**

#### **COURSE OUTCOMES**

1. Apply wood working skills in real world applications
2. Build different parts with metal sheets in real world applications
3. Apply fitting operation in various applications
4. Apply different types of basic electric circuit connections
5. Demonstrate soldering and brazing

## **PART B - IT WORKSHOP**

### **COURSE OUTCOMES**

After Completion of this Course the Student would be able to

1. Identify the basic computer peripherals
2. Gain sufficient knowledge on assembling and disassembling a PC
3. Learn the installation procedure of Windows and Linux OS
4. Acquire knowledge on basic networking infrastructure
5. Learn productivity tools like Word, Excel and Power point
6. Acquire knowledge on basics of internet and worldwide web

## **I B.Tech – II Sem**

### **(19HS0802)ENGINEERING CHEMISTRY**

#### **COURSE OUTCOMES**

1. List the differences between temporary and permanent hardness of water, explain the principles of reverse osmosis and electro dialysis. Compare quality of drinking water with BIS and WHO standards.
2. Apply Nernst equation for calculating electrode and cell potentials, apply Pilling-Bedworth rule for corrosion and corrosion prevention, demonstrate the corrosion prevention methods and factors affecting corrosion, compare different batteries and their applications
3. Explain different types of polymers and their applications, solve the numerical problems based on Calorific value, select suitable fuels for IC engines, explain calorific values, octane number, refining of petroleum and cracking of oils.
4. Explain the constituents of Composites and its classification identify the factors affecting the refractory material, illustrate the functions and properties of lubricants, and demonstrate the phases and reactivity of concrete formation.
5. summarize the applications of SEM, TEM and X-ray diffraction in surface characterization, explain the synthesis of colloids with examples, outline the preparation of nanomaterials and metal oxides identify the application of colloids and nanomaterials in medicine, sensors and catalysis

### **(19HS0831) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**

#### **COURSE OUTCOMES**

1. Solve the differential equations related to various engineering fields
2. Identify solution methods for partial differential equations that model physical processes
3. Interpret the physical meaning of different operators such as gradient, curl and divergence
4. Estimate the work done against a field, circulation using vector calculus
5. 5.Students will become familiar with applications of surface and volume integrals



## **(19CE0102) STRENGTH OF MATERIALS-I**

### **COURSE OUTCOMES**

1. The students would be able to understand the behaviour of materials under different stress and strain conditions
2. The students would be able to draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading
3. The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams under various loading conditions
4. Determine shear stress in the shaft subjected to torsional moments
5. The students would be able to analyse columns and different types of loading condition on columns

## **(19CS0501) PYTHON PROGRAMMING**

### **COURSE OUTCOMES**

At the end of the course, the student will be able to

1. Making Software easily right out of the box
2. Solve the problems using control structures, input and output statements
3. Summarize the features of lists, tuples, dictionaries, strings and files
4. Experience the usage of standard libraries, objects, and modules
5. To build the software for real needs

## **(19ME0302) ENGINEERING GRAPHICS**

### **COURSE OUTCOMES**

1. Graphically construct and understand the importance of mathematical curves in engineering applications
2. Able to draw the basic views related to projections of Points, Lines and Planes
3. Able to draw the projections of geometrical solids and sectional view of solids
4. Understand the concept of projection and acquire visualization skills, development of surfaces and interpenetrations of solids
5. To draw multi view orthographic and other projections including isometric view

## **(19HS0806) ENGINEERING CHEMISTRY LAB**

### **COURSE OUTCOMES**

1. Determine the cell constant and conductance of solutions
2. Prepare advanced polymer materials
3. Estimate the Iron and Calcium in cement
4. Calculate the hardness of water
5. Determination of conductivity of an acid

## **(19CS0502)PYTHON PROGRAMMING LAB**

### **COURSE OUTCOMES**

After completion of this course, a successful student will have

1. Ability to program on basic concepts, control structures
2. Ability to implement data structures and their operations
3. Ability to work on object oriented programming
4. Ability to handle exceptional handling and plotting of graphical entities
5. Ability to develop any real world problem

## **(19HS0816) INDIAN CONSTITUTION**

### **COURSE OUTCOMES**

- 1.Explain the key concepts of political economy
2. Analyze the significant developments in the political ideologies
- 3.Describe the salient features of the constitution of India interpret, integrate and critically
4. Analyze the political economy of Indian international relations and gain knowledge in Judiciary system
- 5.Apply their knowledge and skills acquired to write various competitive examinations

**IIB.Tech – I Sem.**

## **(19ME0345) BASIC ELECTRICAL&MECHANICAL ENGINEERING**

### **COURSE OUTCOMES (COs)**

Upon completion of this course, the students will be able to

1. State various laws in Electrical Engineering and explain the operation of networks
2. Recognize the importance of different network theorems and explicate its applications in two port networks
3. Interpret the principle operation of DC motors and derive an EMF equation for the transformers
4. Classify various casting and metal joining processes in the manufacturing processes
5. Distinguish the types of machines in the manufacturing and elucidate the machining operations
6. Categorize the automobile engines and refrigeration& Air-conditioning systems

## **(19CE0103) STRENGTH OF MATERIALS - II**

### **COURSE OUTCOMES (COs)**

The student will be able to

1. Determine different stresses developed in thin and thick cylinders
2. Analyze members subjected to torsion, combined torsion and bending moment and apply the torsion theory for the analysis of springs
3. Determine the effect of direct and bending stress in beams and apply this principal to dams, chimneys and retaining walls

4. Describe various theories of failures
5. Analyze the fixed beams and continuous beams
6. Analyze curved beams in plan

#### **(19CE0104) SURVEYING & GEOMATICS**

##### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Classify and explain the surveying and its principles
2. Use the principles of Chain and Compass survey to construct traverse and correct the error of chain and tape while measuring distances
3. Prepare LS & CS profiles and contour map using levelling instrument
4. To measure horizontal and vertical angles using theodolite and tachometric surveying and their by compute the horizontal and vertical distances
5. To calculate, design and set various types of horizontal curves
6. To describe the working principles of EDM and total station

#### **(19CE0105) BUILDING MATERIALS & CONSTRUCTION**

##### **COURSE OUTCOMES (COs)**

After the completion of the course student should be able to

1. Classify different engineering materials and its application in construction
2. Describe the manufacturing process of different construction materials
3. Discuss various engineering properties of materials and testing methods
4. Classify sub structure and super structure and describe various building components
5. Classify foundations and can recognize the importance of foundation
6. Explain the construction of masonry, building components and applying surface course and finishes

#### **(19CE0106) STRENGTH OF MATERIALS LAB**

##### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student should be able to

1. Conduct tension test on mild steel bar and plot stress strain curve
2. Conduct compression test on wood, brick and concrete and can calculate their compression test
3. Conduct impact test on metal specimens
4. Find hardness of different materials
5. Determine modulus of elasticity of given material of beam by studying deflection for different loads
6. Determine tensile and torsional strength of mild steel bars and find stiffness of a helical spring

## **(19CE0107) SURVEYING LABORATORY**

### **COURSE OUTCOMES (COs)**

On completion of the course, the students will be able to

1. Calculate the area of given polygon by chain and plane table surveying
2. Determine the elevation of various points using leveling instruments
3. Compute the angles, distance and height by compass, theodolite, tacheometry and total station
4. Setting out the curve by theodolite and tacheometry
5. Describe the concept of foundation marking
6. Use total station for carrying basic operations

## **(19CE0108) COMPUTER AIDED DRAWING LAB**

### **COURSE OUTCOMES (COs)**

After the completion of the course student should be able to

1. Discuss the CAD, its advantages and applications
2. Describe GUI of Auto CAD and can work with basic operation of file management
3. Work with annotation facilities in Auto CAD
4. Draw simple geometric shapes using commands
5. Draw complex two-dimensional geometric figures in Auto CAD
6. Develop complete plan of a residential building in ready to print form

## **(19HS0805) ENVIRONMENTAL SCIENCE**

### **COURSE OUTCOMES (COs)**

On completion of the course, the students will be able to

1. Recognize the physical, chemical and biological components of the earth's systems and show how they function.
2. Characterize and analyse human impacts on the environment.
3. Integrate facts, concepts and methods from multiple disciplines and apply to environmental Problems
4. Create informed opinions about how to interact with the environment on both a personal and a social level
5. Perform independent research on human interactions with the environment
6. Recognize the ecological basis for regional and global environmental issues

## **(19EE0238) GENERATION OF ENERGY THROUGH WASTE**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Analyze agro based, forest residue and industrial waste conversion processes
2. Manufacture of Pyrolytic oils and gases

3. Manufacture of charcoal, yields and applications
4. Understand various types of gasifiers operation
5. Understand inclined and fluidized bed combustors operation
6. Understand types of biogas plants and biomass energy programme in India

### **(19ME0349) FUNDAMENTALS OF MECHANICAL ENGINEERING**

#### **COURSE OUTCOMES (COs)**

At the end of the course, the student will be able to

1. List the types of Engineering materials and also describe alloying, Heat treatment Processes.
2. Recognize the importance of IC Engines in automobiles and the classification of air compressors
3. Distinguish various types of air conditioning systems for house and Industrial applications
4. Explicate the working of various Power plants like nuclear, Hydro & thermal power plants
5. Classify various types' modern machining processes and determine the best suitable process to machine a component.
6. Apply the working principles of CAD, CAM and CIM in the operation of Robotic manufacturing and quality control systems

### **(19EC0448)INTRODUCTION TO COMMUNICATION SYSTEMS**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Demonstrate knowledge in elements of Analog Digital andWireless CommunicationSystems
2. Analyse the analog modulated and demodulated systems
3. Understand the principle involved in different modulation techniques
4. Understand the basic principles of baseband and pass band digital modulation schemes
5. Analyse probability of error performance of digital systems and are able to design digital communications
6. Implement various Keying and accessing techniques in real time wireless communication systems

### **(19CS0550) RELATIONAL DATABASE MANAGEMENT SYSTEM**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Develop relational algebra expressions for queries and optimize them
2. Design the databases using E\_R method for a given specification of requirements
3. Apply Normalization techniques on given database
4. Determine the transaction atomicity, consistency, isolation, and durability for a given transaction-processing system

5. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling
6. Understand Physical Storage Media and RAID concepts

### **(19HS0813) MANAGEMENT SCIENCE**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Utilize appropriate theoretical frameworks to real life business and managerial problems
2. Identify appropriate operational risks and develop appropriate responses to them
3. Apply human resource principles to recruit, select and manage employees to achieve organizational goals
4. Enact strategy, including contingent plans for the effective management of the organization
5. Identify, plan, and implement the projects and evaluate the performance of the projects
6. Analyze effective application of latest developments to diagnose and solve organizational problems

#### **IIB.Tech – II Sem.**

### **(19HS0833) NUMERICAL METHODS, PROBABILITY & STATISTICS**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. To develop the mathematical skills of the students in the areas of numerical methods
2. Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations
3. Work out numerical differentiation and integration whenever and wherever routine methods are not applicable
4. A good understanding of the laws of probability axioms and rules
5. Understanding of moments of discrete and continuous random variables as well as be familiar with common named discrete and continuous random variables
6. Calculate and interpret the correlation and Regression between two variables

### **(19CE0109) FLUID MECHANICS**

#### **COURSE OUTCOMES (COs)**

On completion of the course, the students will be able to

1. State Newton's Law of Viscosity, discuss and calculate fluid properties
2. Define Pascal's Law and apply it for measuring pressure devices
3. Classify various fluid flows and derive continuity equation
4. Deriving Euler's, Bernoulli's, Impulse Momentum Equation and applying them for fluid flow

problems

5. Derive Darcy Weisbach equation and apply it pipe flow problems
6. Describe Laminar and Turbulent flow characteristics

### **(19CE0110) ENGINEERING GEOLOGY**

#### **COURSE OUTCOMES (COs)**

After completing the course, the students are able to

1. Explain the importance of role of geology in civil engineering
2. Describe the concept of Weathering and its importance in civil constructions
3. Identify and classify Minerals, Rocks based on their properties
4. Analyze the Geological structures and their impact on civil engineering structure
5. Describe the principals of geophysical methods and their applications
6. Recognize the significance of earth quakes, landslide and ground water in the constructions of dams, reservoirs, tunnels and buildings

### **(19CE0111) STRUCTURAL ANALYSIS**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Classify statically and kinematically determinate and indeterminate structures and outline role of equilibrium and compatible equations in structural analysis
2. Draw the shear force and bending moment at a section of a beam under moving load
3. Describe the concept of energy methods and apply theorems based on virtual work on analysis of deflection of beams and trusses
4. Analyze continuous beams and portal frames by slope deflection method
5. Analyze continuous beams and portal frames by moment distribution method
6. Analyze indeterminate structures such as continuous beams, portal frames using stiffness and flexibility matrix methods

### **(19CE0112) FLUID MECHANICS & HYDRAULIC MACHINERY LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student should be able to

1. Calibrate Venturimeter & Orifice meter
2. Calculate losses in flows
3. Estimate the efficiency of different pumps
4. Study the performance of different turbines
5. Study importance of liquid properties and its methods of determination
6. Calculate forces and pressure due to fluid action under different conditions

### **(19CE0113) ENGINEERING GEOLOGY LAB**

#### **COURSE OUTCOMES (COs)**

After performing these experiments, the students are able to

1. Identify and classify minerals by their Physical properties
2. Identify and classify Rocks by their Physical properties
3. Draw the sections for geological maps showing tilted beds, faults, uniformities
4. Interpret the geological maps on practical applications in Civil Engineering
5. Follow standards in geological investigations
6. Analyze the Structural Geology Problems

### **(19CE0114) GIS LAB**

#### **COURSE OUTCOMES (COs)**

After the completion of the course student should be able to

1. Describe the basic components of GIS
2. Classify the maps, coordinate systems and projections
3. Create the new maps by using the old maps through mosaicing
4. Study GIS data with case examples on mapping
5. Solve the geospatial problems using the GIS interface
6. Prepare different Geo spatial layers

### **(19HS0817) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Connect up the basic principles of thought process
2. Understand Holistic life style of yogic science and wisdom capsules in Sanskrit literature
3. Analyze the society and nature through sustainability
4. Explain Indian knowledge system and Indian perspective of modern science
5. Use the basic principles of Yoga and holistic health care system
6. Apply the holistic health care system

### **(19EE0233) INDUSTRIAL INSTRUMENTATION**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Identify and explain the types of errors occurring in measurement systems
2. Differentiate among the types of data transmission and modulation techniques
3. Apply digital techniques to measure voltage, frequency and speed
4. Analyse the working principles of different Signal Analyzers and Digital meters
5. Understand the operation of several types of transducers
6. Choose suitable Transducers for the measurement of non-electrical quantities



### **(19ME0350) MECHANICAL MEASUREMENTS & CONTROL SYSTEMS**

#### **COURSE OUTCOMES (COs)**

After completion of this course, the students will be able to

1. State the basic principles of measurement systems and explain its performance characteristics
2. Distinguish the types of various temperature and pressure measurement instruments and finds the best one for the industrial applications
3. Explicate the principle of measurement of Speed, Acceleration and Vibration instruments and describe its working
4. Illustrate the operation of Fuel level, measurement of Flow and Humidity Measurement instruments and also state the applications of various control systems
5. Identify the appropriate device for the measurement of temperature, pressure, speed, stress, humidity, flow velocity etc., and justify its use through characteristics and performance
6. Classify the various types of control systems for the measurement of temperature, speed and position

### **(19EC0449) ELEMENTS OF EMBEDDED SYSTEMS**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to

1. Differentiate between general computing system and the embedded system, also recognize the classification of embedded systems
2. Enumerate and describe the components of an embedded system
3. Learn about open source electronics platform
4. Program an embedded system by interfacing sensors & actuators
5. Identify the basic building blocks of Internet of Things and characteristics
6. Implement their own ideas in various application areas of Embedded systems and IoT

### **(19CS0551) JAVA PROGRAMMING**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Implement simple abstract data types and design abstraction functions
2. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity
3. Apply object-oriented design patterns for problem solving
4. Implement Exception handling with synchronization
5. Execute programs on Multithreading and String handling concepts
6. Design applications with an event-driven graphical user interface

### **(19HS0814) INTELLECTUAL PROPERTY RIGHTS**

## **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights
2. Identify different types of intellectual properties, ownership rights and the scope of the protection
3. Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work
4. Able to identify, apply, and assess ownership rights, registration processes for IP rights
5. To discern the approaches for intellectual property management and intellectual property audits
6. Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY :: PUTTUR  
(AUTONOMOUS)**

**Bachelor of Technology**

**Department of Electrical & Electronics Engineering**

**IB.Tech–ISem.**

**(19HS0801) APPLIED CHEMISTRY**

**COURSE OUTCOMES**

- Apply Nernst equation for calculating electrode and cell potentials, differentiate between pHmetry, potentiometric and conductometric titrations, explain the theory of construction of battery and fuel cells, solve problems based on cell potential.
- Apply Schrodinger wave equation to hydrogen and particle in a box, illustrate the molecular orbital energy level diagram of different molecular species, semiconductors and insulators discuss the magnetic behavior and colour of complexes.
- Explain the different types of polymers and their applications, explain the preparation, properties and applications of Bakelite, Nylon-66, and carbon fibres, describe the mechanism of conduction in conducting polymers, discuss Buna-S and Buna-N elastomers and their applications.
- Explain the different types of spectral series in electromagnetic spectrum, understand the principles of different analytical instruments, explain the different applications of analytical instruments.
- Explain the band theory of solids for conductors, semiconductors and insulators, explain supramolecular chemistry and self-assembly, demonstrate the application of Rotaxanes and Catenanes as artificial molecular machines

**(19HS0830) ALGEBRA AND CALCULUS**

**COURSE OUTCOMES**

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications
- Utilize mean value theorem to solve all life problems
- Familiarize with functions of several variables which is useful in optimization
- Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional coordinate systems
- Students will become familiar with 3-dimensional coordinate systems and also learn the utilization of special functions.

**(19HS0810) COMMUNICATIVE ENGLISH**

**COURSE OUTCOMES**

- To understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information.
- To employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information.
- To Participate in informal discussions and speak clearly on a specific topic or in general.
- To Comprehend, discuss and respond to academic texts and use appropriate language for description and interpretation in writing

- To form sentences using proper grammatical structures and correct word forms

### **(19ME0361) THERMAL & FLUID ENGINEERING**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

- Demonstrate the different types of electric power stations.
- Describe the various properties of a thermodynamic system.
- Have a broad knowledge of different types of cycles.
- Knows the different types of fluid flows.
- The different devices used for measurement of fluid flow.

### **(19HS0803) APPLIED CHEMISTRY LAB**

#### **COURSE OUTCOMES**

- Determine the cell constant and conductance of solutions.
- Prepare advanced polymer materials.
- Estimate the Iron and Calcium in cement.
- Calculate the hardness of water.
- Determination of conductivity of an Acid.

### **(19HS0811) COMMUNICATIVE ENGLISH LAB**

#### **COURSE OUTCOMES**

- Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
- Apply communication skills through various language learning activities.
- Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
- Evaluate and exhibit acceptable etiquette essential in social and professional settings.
- Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

### **(19ME0301) WORKSHOP PRACTICE LAB**

#### **PART A-ENGINEERING WORKSHOP**

#### **COURSE OUTCOMES**

- Apply wood working skills in real world applications.
- Build different parts with metal sheets in real world applications.
- Apply fitting operation in various applications.
- Apply different types of basic electric circuit connections.
- Demonstrate soldering and brazing.

## PART B - IT WORKSHOP

### **COURSE OUTCOMES**

- After Completion of this Course the Student would be able to
- Identify the basic computer peripherals.
- Gain sufficient knowledge on assembling and disassembling a PC.
- Learn the installation procedure of Windows and Linux OS.
- Acquire knowledge on basic networking infrastructure.
- Learn productivity tools like Word, Excel and Powerpoint.
- Acquire knowledge on basics of internet and world wide web.

### **IB.Tech – II Sem.**

#### **(19HS0849) APPLIED PHYSICS**

### **COURSE OUTCOMES**

After completing this course students will be able to

- Explain various terms related to waves and Oscillations.
- Explain the Dual nature of matter and physical significance of Wave function.
- Recognize importance of free electron theory and semiconductors.
- Apply concepts of lasers and optical Fibers light in various applications.
- Apply the basic properties of nanomaterials in various engineering branches.

#### **(19HS0831) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**

### **COURSE OUTCOMES**

- Solve the differential equations related to various engineering fields
- Identify solution methods for partial differential equations that model physical processes
- Interpret the physical meaning of different operators such as gradient, curl and divergence
- Estimate the work done against a field, circulation using vector calculus
- Students will become familiar with applications of surface and volume integrals

#### **(19ME0302) ENGINEERING GRAPHICS**

### **COURSE OUTCOMES**

- Graphically construct and understand the importance of mathematical curves in engineering applications
- Able to draw the basic views related to projections of Points, Lines and Planes
- Able to draw the projections of geometrical solids and sectional view of solids
- Understand the concept of projection and acquire visualization skills, development of surfaces and interpenetrations of solids
- To draw multiview orthographic and other projections including isometric

## **(19CS0501)PYTHONPROGRAMMING**

### **COURSEOUTCOMES**

Attheendofthecourse,the studentwill beableto

- MakingSoftware easilyright outof thebox
- Solvethethe problems using control structures, input and output statements
- Summarizethefeaturesof lists, tuples, dictionaries, strings and files
- Experiencetheusage ofstandard libraries,objects,andmodules
- Tobuild thesoftware for realneeds.

## **(19EE0201)ELECTRICAL CIRCUITS-I**

### **COURSEOUTCOMES**

Aftercompleting the course, thestudent should beable to dothe following:

- Determine the equivalent impedance of given network by using network reductiontechniques.
- Determinetherealpower, reactivepower, power factoretc,.for thegivennetwork.
- Determinethecurrent throughanyelement andvoltageacross anyelement.
- Applythenetworktheoremssuitably.
- UnderstandLocusdiagrams andresonance

## **(19HS0853) APPLIED PHYSICS LAB**

### **COURSEOUTCOMES**

Thestudentswill be ableto

- Operatevariousopticalinstruments.
- Estimatewavelengthhof laserand particlessizeusinglaser.
- Plot the intensity of the magnetic field of induction along the axis of circular coil carryingcurrentwith distance.
- Evaluate the acceptanceangle ofan opticalfiber andnumerical aperture.
- DetermineenergylossbyB-Hcurve.

## **(19CS0502)PYTHON PROGRAMMINGLAB**

### **COURSEOUTCOMES**

Aftercompletionof thiscourse, asuccessful studentwill have

- Abilityto program onbasicconcepts, controlstructures.
- Abilitytoimplementdatastructuresand theiroperations
- Abilityto work on object orientedprogramming
- Abilitytohandleexceptionalhandling andplottingofgraphicalentities.
- Abilityto developanyrealworld problem

## (19HS0816) INDIAN CONSTITUTION

### COURSE OUTCOMES

Students will be able to:

- Explain the key concepts of political economy
- Analyse the significant developments in the political ideologies
- Describe the salient features of the constitution of India interpret, integrate and critically
- Analyse the political economy of Indian international relations and gain knowledge in Judiciary system
- Apply their knowledge and skills acquired to write civil service examinations

### II-B.Tech.–I Sem.

## (19HS0832) PROBABILITY, NUMERICAL METHODS AND TRANSFORMS

### COURSE OUTCOMES (COs)

Upon completion of the course the student will be able

- A good understanding of the laws of probability and the use of Baye's theorem.
- To develop the mathematical skills of the students in the areas of numerical methods.
- Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.
- Work out numerical differentiation and integration whenever and wherever routine methods are not applicable.
- Calculate the Laplace transform of standard functions both from the definition and by using tables.
- Ability to compute z-transform and inverse z-transform.

## (19EC0402) ELECTRONIC DEVICES AND CIRCUITS

### COURSE OUTCOMES (COs)

On successful completion of this course, the student will be able to

- Demonstrate the characteristics of PN Junction Diode, Rectifiers, Filters, BJT, JFET, MOSFET and special purpose electronic devices.
- Analyse numerical and analytical problems in Rectifiers, Filters, Transistor biasing circuits and Transistor amplifiers.
- Design and develop electronic circuits such as Rectifiers with and without filters, Transistor biasing circuits and Transistor amplifiers.
- Solve engineering problems and arrive at solutions relating to electronic devices and circuits.
- Identify a suitable semiconductor device and transistor for any given specification.
- Select suitable technique for transistor modelling.

## **(19EE0202) ELECTRICAL CIRCUITS-II**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Understand and Evaluate three phase circuits
- Analyze the transient behaviour of electrical networks for various excitations.
- 3. Analyze the Electrical Circuits with the concept of Network topology.
- Analyze the three phase circuits with Star & Delta connected balanced and unbalanced loads.
- Obtain the various network parameters for the given two port networks.
- 6. Represent the transfer function for the given network.

## **(19EE0203) ELECTRICAL MACHINES -I**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Calculate the e.m.f. generated on open circuit and find terminal voltage on load.
- Diagnose the failure of DC generator to build up voltage.
- Identify suitable method and conditions for obtaining the required speed of DC motor.
- Compute the load shared by each generator when several generators operate in parallel.
- Conduct O.C, S.C tests and predetermine the regulation and efficiency of transformer.
- Compute the load shared by each transformer when several transformers operate in parallel

## **(19CE0136) WATER TECHNOLOGY**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Underline the importance of water and describe the mechanism of hydrological cycle
- Describe various elements associated with public water supply
- Describe water quality criteria and standards, and their relation to public health
- Recognize the cause of water pollution and influence of climatic changes on water resources
- Summarize various water conservation techniques in practice
- Explain need for watershed management and implement various Plans for watershed management

## **(19ME0349) FUNDAMENTALS OF MECHANICAL ENGINEERING**

### **COURSE OUTCOMES**

At the end of the course, the student will be able to

- List the types of Engineering materials and also describe alloying, Heat treatment Processes.
- Recognize the importance of IC Engines in automobiles and the classification of air compressors
- Distinguish various types of air conditioning systems for house and Industrial applications
- Explicate the working of various Power plants like nuclear, Hydro & thermal power plants



- Classify various types of modern machining processes and determine the best suitable process to machine a component.
- Apply the working principles of CAD, CAM and CIM in the operation of Robotic manufacturing and quality control systems

### **(19EC0448) INTRODUCTION TO COMMUNICATIONS SYSTEMS**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Demonstrate knowledge in elements of Analog, Digital and Wireless Communication Systems.
- Analyze the analog modulated and demodulated systems.
- Understand the principle involved in different modulation techniques
- Understand the basic principles of baseband and passband digital modulation schemes
- Analyze the probability of error performance of digital systems and are able to design digital communications.
- Implement various Keying and accessing techniques in real-time wireless communication systems

### **(19CS0550) RELATIONAL DATABASE MANAGEMENT SYSTEM**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Develop relational algebra expressions for queries and optimize them.
- Design the database using E\_R method for given specification of requirements.
- Apply Normalization techniques on given database.
- Determine the transaction atomicity, consistency, isolation, and durability for given transaction-processing system.
- Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.
- Understand Physical Storage Media and RAID concepts.

### **(19HS0813) MANAGEMENT SCIENCE**

#### **COURSE OUTCOMES:**

- Utilize appropriate theoretical framework to solve all business and managerial problems
- Identify appropriate operational risks and develop appropriate responses to them
- Apply human resource principles to recruit, select and manage employees to achieve organizational goals
- Enact strategy, including contingent plans for the effective management of the organization
- Identify, plan, and implement the projects and evaluate the performance of the projects
- Analyze effective application of latest developments to diagnose and solve organizational problems

## **(19EC0405) ELECTRONIC DEVICES AND CIRCUITS LAB**

### **COURSE OUTCOMES (COs)**

On successful completion of this course the students will be able to

- Demonstrate knowledge in different electronic devices and analog circuits.
- Analyze the characteristics of different electronic devices and circuits like Diodes - PN Junction Diode, Zener Diode and Transistors - BJT, FET.
- Design and develop electronic circuits like rectifiers, clippers, clampers, BJT and FET Amplifiers.
- Solve engineering problems with better Electronic circuits.
- Function effectively as an individual and as a member in a group in the area of electronic devices and circuits.
- Develop skills to communicate verbally and in written form in the area of electronic devices and circuits.

## **(19EE0204) ELECTRICAL MACHINES - I LAB**

### **COURSE OUTCOMES:**

The students should be able to do the following:

- Conduct experiments to obtain the no-load and load characteristics of D.C. Generators.
- Conduct tests on D.C. motors for predetermination of efficiency.
- Conduct tests on D.C. motors for determination of efficiency.
- Control the speed of D.C. motor in a given range using appropriate method.
- Identify the reason as to why D.C. Generator is not building up voltage.
- Identify the Separation of Losses in DC Shunt Motor

## **(19EE0205) ELECTRICAL CIRCUITS LAB**

### **COURSE OUTCOMES (COs)**

After completing the course, the students should be able to do the following:

- Correctly measure and successfully troubleshoot circuits by taking accurate data and interpret results.
- Study different meters and instruments for measurement of electrical quantities
- Experimentally verify the basic circuit theorems.
- Understand 3 phase balanced, star and delta connected supply and load and to measure power in 3 phase circuits
- Determine the resonant Frequency, quality factor & bandwidth of the RLC circuits
- Draw the locus diagrams of RLC circuits.
- Find the various parameters of two port network.
- Record and document results of lab work using text and graphs.

## **(19HS0805) ENVIRONMENTAL SCIENCE**

### **COURSE OUTCOMES**

- Recognize the physical, chemical and biological components of the earth's systems and show how they function.
- Characterize and analyze human impacts on the environment.
- Integrate facts, concepts and methods from multiple disciplines and apply to environmental problems.
- Create informed opinions about how to interact with the environment on both a personal and a social level.
- Perform independent research on human interactions with the environment.
- Recognize the ecological basis for regional and global environmental issues

### **IIB. Tech. – II Sem.**

## **(19EC0401) SWITCHING THEORY AND LOGIC DESIGN**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Define different Number systems, Binary Codes and perform Number base conversions.
- Simplify the Boolean functions, design and implement using Logic gates.
- Understand the methods for gate-level minimization techniques.
- Design and implement Sequential and Combinational circuits.
- Apply the state reduction methods in design of FSMs.
- Understand and design memory systems like RAM, ROM, PLA, PAL.

## **(19EC0446) ANALOG ELECTRONIC CIRCUITS**

### **COURSE OUTCOMES**

On successful completion of the course, the student will be able to

- Demonstrate knowledge in Feedback amplifiers, Oscillators and Operational Amplifiers.
- Perform analysis of analog electronic circuits for meeting defined specifications.
- Design and develop analog electronic circuits such as Feedback Amplifiers, Oscillators and various applications of operational amplifier with given specifications.
- Solve problems relating to analog electronic circuit design.
- Select an Amplifier circuit suitable for a specific electronics subsystem.
- Apply course knowledge to assess societal issues and understand the consequent responsibilities relevant to the professional engineering practice using analog electronic circuits.

## **(19EE0207) ELECTROMAGNETIC FIELDS**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Acquire mathematical foundation on vector calculus
- Analyse and estimate Electric field quantities with charged distribution
- Study the behaviour of electric fields in conductor and dielectric materials
- Estimate the magnetic field strengths due to different current carrying elements

- Evaluate the magnetic forces generated due to interaction of electric and magnetic fields
- Understand the electromagnetic wave propagation in free space

### **(19EE0208) ELECTRICAL MACHINES-II**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Understand construction of 3 phase induction motor and torque parameter calculation.
- Conduct No-load and Blocked rotor tests on 3 phase induction motors
- Understand various types speed control methods of 3 phase induction motors
- Understand construction of synchronous generator and parallel operation
- Understand methods of starting of synchronous motors and equivalent circuit
- Understand variation of current and power factor with excitation

### **(19CE0143) FUNDAMENTALS OF URBAN PLANNING**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Recognize issues related to town planning and discuss the objectives, necessity and stages of town planning
- Summarize importance of zoning, can classify various town planning practices and can conduct surveys for town planning
- Classify the residential building, list the agencies involved in improving house and review the problems associated with residential housing
- Discuss the issues associated with slums and recognize the methods to improve condition of slums
- Interpret norms laid down for public and industrial building and can summarize building bye-laws
- List and discuss various urban roads and the concepts of traffic management in a town

### **(19ME0350) MECHANICAL MEASUREMENTS & CONTROL SYSTEMS**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to:

- State the basic principles of measurement systems and explain its performance characteristics
- Distinguish the types of various temperature and pressure measurement instruments and find the best one for the industrial applications
- Explicate the principle of measurement of Speed, Acceleration and Vibration instruments and describe its working
- Illustrate the operation of Fuel level, measurement of Flow and Humidity Measurement instruments and also state the application of various control systems
- Identify the appropriate device for the measurement of temperature, pressure, speed, stress, humidity, flow velocity etc., and justify its use through characteristics and performance.
- Classify the various types of control systems for the measurement of temperature, speed and position

## **(19EC0449)ELEMENTS OFEMBEDDEDSYSTEMS**

### **COURSEOUTCOMES**

Onsuccessfulcompletionofthiscourse, studentswillbeableto

- Differentiatebetweengeneralcomputingsystemandtheembeddedsystem,alsorecognizetheclassificationofembeddedsystems.
- Enumerateanddescribethecomponentsofanembeddedsystem.
- Learnaboutopensourceelectronicsplatform.
- Programanembeddedsystembyinterfacingsensors&actuators.
- IdentifythebasicbuildingblocksofInternetofThingsandcharacteristics.
- ImplementtheirowndeasinvariousapplicationareasofEmbeddedsystemsandIoT.

## **(19CS0551)JAVAPROGRAMMING**

### **COURSEOUTCOMES(COs)**

Onsuccessfulcompletionofthiscourse, thestudentwillbeableto

- Implementsimpleabstract datatypes anddesignabstraction functions.
- Recognizefeaturesofobject-orienteddesignsuchasencapsulation,polymorphism,inheritance,and composition of systems based on objectidentity.
- Applyobject-oriented designpatterns forproblem solving.
- ImplementExceptionhandlingwithsynchronization.
- ExecuteprogramsonMultithreadingandStringhandlingconcepts.
- Designapplicationswithanevent-drivengraphicaluserinterface.

## **(19HS0814)INTELLECTUAL PROPERTY RIGHTS**

### **COURSEOUTCOMES:**

- Becomeawareofintellectualpropertyrights,concepts,treaties,agenciesandinternationalorganizationsinvolvedinsanctioningIPrights
- Identifydifferenttypesofintellectualproperties,ownershiprightsandthescopeoftheprotection
- Getanadequateknowledgeonpatents,trademarks,copyrightsandtogetpropertyrightsfor their intellectualwork
- Abletoidentify,apply,andassessownershiprights,registrationprocessesforIPrights
- Todiscerntheapproachesforintellectualpropertymanagementandintellectualpropertyaudits
- Demonstrateknowledgeandunderstanding on unfair competition andlatest developmentsinIPrightsatinternationallevel

## **(19EC0404)SWITCHINGTHEORYANDLOGICDESIGN LAB**

### **COURSEOUTCOMES**

Onsuccessfulcompletionof thiscourse,the studentwillbe ableto

1. Verifythe operationofLogicgates, combinationalandSequentialcircuits
2. Constructbasiccombinationalcircuitsandverifytheirfunctionalities.
3. Applythedesignprocedures indesigning basicsequentialcircuits.
4. Understandthefunctionalityof counters.

- Understand the sequencing of Shift registers.
- Construct various digital circuits and verify their operation.

### **(19EC0447) ANALOG ELECTRONIC CIRCUITS LAB**

#### **COURSE OUTCOMES**

On successful completion of the course, students will be able to

- Demonstrate basic knowledge and perform analysis of analog electronic circuits for meeting defined specifications.
- Design and identify the applications of feedback amplifiers, sinusoidal oscillators and applications of operational amplifiers in different electronic circuits.
- Develop analog electronic circuits for various applications with given specifications.
- Find suitable analog to digital and digital to analog converters using operational amplifiers to apply for real time applications.
- Function effectively as an individual and as a member in a group in the area of electronic devices and circuits.
- Develop skills to communicate verbally and in written form in the area of electronic devices and circuits

### **(19EE0209) ELECTRICAL MACHINES-III LAB**

#### **COURSE OUTCOMES:**

- Identify different parts of transformers and induction motors and specify their functions.
- Determination of losses and efficiency of transformer.
- Understand the operation of transformers and induction motors.
- Carry out different testing methods and assess the performance of transformers and induction motors
- Start and control the induction motor
- Determination of regulation of synchronous machine

### **(19HS0817) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**

#### **COURSE OUTCOMES (COs)**

- On successful completion of this course, the student will be able to
- Connect up the basic principles of thought process.
- Understand Holistic lifestyle of yoga science and wisdom capsules in Sanskrit literature.
- Analyze the society and nature through sustainability.
- Explain Indian knowledge system and Indian perspective of modern science.
- Use the basic principles of Yoga and holistic healthcare system.
- Apply the holistic healthcare system.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)  
Bachelor of Technology**

**Department of Mechanical Engineering**

**I B. Tech. – I Semester (M.E)**

**(19HS0810) COMMUNICATIVE ENGLISH**

**COURSE OUTCOMES**

On Completion of the course the students will be able to

1. Understand social or transactional dialogues spoken by native speakers of English and Identify the context, topic, and pieces of specific information.
2. Employ suitable strategies for skimming and scanning to get the general idea of a text And locate specific information.
3. Participate in informal discussions and speak clearly on a specific topic or in general.
4. Comprehend, discuss and respond to academic texts and use appropriate language for Description and interpretation in writing
5. Form sentences using proper grammatical structures and correct word forms.

**(19HS0830) ALGEBRA AND CALCULUS**

**COURSE OUTCOMES**

On Completion of the course the students will be able to

1. Develop the use of matrix algebra techniques that is needed by engineers for Practical applications
2. Utilize mean value theorems to real life problems
3. Familiarize with functions of several variables which is useful in optimization
4. Learn important tools of calculus in higher dimensions. Students will become familiar with 2-dimensional coordinate systems
5. Become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions.

**(19HS0850)ADVANCED PHYSICS**

**COURSE OUTCOMES**

On Completion of the course the students will be able to

1. Analyse the differences between interference and diffraction with applications.
2. Apply the principles of acoustics in designing of buildings.
3. Explains the applications of ultrasonic in various engineering fields.
4. Explain the applications of dielectric and magnetic materials.
5. Apply concepts of Lasers and Optical Fibers light in various applications.
6. Apply the basic properties of nanomaterials in various engineering branches.

### **(19CE0101) ENGINEERING MECHANICS**

#### **COURSE OUTCOMES**

On Completion of the course the students will be able to

1. Construct free body diagrams and develop appropriate equilibrium equations. •
2. Understand the concepts of friction and to apply in real life problems.
3. Determine the centroid for composite sections.
4. Determine the Moment of Inertia for composite sections.

### **(19HS0811) COMMUNICATIVE ENGLISH LAB**

#### **COURSE OUTCOMES**

On Completion of the course the students will be able to

1. Remember and understand the different aspects of the English language proficiency with Emphasis on LSRW skills.
2. Apply communication skills through various language learning activities.
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better Listening and speaking comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
5. Create awareness on mother tongue influence and neutralize it in order to improve fluency In spoken English.

### **(19HS0854) ADVANCED PHYSICS LAB**

#### **COURSE OUTCOMES**

On Completion of the course the students will be able to

1. Operate various optical instruments.
2. Estimate wavelength of laser and particles size using laser.
3. Plot the intensity of the magnetic field of induction along the axis of circular coil carrying current with distance.
4. Evaluate the acceptance angle of an optical fiber and numerical aperture.
5. Determine energy loss by B-H curve.

### **(19ME0301) WORKSHOP PRACTICE LAB**

#### **COURSE OUTCOMES**

On Completion of the course the students will be able to

1. Describe various prototypes in the carpentry trade
2. Illustrate different basic prototypes in the fitting trade
3. Explain the method of preparation of various Tin smithy models
4. Apply basic house wiring techniques in electric circuit connections
5. Differentiate between soldering and brazing
6. Estimate the amount of material required for various models

### **(19HS0831) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**

#### **COURSE OUTCOMES**

On Completion of the course the students will be able to



1. Solve the differential equations related to various engineering fields
2. Identify solution methods for partial differential equations that model physical processes
3. Interpret the physical meaning of different operators such as gradient, curl and divergence
4. Estimate the work done against a field, circulation using vector calculus
5. Students will become familiar with applications of surface and volume integrals

### **(19HS0802) ENGINEERING CHEMISTRY**

#### **COURSE OBJECTIVES**

The objective of this course is to

1. Familiarize engineering chemistry and its applications
2. Impart the concept of soft and hard waters, softening methods of hard water
3. Train the students on the principles and applications of electrochemistry, polymers, Surface chemistry and cement

### **(19CS0501) PYTHON PROGRAMMING**

#### **COURSE OUTCOMES**

On Completion of the course the students will be able to

1. Making Software easily right out of the box
2. Solve the problems using control structures, input and output statements
3. Summarize the features of lists, tuples, dictionaries, strings and files
4. Experience the usage of standard libraries, objects, and modules
5. Identify build the software for real needs.

### **(19ME0302) ENGINEERING GRAPHICS**

#### **COURSE OUTCOMES**

On Completion of the course the students will be able to

1. Appreciate the usage of engineering curves in tracing the paths of simple machine components
2. Understand the concept of projection and acquire visualization skills, projections of Points
3. Draw the projections of geometrical solids and sectional view of solids
4. Understand the concept of projection and acquire visualization skills, development of surfaces and interpenetrations of solids
5. Draw multi view orthographic and other projections including isometric
6. Draw the basic views related to projections of lines and planes

### **(19ME0303) MATERIALS ENGINEERING**

#### **COURSE OUTCOMES**

On Completion of the course the students will be able to

1. Elaborate a broad knowledge on different properties of materials with respect to grain size
2. Discuss the different types of Equilibrium Diagrams.
3. Describe the various properties of Ferrous and Non Ferrous Metals.
4. Illustrate the concept of heat treatment of steels &strengthening mechanisms
5. Identify the method of manufacturing of different Composite materials.
6. Classify and distinguish different types of ferrous and non ferrous alloys

### **(19HS0806) ENGINEERING CHEMISTRY LAB**

#### **COURSE OUTCOMES**

On Completion of the course the students will be able to

1. Determine the cell constant and conductance of solutions
2. Prepare advanced polymer materials
3. Estimate the Iron and Calcium in cement
4. Calculate the hardness of water
5. Determination of conductivity of an acid

### **(19CS0502) PYTHON PROGRAMMING LAB**

#### **COURSE OUTCOMES**

On Completion of the course the students will be able to

1. Ability to program on basic concepts, control structures.
2. Ability to implement data structures and their operations
3. Ability to work on object oriented programming
4. Ability to handle exceptional handling and plotting of graphical entities.
5. Ability to develop any real world problem

### **(19HS0816) INDIAN CONSTITUTION**

#### **COURSE OUTCOMES**

On Completion of the course the students will be able to

1. Explain the key concepts of political economy
2. Analyze the significant developments in the political ideologies
3. Describe the salient features of the constitution of India interpret, integrate and critically
4. Analyze the political economy of Indian international relations and gain knowledge in Judiciary system.
5. Apply their knowledge and skills acquired to write various competitive examinations.

### **(19EE0240) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Determine the equivalent impedance of a given network by using network reduction techniques.
2. Calculate the voltage and current for a given particular network by using KCL&KVL.
3. Analyze the working operation & characteristics of DC generators.
4. Understand the construction of DC motors and transformer.
5. Analyze the operating principles of major electronic devices, its characteristics and application
6. Design and analyze the DC bias circuitry of BJT and FET.

### **(19CE0150) STRENGTH OF MATERIALS**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Summarize the basic principles of elasticity, theory of failures and apply them to estimate the stress and strain for axial members.
2. Draw shear force and bending moment diagrams under different loading conditions

3. Study the theories related to the bending stress, shear stress distribution and torsional stress for beams of different cross-sections and their applications.
4. Describe the slope and deflection of beam and calculate the slope and deflection for statically determinate beams by using different methods.
5. Classify different type of column and derive Euler's equation for long columns with different end conditions.
6. Analyze the pressure vessels subject to internal and external fluid pressure.

### **(19CE0151) FLUID MECHANICS & HYDRAULIC MACHINERY**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. State Newton's Law of Viscosity, discuss and calculate fluid properties.
2. Define Pascal's Law and applies it for measuring pressure devices.
3. Classify various fluid flows and derive continuity, Euler's, Bernoulli's, Impulse Momentum, Darcy Weisback Equation and applying them for fluid flow problems and pipe flow Problems.
4. Analyze impact of jets on vanes and develop velocity triangle.
5. Discuss operation principals of hydroelectric power plant.
6. Explain the principals of pumps and turbine.

### **(19ME0304) KINEMATICS OF MACHINERY**

#### **COURSE OUTCOMES**

On successful completion of the course, the students will be able to

1. Identify common mechanisms used in machines.
2. Find different mechanisms, Inversions of kinematic chains.
3. Carryout analysis on different types of links, position, velocity, acceleration.
4. Understand drafting concepts of Cam and Cam profile.
5. List out different types of gears and their profiles.
6. Explain the concept of Real time kinematic mechanisms.

### **(9CE0136) WATER TECHNOLOGY**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Underline the importance of water and describe the mechanism of hydrological cycle.
2. Describe various elements associate with public water supply.
3. Describe water quality criteria and standards, and their relation to public health.
4. Recognize the cause of water pollution and influence of climatic changes on water resources.
5. Summarize various water conservation techniques in practice.
6. Explain need for watershed management and implement various Plans for watershed management.

### **(19EE0238) GENERATION OF ENERGY THROUGH WASTE**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Analyze agro based, forest residue and industrial waste conversion processes.

2. Manufacture of Pyro lytic oils and gases.
3. Manufacture of charcoal, yields and applications.
4. Understand various types of gasifies operation.
5. Understand inclined and fluidized bed combustors operation.
6. Understand types of biogas plants and biomass energy Programming India.

### **(19EC0450) INTRODUCTION TO COMMUNICATION SYSTEMS**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Demonstrate knowledge in elements of Analog Digital and Wireless Communication Systems.
2. Analyze the analog modulated and demodulated systems.
3. Understand the principle involved in different modulation techniques.
4. Understand the basic principles of baseband and pass band digital modulation schemes.
5. Analyze probability of error performance of digital systems and are able to design digital communications.
6. Implement various Keying and accessing techniques in real time wireless communication systems.

### **(19CS0550) RELATIONAL DATABASE MANAGEMENT SYSTEM**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Develop relational algebra expressions for queries and optimize them.
2. Design the databases using E\_R method for a given specification of requirements.
3. Apply Normalization techniques on given database.
4. Determine the transaction atomicity, consistency, isolation, and durability for a given Transaction-processing system.
5. Implement the isolation property, including locking, time stamping based on Concurrency Control and Serializability of scheduling.
6. Understand Physical Storage Media and RAID concepts

### **(19HS0813) MANAGEMENT SCIENCE**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Utilize appropriate theoretical frameworks to real life business and managerial problems.
2. Identify appropriate operational risks and develop appropriate responses to them.
3. Apply human resource principles to recruit, select and manage employees to achieve

Organizational goals.

4. Enact strategy, including contingent plans for the effective management of the organization.
5. Identify, plan, and implement the projects and evaluate the performance of the projects.
6. Analyze effective application of latest developments to diagnose and solve organizational

problems.

**(19EE0241) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB  
COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Students will understand all the fundamental components about electrical Engineering and Electronics Engineering.
2. Make electrical connections by wires of appropriate ratings.
3. Understand the usage of common electrical and electronic measuring instruments.
4. Understand the basic characteristics of transformers and electrical machines.

**(19CE0106) STRENGTH OF MATERIALS LAB  
COURSE OUTCOMES**

On successful completion of this course the student should be able to

1. Conduct tension test on mild steel bar and plot stress strain curve.
2. Conduct compression test on wood, brick and concrete and can calculate their compression test.
3. Conduct impact test on metal specimens.
4. Find hardness of different materials.
5. Determine modulus of elasticity of given material of beam by studying deflection for different loads.
6. Determine tensile and torsional strength of mild steel bars and find stiffness of a helical spring.

**(19CE0112) FLUID MECHANICS &HYDRAULIC MACHINERY LAB  
COURSE OUTCOMES**

On successful completion of this course, the student should be able to

1. Calibrate Venturi meter & Orifice meter
2. Calculate losses inflows
3. Estimate the efficiency of different pumps.
4. Study the performance of different turbines.
5. Study importance of liquid properties and its methods of determination.
6. Calculate forces and pressure due to fluid action under different conditions.

**(19HS0805) ENVIRONMENTAL SCIENCE  
COURSE OUTCOMES**

On successful completion of the course the students will be able to

1. Recognize the physical, chemical and biological components of the earth's systems and show how they function.
2. Characterize and analyze human impacts on the environment.
3. Integrate facts, concepts and methods from multiple disciplines and apply to environmental problems.
4. Create informed opinions about how to interact with the environment on both a personal and a social level.
5. Perform independent research on human interactions with the environment.
6. Recognize the ecological basis for regional and global environmental issues

**(19HS0833) NUMERICAL METHODS, PROBABILITY & STATISTICS COURSE  
COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Develop the mathematical skills of the students in the areas of numerical methods.
2. Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.
3. Work out numerical differentiation and integration whenever and wherever routine methods are not applicable.
4. A good understanding of the laws of probability axioms and rules.
5. Understanding of moments of discrete and continuous random variables as well as be familiar with common named discrete and continuous random variables.
6. Calculate and interpret the correlation and Regression between two variables.

### **(19ME0305) ENGINEERING THERMODYNAMICS**

#### **COURSE OUTCOMES**

On successful completion of the course, the students will be able to

1. State and explain the open and closed systems as well as develop and apply continuity equation for them.
2. Describe the Basic concepts of thermodynamics such as temperature, pressure, system, Properties, process, state, cycles and equilibrium.
3. Explain the Basic laws of thermodynamics and their applications.
4. Interpret the Concepts of enthalpy, entropy and other thermodynamic properties of ideal gas Process.
5. Analyze Thermodynamic cycles and behavior of pure substances, usage of steam tables and Mollier chart in solving steam related problems.
6. Summarize various types of boilers, their construction, working and their applications.

### **(19ME0306) MANUFACTURING PROCESSES**

#### **COURSE OUTCOMES**

On successful completion of the course, the student will be able to

1. Interpret the pattern making, core making and examine the defects present in casting.
2. Select appropriate Joining Processes to join Work piece.
3. Analyze the suitable Hot, Cold Working, and Rolling processes for specific application.
4. Describe the different sheet metal working processes.
5. Explain the process of plastic moulding in Manufacturing Industries.
6. Categorize and select a suitable manufacturing process for metals and plastics according to their needs and applications.

### **(19ME0307) THEORY OF MACHINES**

#### **COURSE OUTCOMES**

On successful completion the course, the students will be able to

1. Explain the Effect of gyroscopic couple, its reactions and also design flywheel for machinery.
2. Find the uses of clutch and modify its application.
3. Design the Brakes according to applications and need.
4. Design a gyroscope in an optimized size with maximum effort.

5. Interpret how to balance an engine to reduce its vibration and noise.
6. Identify the cause of vibration and calculate its magnitude to reduce it.

### **(19CE0143) FUNDAMENTALS OF URBAN PLANNING**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Recognize issues related to town planning and discuss the objectives, necessity and stages of town planning.
2. Summarize importance of zoning, can classify various town planning practices and can conduct surveys for town planning.
3. Classify the residential building, list the agencies involved in improving house and review the problems associated with residential housing.
4. Discuss the issues associated with slums and recognize the methods to improve condition of slums.
5. Interpret norms laid down for public and industrial building and can summarize building by-laws.
6. List and discuss various urban roads and the concepts of traffic management in a town.

### **(19EE0233) INDUSTRIAL INSTRUMENTATION**

#### **COURSE OUTCOMES:**

On successful completion of this course, the student will be able to

1. Identify and explain the types of errors occurring in measurement systems.
2. Differentiate among the types of data transmission and modulation techniques.
3. Apply digital techniques to measure voltage, frequency and speed.
4. Analyze the working principles of different Signal Analyzers and Digital meters.
5. Understand the operation of several types of transducers.
6. Choose suitable Transducers for the measurement of non-electrical quantities.

### **(19EC0451) ELEMENTS OF EMBEDDED SYSTEMS**

#### **COURSE OUTCOMES**

On successful completion of this course, students will be able to

1. Differentiate between general computing system and the embedded system; also recognize the classification of embedded systems.
2. Enumerate and describe the components of an embedded system.
3. Learn about open source electronics platform.
4. Program an embedded system by interfacing sensors & actuators.
5. Identify the basic building blocks of Internet of Things and characteristics.
6. Implement their own ideas in various application areas of embedded systems and IOT.

### **(19CS0551) JAVA PROGRAMMING**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Implement simple abstract data types and design abstraction functions.
2. Recognize features of object-oriented design such as encapsulation, polymorphism,

Inheritance, and composition of systems based on object identity.

3. Apply object-oriented design patterns for problem solving.
4. Implement Exception handling with synchronization.
5. Execute programs on Multithreading and String handling concepts.

6. Design applications with an event-driven graphical user interface.

**(19HS0814) INTELLECTUAL PROPERTY RIGHTS**

**COURSE OUTCOMES**

On successful completion of the course the students will be able to

1. Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights.
2. Identify different types of intellectual properties, ownership rights and the scope of the protection.
3. Adequate knowledge on patents, trademarks, and copy rights and to get property rights for their intellectual work.
4. Identify, apply, and assess ownership rights, registration processes for IP rights.
5. Discern the approaches for intellectual property management and intellectual property audits.
6. Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level.

**(19ME0308) FUELS LAB**

**COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. List out the different types of boilers.
2. Describe the working of Abel's Flash & Fire point Test.
3. Experiment on Cleveland's Flash & Fire point Test.
4. Explain the method of finding viscosity using Redwood Viscometer-I.
5. Understands about the Redwood Viscometer-II.
6. Interpret the method of finding carbon residue percentage in given fuel.

**(19ME0309) MANUFACTURING PROCESSES LAB**

**COURSE OUTCOMES**

On successful completion of the course, the students will be able to

1. Demonstrate Engineering principles on metallurgy and material science in manufacturing

Processes.

2. Produce metal products using casting method.
3. Understand the principle of Arc welding and spot welding and perform the same.
4. Produce sheets metals parts using mechanical press like piercing and drawing operation.
5. Create plastic materials through injection molding and blow molding process.
6. Use Soldering process to join components on Electronic circuit.

**(19ME0310) COMPUTER AIDED MACHINE DRAWING LAB**

**COURSE OUTCOMES:**

On successful completion of this course, the Student will be able to

1. Understand and draw the conventional representation of various materials and machine

components.

2. Design various thread profiles.
3. Explain the step to draw Machine elements such as Bolt, Nut and Keys.
4. Design a component with given part drawings.
5. Explain the procedure to draw part drawings from a given assembled diagram.



6. Know the various commands and tool bars used in CAD software.

**(19HS0817) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**

**COURSE OUTCOMES**

On successful completion of the course the students will be able to

1. Connect up the basic principles of thought process.
2. Understand Holistic life style of yogic science and wisdom capsules in Sanskrit literature.
3. Analyze the society and nature through sustainability.
4. Explain Indian knowledge system and Indian perspective of modern science.
5. Use the basic principles of Yoga and holistic health care system.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)  
Bachelor of Technology**

**Department of Electronics and Communication Engineering**

**I B. Tech. – I Semester (E.C.E)**

**(19HS0801) APPLIED CHEMISTRY**

**Course Outcomes:**

On successful completion of this course, the student will be able to

- Apply Nernst equation for calculating electrode and cell potentials, differentiate between pH metry, potentiometric and conductometric titrations, explain the theory of construction of battery and fuel cells, solve problems based on cell potential.
- Apply Schrodinger wave equation to hydrogen and particle in a box, illustrate the molecular orbital energy level diagram of different molecular species, semiconductors and insulators discuss the magnetic behavior and colour of complexes.
- Explain the different types of polymers and their applications, explain the preparation, properties and applications of Bakelite, Nylon-66, and carbon fibres, describe the mechanism of conduction in conducting polymers, discuss Buna-S and Buna-N elastomers and their applications.
- Explain the different types of spectral series in electromagnetic spectrum, understand the principles of different analytical instruments, Explain the different applications of analytical instruments.
- Explain the band theory of solids for conductors, semiconductors and insulators, explain supra molecular chemistry and self assembly, demonstrate the application of Rotaxanes and Catenanes as artificial molecular machines

**(19HS0830) ALGEBRA AND CALCULUS**

**Course Outcomes:**

On successful completion of this course, the student will be able to

- Develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- Utilize mean value theorems to real life problems..
- Familiarize with functions of several variables which is useful in optimization
- Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems.
- Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions.

## **(19ME0302) ENGINEERING GRAPHICS**

### **Course Outcomes:**

On successful completion of this course, the student will be able to

1. Graphically construct and understand the importance of mathematical curves in engineering applications.
2. Able to draw the basic views related to projections of Points, Lines and Planes.
3. Able to draw the projections of geometrical solids and sectional view of solids.
4. Understand the concept of projection and acquire visualization skills, development of surfaces and interpenetrations of solids.
5. To draw multi view orthographic and other projections including isometric.

## **(19CS0501) PYTHON PROGRAMMING**

### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Develop Software easily right out of the box.
- Solve the problems using control structures, input and output statements.
- Summarize the features of lists, tuples, dictionaries, strings and files.
- Experience the usage of standard libraries, objects, and modules.
- To build the software for real needs.

## **(19HS0803) APPLIED CHEMISTRY LAB**

### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Determine the cell constant and conductance of solutions.
- Prepare advanced polymer materials.
- Estimate the Iron and Calcium in cement.
- Calculate the hardness of water.
- Determination of conductivity of an Acid.

## **(19ME0301) WORKSHOP PRACTICE LAB**

### **Course outcomes:**

On successful completion of this course, the student will be able to

- Apply wood working skills in real world applications.
- Build different parts with metal sheets in real world applications
- Apply fitting operation in various applications
- Apply different types of basic electric circuit connections
- Demonstrate soldering and brazing.

## **PART A – ENGINEERING WORKSHOP**

### **Course outcomes:**

On successful completion of this course, the student will be able to

- Apply wood working skills in real world applications.
- Build different parts with metal sheets in real world applications
- Apply fitting operation in various applications
- Apply different types of basic electric circuit connections
- Demonstrate soldering and brazing.

## **PART B - IT WORKSHOP**

### **Course outcomes:**

On successful completion of this course, the student will be able to

1. Identify the basic computer peripherals.
2. Gain sufficient knowledge on assembling and disassembling a PC.
3. Learn the installation procedure of Windows and Linux OS.
4. Acquire knowledge on basic networking infrastructure.
5. Learn productivity tools like Word, Excel and Powerpoint.
6. Acquire knowledge on basics of internet and world wide web.

## **(19CS0502) PYTHON PROGRAMMING LAB**

**(Common to CSE, CSIT and ECE)**

### **Course Outcomes:**

On successful completion of this course, the student will be able to

1. Ability to program on basic concepts, control structures.
2. Ability to implement data structures and their operations
3. Ability to work on object oriented programming
4. Ability to handle exceptional handling and plotting of graphical entities.
5. Ability to develop any real world problem

## **I B.Tech- II Sem**

## **(19HS0810) COMMUNICATIVE ENGLISH**

### **Course Outcomes:**

On successful completion of this course, the student will be able to

- To understand social or transactional dialogues spoken by native speakers of

English and identify the context, topic, and pieces of specific information.

- To employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information.
- To Participate in informal discussions and speak clearly on a specific topic or in general.
- To Comprehend, discuss and respond to academic texts and use appropriate language for description and interpretation in writing
- To form sentences using proper grammatical structures and correct word forms.

### **(19HS0831) DIFFERENTIAL EQUATIONS AND VECTOR**

#### **CALCULUS**

##### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Solve the differential equations related to various engineering fields.
- Identify solution methods for partial differential equations that model physical processes.
- Interpret the physical meaning of different operators such as gradient, curl and Divergence.
- Estimate the work done against a field, circulation using vector calculus.

### **(19HS0851) SEMICONDUCTOR PHYSICS**

##### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Explain concepts of free electron theory and energy bands in solids.
- Identify the applications of semiconductors in electronic devices.
- Explain the applications of magnetic materials.
- Evaluate the Maxwell equations and assess the EM wave propagation in non-conducting medium.
- Apply the basic properties of nanomaterials in various engineering branches.

### **(19EE0239) BASIC ELECTRICAL ENGINEERING**

##### **Course Outcomes:**

- On successful completion of this course, the student will be able to
- Determine the equivalent impedance of given network by using network reduction techniques.
- Determine the current through any element and voltage across any element
- Apply the network theorems suitably.
- Analyze the operating principles of electrical machines.
- Analyze the operating principles of transformer.

### **(19EC0401) SWITCHING THEORY AND LOGIC DESIGN**

**Course Outcomes:**

On successful completion of this course, the student will be able to

- Able to define different Number systems, Binary Codes and perform Number base conversions.
- Able to simplify the Boolean functions, design and implement using Logicgates.
- Understand the methods for gate-level minimization techniques.
- Design and implement Sequential and Combinational circuits.
- Apply the state reduction methods in design of FSMs.
- Understand and design memory systems like RAM, ROM, PLA, PAL.

**(19HS0811) Communicative English Lab****Course Outcomes:**

On successful completion of this course, the student will be able to

- Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
- Apply communication skills through various language learning activities.
- Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
- Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
- 5. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

**(19HS0855) SEMICONDUCTORS PHYSICS LAB****Course Outcomes:**

On successful completion of this course, the student will be able to

- Operate various optical instruments.
  - Estimate wavelength of laser and particles size using laser.
  - Plot the intensity of the magnetic field of induction along the axis of circular coil carrying current with distance.
  - Evaluate the acceptance angle of an optical fiber and numerical aperture.
- Determine energy loss by B-H curve

**(19HS0817) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE****Course Outcomes:**

On successful completion of this course, the student will be able to

- To connect up the basic principles of thought process.
- To understand Holistic life style of yogic science and wisdom capsules in Sanskrit literature.
- To analyze the society and nature through sustainability.

- To explain Indian knowledge system and Indian perspective of modern science.
- To use the basic principles of Yoga and holistic health care system.

**(19HS0834) NUMERICAL METHODS AND TRANSFORMS**

**Course Outcomes:**

On successful completion of this course, the student will be able to

- To develop the mathematical skills of the students in the areas of numerical methods.
- Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.
- Work out numerical differentiation and integration whenever and wherever routine methods are not applicable.
- Calculate the Laplace transform of standard functions both from the definition and by using tables.
- Students will be able to comprehend basic systems properties and signals.
- Students will be able to apply Fourier analysis to periodic and aperiodic signals

**(19EE0242) NETWORK THEORY**

**Course Outcomes:**

On successful completion of this course, the student will be able to

- Understand basics electrical circuits with nodal and mesh analysis.
- Solve the given circuit with various theorems and methods.
- Determine the transient response of R-L, R-C, R-L-C circuits for d.c and a.c excitations.
- Apply Fourier transforms to electrical circuits excited by non-sinusoidal sources.
- Learn the various parameters and their interrelationship, able to solve numerical with series, cascade, and parallel connection using two port parameters.
- Design different types of filters.

**(19EC0402) ELECTRONIC DEVICES AND CIRCUITS**

**(Common to EEE and ECE)**

**Course Outcomes:**

On successful completion of this course, the student will be able to

- Demonstrate the characteristics of PN Junction Diode, Rectifiers, Filters, BJT, JFET, MOSFET and special purpose electronic devices.
- Analyze numerical and analytical problems in Rectifiers, Filters, Transistor

biasing circuits and Transistor amplifiers.

- Design and develop electronic circuits such as Rectifiers with and without filters, Transistor biasing circuits and Transistor amplifiers.
- Solve engineering problems and arrive at solutions relating to electronic devices and circuits.
- Identify a suitable semiconductor device and transistor for any given specification.
- Select suitable technique for transistor modelling.

### **(19EC0403) SIGNALS, SYSTEMS AND RANDOM PROCESSES**

#### **Course Outcomes:**

At the end of this course students will demonstrate the ability to

- Analyze different types of signals.
- Represent continuous systems in time and frequency domain using different transforms.
- Investigate the system stability.
- Understand the concept of convolution of signals.
- Understand and Analyze the Laplace Transform and ROC.
  - A student will be able to determine the temporal and spectral characteristics

### **(19CE0136) WATER TECHNOLOGY**

#### **(Open Elective-I) Course Outcomes:**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Underline the importance of water and describe the mechanism of hydrological cycle.
- Describe various elements associated with public water supply.
- Describe water quality criteria and standards, and their relation to public health.
- Recognize the cause of water pollution and influence of climatic changes on water resources.
- Summarize various water conservation techniques in practice.
- Explain need for watershed management and implement various Plans for watershed management.

### **(19EE0238) GENERATION OF ENERGY THROUGH WASTE**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Analyse agro based, forest residue and industrial waste conversion processes.
- Manufacture of Pyrolytic oils and gases
- Manufacture of charcoal, yields and applications
- Understand various types of gasifier operation



- Understand inclined and fluidized bed combustors operation
  - Understand types of biogas plants and biomass energy programme in India
- (19ME0349) FUNDAMENTALS OF MECHANICAL ENGINEERING**

**Course Outcomes:**

On successful completion of this course, the student will be able to

- List the types of Engineering materials and also describe alloying, Heat treatment Processes.
- Recognize the importance of IC Engines in automobiles and the classification of air compressors
- Distinguish various types of air conditioning systems for house and Industrial applications
- Explicate the working of various Power plants like nuclear, Hydro & thermal power plants
- Classify various types modern machining processes and determine the best suitable process to machine a component.
- Apply the working principles of CAD, CAM and CIM in the operation of Robotic manufacturing and quality control systems

**(19CS0549) LINUX PROGRAMMING**

**(Open Elective – I)**

**Course Outcomes:**

On successful completion of this course, the student will be able to

- Understand the basic set of commands and editors in Linux operating system.
- Implement and execute various shell scripts.
- Work with filters, pipes and user communication, Vi-Editor commands.
- Execute various commands related to regular expressions
- Implement korn shell programming
- Execute commands related to C shell.

**(19HS0813) MANAGEMENT SCIENCE**

**Course Outcomes:**

On successful completion of this course, the student will be able to

- Utilize appropriate theoretical frameworks to real life business and managerial problems.
- Identify appropriate operational risks and develop appropriate responses to them.
- Apply human resource principles to recruit, select and manage

- employees to achieve organizational goals.
- Enact strategy, including contingent plans for the effective management of the organization.
- Identify, plan, and implement the projects and evaluate the performance of the projects.
- Analyze effective application of latest developments to diagnose and solve organizational problems.

### **(19EC0404) SWITCHING THEORY AND LOGIC DESIGN LAB**

**(Common to EEE and ECE)**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Verify the operation of Logic gates, combinational and Sequential circuits
- Construct basic combinational circuits and verify their functionalities.
- Apply the design procedures in designing basic sequential circuits.
- Understand the functionality of counters.
- Understand the sequencing of Shift registers.
- Construct various digital circuits and verify their operation.

### **(19EC0405) ELECTRONIC DEVICES AND CIRCUITS LAB**

**(Common to EEE and ECE)**

#### **Course Outcomes:**

On successful completion of this course the students will be able to

- Demonstrate knowledge in different electronic devices and analog circuits.
- Analyze the characteristics of different electronic devices and circuits like Diodes-PN Junction Diode, Zener Diode and Transistors-BJT, FET.
- Design and develop electronic circuits like rectifiers, clippers, clampers, BJT and FET Amplifiers.
- Solve engineering problems with better Electronic circuits.
- Function effectively as an individual and as a member in a group in the area of electronic devices and circuits.
- Develop skills to communicate verbally and in written form in the area of electronic devices and circuits.

### **(19EC0406) BASIC SIMULATION LAB**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Analyze various types of signals and sequences.
- Apply convolution and correlation operations on different signals.

- Determine the response of an LTI system to given signals.
- Plot and analyze the spectrum of a given signal using MATLAB.
- Verify the Sampling theorem.
- Compute various statistical properties of a random noise.

### (19HS0816) INDIAN CONSTITUTION

#### Course Outcomes:

On successful completion of the course, students will be able to

- Explain the key concepts of political economy.
- Analyse the significant developments in the political ideologies.
- Describe the salient features of the constitution of India interpret, integrate and critically.
- Analyse the political economy of Indian international relations and gain knowledge in Judiciary system.
- Apply their knowledge and skills acquired to write various competitive examinations.
- Analyse the constitutional rights in relating to Practical life.

#### II B. Tech. – II Sem

### (19EC0407) ELECTRONIC CIRCUIT ANALYSIS

#### Course Outcomes:

On successful completion of the course, students will be able to

- Acquire knowledge of BJT High Frequency Model, Multistage amplifiers, Feedback amplifiers, oscillators, Power amplifiers, Tuned amplifiers and Multivibrators.
- Perform analysis of analog electronic circuits for meeting defined specifications.
- Design and develop analog electronic circuits such as Multistage amplifiers, Feedback amplifiers, Oscillators, Power amplifiers, Tuned amplifiers and Multivibrators with given specifications.
- Solve problems relating to analog electronic circuit design.
- Select an Amplifier circuit suitable for a specific electronics subsystem.
- Apply course knowledge to assess societal issues and understand the consequent responsibilities relevant to the professional engineering practice using analog electronic circuits.

### (19EC0408) ANALOG COMMUNICATIONS

#### Course Outcomes:

On successful completion of this course, the student will be able to

- Understand different blocks in communication system and distinguish between

different amplitude modulation schemes with their advantages, disadvantages and applications.

- Analyze generation and detection of FM signal and comparison between amplitude and angle modulation schemes.
- Study the different types of noises and its effects to analyze the behavior of different Analog modulation schemes in presence of noise & evaluate the performance of analogue communications in the presence of noise.
- Differentiate between different analog pulse modulation and demodulation techniques and signal multiplexing for various applications.
- Identify different radio receiver circuits and role of AGC and understand the concept of information and capacity
- Identify source coding and channel coding schemes for a given communication link.

### **(19EC0409) LINEAR & DIGITAL IC APPLICATIONS**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Able to define internal structures of the op amp and basic concepts of filters, timers and converters
- Able to experiment the linear, nonlinear applications of op-amp with specialized ICs and converters.
- Evaluate the applications of op-amp circuits, specialized ICs and converters.
- Able to design the op amp circuits and converters for real time applications.
- Understand CMOS and TTL Logic families and their interfacing.
- Describe various design style of VHDL programming.
- Apply the knowledge of VHDL programming to develop VHDL model for standard combinational and sequential IC structures.

### **(19EC0410) ELECTROMAGNETIC THEORY AND TRANSMISSION LINES**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Analyse the relation between electric and magnetic fields using vector analysis.
- Evaluate the Maxwell's Equation in Static Electric and Magnetic Field.
- Apply Maxwell's equations in Electromagnetic fields.
- Characterize Maxwell's equation in both static and Time varying fields.
- Understand the propagation of electromagnetic waves in different media.
- Understand the concepts of Transmission lines and Their Applications.
- **(19EC0410) ELECTROMAGNETIC THEORY AND TRANSMISSION LINES**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Analyse the relation between electric and magnetic fields using vector analysis.
- Evaluate the Maxwell's Equation in Static Electric and Magnetic Field.

- Apply Maxwell's equations in Electromagnetic fields.
- Characterize Maxwell's equation in both static and Time varying fields.
- Understand the propagation of electromagnetic waves in different media.
- Understand the concepts of Transmission lines and Their Applications.

### **(19CE0143) FUNDAMENTALS OF URBAN PLANNING**

#### **(Open Elective –II)**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Recognize issues related to town planning and discuss the objectives, necessity and stages of town planning
- Summarize importance of zoning, can classify various town planning practices and can conduct surveys for town planning
- Classify the residential building, list the agencies involved in improving house and review the problems associated with residential housing
- Discuss the issues associated with slums and recognize the methods to improve condition of slums
- Interpret norms laid down for public and industrial building and can summarize building bye-laws
- List and discuss various urban roads and the concepts of traffic management in a town

### **(19EE0233) INDUSTRIAL INSTRUMENTATION**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Identify and explain the types of errors occurring in measurement systems.
- Differentiate among the types of data transmission and modulation techniques.
- Apply digital techniques to measure voltage, frequency and speed.
- Analyse the working principles of different Signal Analyzers and Digital meters.
- Understand the operation of several types of transducers.
- Choose suitable Transducers for the measurement of non-electrical quantities.

### **(19ME0350) MECHANICAL MEASUREMENTS & CONTROL SYSTEMS**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- State the basic principles of measurement systems and explain its performance characteristics

- Distinguish the types of various temperature and pressure measurement instruments and finds the best one for the industrial applications
- Explicate the principle of measurement of Speed, Acceleration and Vibration instruments and describe its working
- Illustrate the operation of Fuel level, measurement of Flow and Humidity Measurement instruments and also state the applications of various control systems
- Identify the appropriate device for the measurement of temperature, pressure, speed, stress, humidity, flow velocity etc., and justify its use through characteristics and performance.
- Classify the various types of control systems for the measurement of temperature, speed and position

### **(19CS0551) JAVA PROGRAMMING**

#### **(Open Elective- II)**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Implement simple abstract data types and design abstraction functions.
- Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
- Apply object-oriented design patterns for problem solving.
- Implement Exception handling with synchronization.
- Execute programs on Multithreading and String handling concepts.
- Design applications with an event-driven graphical user interface.

### **(19HS0814) INTELLECTUAL PROPERTY RIGHTS**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights
- Identify different types of intellectual properties, ownership rights and the scope of the protection
- Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work
- Able to identify, apply, and assess ownership rights, registration processes for IP rights
- To discern the approaches for intellectual property management and intellectual property audits
- Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level

### **(19EC0411) ELECTRONIC CIRCUIT ANALYSIS LAB**

**Course Outcomes:**

On successful completion of the course, students will be able to

- Acquire knowledge in different electronic circuits using transistor amplifier.
- Analyze and design of amplifiers, feedback amplifiers, oscillators, Tuned amplifiers and Multivibrators.
- Measure and simulate important parameters of various amplifiers which are used to understand the behavior of analog electronic circuits.
- Identify a suitable analog electronic circuit for various applications with a given specification.
- Function effectively as an individual and as a member in a group in the area of analog electronic circuits.
- Develop skills to communicate in verbal and written form in the area of analog electronic circuits.

**(19EC0412) ANALOG COMMUNICATIONS LAB****Course Outcomes:**

On successful completion of this course, the student will be able to

- Technically visualize spectra of different analog modulation schemes
- Analyze practical behavior of different elements available in analog communication system such as filters, amplifiers etc.
- Measure characteristics of radio receiver measurements.
- Experience real time behavior of different analog modulation schemes
- Acquire knowledge about pulse modulation systems
- Observe the modulation and demodulation behavior of various modulation techniques

**(19EC0413) LINEAR & DIGITAL IC APPLICATIONS LAB****Course Outcomes:**

On Successful Completion of this, Course the Student will be able to

- Design and analyze the various linear & Non-Linear applications of op-amp.
- Design and analyze filter circuits using op-amp.
- Design and analyze oscillators and multivibrators circuits using op-amp (IC741) or IC555
- Design and draw the internal structure of the various digital integrated circuits.
- Develop VHDL/Verilog HDL source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer.
- Verify the logical operations of the digital IC's (Hardware) in the laboratory.

**(19HS0805) ENVIRONMENTAL SCIENCE****Course Outcomes:**

On Successful Completion of this Course, the Student will be able to

- Recognize the physical, chemical and biological components of the earth's systems and show how they function.
- Characterize and analyze human impacts on the environment.
- Integrate facts, concepts and methods from multiple disciplines and apply to environmental problems.
- Create informed opinions about how to interact with the environment on both a personal and a social level.
- Perform independent research on human interactions with the environment.
- Recognize the ecological basis for regional and global environmental issues.



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**Department of Computer Science and Engineering**

**I B.Tech – I Sem (CSE)**

**(19HS0830) ALGEBRA AND CALCULUS**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Develop the use of matrix algebra techniques that is needed by engineers for Practical applications
- Utilize mean value theorems to real life problems
- Familiarize with functions of several variables which is useful in optimization
- Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems
- Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions.

**(19HS0851) SEMICONDUCTOR PHYSICS**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Explain concepts of free electron theory and energy bands in solids.
- Identify the applications of semiconductors in electronic devices.
- Explain the applications of magnetic materials.
- Evaluate the Maxwell equations and asses the EM wave propagation in non- conducting medium.
- Apply the basic properties of nano-materials in various engineering branches.

**(19ME0302) ENGINEERING GRAPHICS**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Graphically construct and understand the importance of mathematical curves in engineering applications
- Able to draw the basic views related to projections of Points, Lines and Planes
- Able to draw the projections of geometrical solids and sectional view of solids
- Understand the concept of projection and acquire visualization skills, development of surfaces and interpenetrations of solids

- To draw multi view orthographic and other projections including isometric

**(19CS0501) PYTHON PROGRAMMING**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Solve the problems using control structures, input and output statements.
- Summarize the features of lists, tuples, dictionaries, strings and files
- Experience the usage of standard libraries, objects, and modules
- Solve the problems using Object Oriented Programming Concepts
- Build the software for real time applications using python
- Install various Python packages

**(19HS0855) SEMICONDUCTOR PHYSICS LAB**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- To explore the application of Interference and Diffraction by doing concerned experiments.
- Elucidate the concepts of Physics through involvement in the experiment by applying theoretical knowledge.
- To understand the concept of energy gap, B-H curve and resonance phenomena in LCR circuits.
- Develop an ability to apply the knowledge of physics experiments in the later studies.

**(19CS0502) PYTHON PROGRAMMING LAB**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Write, Test and Debug Python Programs
- Implement Conditionals and Loops for Python Programs
- Use functions and represent Compound data using Lists, Tuples and Dictionaries
- Read and write data from & to files in Python and develop Application using Pygame
- Build software for real needs.
- Ability to work on a real life Project, implementing R Analytics to create Business insights.

**(19ME0301)WORKSHOP PRACTICE LAB**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Apply wood working skills in real world applications.
- Build different parts with metal sheets in real world applications.
- Apply fitting operation in various applications.

- Apply different types of basic electric circuit connections.
- Demonstrate soldering and brazing.
- Identify the basic computer peripherals.
- Gain sufficient knowledge on assembling and disassembling a PC.
- Learn the installation procedure of Windows and Linux OS.
- Acquire knowledge on basic networking infrastructure.
- Learn productivity tools like Word, Excel and Power point.
- Acquire knowledge on basics of internet and worldwide web.

## **I B. Tech – II Sem. (CSE)**

### **(19HS0801) APPLIED CHEMISTRY**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Apply Nernst equation for calculating electrode and cell potentials, differentiate between pH metry, potentiometric and conductometric titrations, explain the theory of construction of battery and fuel cells, solve problems based on cell potential.
- Apply Schrodinger wave equation to hydrogen and particle in a box, illustrate the molecular orbital energy level diagram of different molecular species, semiconductors and insulators discuss the magnetic behavior and colour of complexes.
- Explain the different types of polymers and their applications, explain the preparation, properties and applications of Bakelite, Nylon-66, and carbon fibres, describe the mechanism of conduction in conducting polymers, discuss Buna-S and Buna-N elastomers and their applications.
- Explain the different types of spectral series in electromagnetic spectrum, understand the principles of different analytical instruments, Explain the different applications of analytical instruments.
- Explain the band theory of solids for conductors, semiconductors and insulators, explain supramolecular chemistry and self assembly, demonstrate the application of Rotaxanes and Catenanes as artificial molecular machines

### **(19HS0810) COMMUNICATIVE ENGLISH**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- To understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information.
- To employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information.

- To Participate in informal discussions and speak clearly on a specific topic or in general.
- To Comprehend, discuss and respond to academic texts and use appropriate language for description and interpretation in writing
- To form sentences using proper grammatical structures and correct word forms.

### **(19HS0835) PROBABILITY & STATISTICS**

#### **COURSE OUTCOMES (COs)**

After completion of this course, a successful student will be able to

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability
- To understand the basic notions of discrete and continuous probability.
- To understand the methods of statistical inference and the role that sampling distributions play in those methods.

### **(19EE0240) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Determine the equivalent impedance of given network by using network reduction techniques.
- Determine the current through any element and voltage across any element
- Apply the network theorems suitably.
- Analyze the operating principles of motor and transformer.
- Analyze the operating principles of major electronic devices, its characteristics and applications.
- Design and analyze the DC bias circuitry of BJT and FE

### **(19CS0503) DIGITAL LOGIC DESIGN**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Understand the working of logic families and logic gates.
- Design and implement Combinational and Sequential logic circuits.
- Understand the process of Analog to Digital conversion and Digital to Analog conversion.
- Design and develop sequential logic circuits
- Use PLDs to implement the given logical problem.

### **(19HS0803) APPLIED CHEMISTRY LAB**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Determine the cell constant and conductance of solutions
- Prepare advanced polymer materials
- Estimate the Iron and Calcium in cement
- Calculate the hardness of water

### **(19HS0811) COMMUNICATIVE ENGLISH LAB**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
- Apply communication skills through various language learning activities.
- Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
- Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
- Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

### **(19HS0817) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Ability to understand, connect up and explain basics of Indian traditional Knowledge in modern scientific perspective.

## **II B. Tech – I Sem. (CSE)**

### **(19EC0421) MICROPROCESSORS AND MICROCONTROLLERS**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Understand the evolution of computers, processors, and its applications
- Explain the various software and hardware parts of a microprocessors and computer
- Understand the architectures of 8085 microprocessor and 8051 microcontroller system
- Analyze the programming model of 8085 Microprocessor & 8051 microcontroller development environment.
- Implement the techniques of interfacing memories, various I/O devices, sensors and actuators with microprocessor and microcontrollers

- Design and develop various microprocessor/microcontroller-based systems for the real-life problems

### **(19CS0504) COMPUTER ORGANIZATION & ARCHITECTURE**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Understand the CPU design and computer arithmetic
- Understand the design of control unit
- Understand the memory hierarchy and its impact of cost and performance.
- Discuss hardware requirements for cache memory and virtual memory.
- Design algorithms to exploit pipelining and multiprocessors
- Use memory and I/O devices effectively

### **(19CS0505) C and DATA STRUCTURES**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Recognize the programming elements of C Programming language
- Select the control structure for solving the problem
- Apply modular approach for solving the problem
- Solve mathematical problems using C Programming language
- Develop the applications using stacks and queues
- Construct the linked lists for various applications and perform sorting techniques

### **(19CS0506) DATABASE MANAGEMENT SYSTEMS**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Develop relational algebra expressions for queries and optimize them.
- Design the databases using E\_R method for a given specification of requirements.
- Apply Normalization techniques on given database.
- Determine the transaction atomicity, consistency, isolation, and durability for a given transaction-processing system.
- Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.
- Understand Physical Storage Media and RAID concepts.

### **(19CE0136) WATER TECHNOLOGY**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Underline the importance of water and describe the mechanism of hydrological cycle
- Describe various elements associate with public water supply
- Describe water quality criteria and standards, and their relation to public health
- Recognize the cause of water pollution and influence of climatic changes on water resources
- Summarize various water conservation techniques in practice
- Explain need for watershed management and implement various Plans for watershed management

### **(19EE0238) GENERATION OF ENERGY THROUGH WASTE**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Analyse agro based, forest residue and industrial waste conversion processes.
- Manufacture of Pyrolytic oils and gases
- Manufacture of charcoal, yields and applications
- Understand various types of gasifiers operation
- Understand inclined and fluidized bed combustors operation
- Understand types of biogas plants and biomass energy programme in India

### **(19ME0349) FUNDAMENTALS OF MECHANICAL ENGINEERING**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- List the types of Engineering materials and also describe alloying, Heat treatment Processes.
- Recognize the importance of IC Engines in automobiles and the classification of air compressors
- Distinguish various types of air conditioning systems for house and Industrial applications
- Explicate the working of various Power plants like nuclear, Hydro & thermal power plants
- Classify various types modern machining processes and determine the best suitable process to machine a component.
- Apply the working principles of CAD, CAM and CIM in the operation of Robotic manufacturing and quality control systems

### **(19EC0448) INTRODUCTION TO COMMUNICATION SYSTEMS**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Demonstrate knowledge in elements of Analog Digital and Wireless Communication Systems.
- Analyze the analog modulated and demodulated systems.
- Understand the principle involved in different modulation techniques
- Understand the basic principles of baseband and pass band digital modulation schemes
- Analyze probability of error performance of digital systems and are able to design digital communications.
- Implement various Keying and accessing techniques in real time wireless communication systems

### **(19HS0813) MANAGEMENT SCIENCE**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Utilize appropriate theoretical frameworks to real life business and managerial problems
- Identify appropriate operational risks and develop appropriate responses to them
- Apply human resource principles to recruit, select and manage employees to achieve organizational goals
- Enact strategy, including contingent plans for the effective management of the organization
- Identify, plan, and implement the projects and evaluate the performance of the projects
- Analyze effective application of latest developments to diagnose and solve organizational problems

### **(19EC0424) MICROCONTROLLER AND APPLICATIONS LAB.**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to

- Familiar with keil programming environment
- Demonstrate arithmetic, logical and string operations using assembly language programming.
- Develop embedded C language programs for various applications using 8051 microcontroller.
- Explore the provided example code and online resources for extending knowledge about the capabilities of the 8051 microcontrollers
- Test, debug, and deploy the 8051 microcontroller-based systems
- Design and develop own microprocessor/microcontroller-based solutions for the real-world problems



### **(19CS0507) C and DATA STRUCTURES LAB**

#### **COURSE OUTCOMES (COs)**

On Successful completion of this course, the student will be able to

- Read, understand and trace the execution of programs written in C language
- Develop C programs for simple applications making use of basic constructs, arrays and strings
- Develop C programs involving functions, recursion, pointers, and structures
- Select the data structure appropriate for solving the problem
- Illustrate the working of stack and queue
- Implement searching and sorting algorithm

### **(19CS0508) DATA BASE MANAGEMENT SYSTEMS LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Develop relational algebra expressions for queries and optimize them.
- Design the databases using E\_R method for a given specification of requirements.
- Apply Normalization techniques on given database.
- Determine the transaction atomicity, consistency, isolation, and durability for a given transaction-processing system.
- Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.
- Execute DDL, DML, DCL commands.

### **(19HS0816) INDIAN CONSTITUTION**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to

- Explain the key concepts of political economy.
- Analyse the significant developments in the political ideologies.
- Describe the salient features of the constitution of India interpret, integrate and critically.
- Analyse the political economy of Indian international relations and gain knowledge in Judiciary system.
- Apply their knowledge and skills acquired to write various competitive examinations.
- Analyse the constitutional rights in relating to Practical life.

### **II B. Tech – II Sem. (CSE)**

### **(19HS0836) DISCRETE MATHEMATICS**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Write an argument using logical notation and determine if the argument is or is not valid.
- Demonstrate the ability to write and evaluate a proof or outline the basic structure of and give examples of each proof technique described.
- Understand the basic principles of sets and operations in sets.
- Demonstrate an understanding of relations and functions and be able to determine their properties.
- Determine when a function is 1-1 and "onto".
- Demonstrate different traversal methods for trees and graphs.
- Model problems in Computer Science using graphs and trees.

### **(19CS0509) FORMAL LANGUAGES AND AUTOMATA THEORY**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to

- Compare, understand and analyze different languages, grammars, Automata and Machines and appreciate their power and convert Automata to Programs and Functions.
- Construct finite Automata for various problems.
- Design automata, regular expressions and context-free grammar accepting and
- Generating a certain language, design of new grammar and languages.
- Define Push Down Automata performing simple tasks and equivalence of PDA and CFGs.
- Find solutions to the problems using Turing machines.
- Distinguish between computability, decidability and un-decidability problems.

### **(19CS0510) OBJECT ORIENTED PROGRAMMING THROUGH JAVA**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Implement simple abstract data types and design implementations using abstraction functions.
- Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
- Implement Exception handling with synchronization.
- Execute programs on Multithreading and String handling concepts.
- Design applications with an event-driven graphical user interface.
- Design and Implementation of Application Programming Interfaces.

## **(19CS0511) OPERATING SYSTEMS**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to

- Describe the important computer system resources and the role of operating system in their management policies and algorithms.
- Understand the process management policies and scheduling of processes by CPU.
- Analyze the requirement for process synchronization and coordination handled by operating system.
- Describe and analyze the memory management and its allocation policies.
- Categorize the storage management policies with respect to different storage management technologies
- Study the need for special purpose operating system with the advent of new emerging technologies.

## **(19CE0143) FUNDAMENTALS OF URBAN PLANNING**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to

- Recognize issues related to town planning and discuss the objectives, necessity and stages of town planning
- Summarize importance of zoning, can classify various town planning practices and can conduct surveys for town planning
- Classify the residential building, list the agencies involved in improving house and review the problems associated with residential housing
- Discuss the issues associated with slums and recognize the methods to improve condition of slums
- Interpret norms laid down for public and industrial building and can summarize building bye-laws
- List and discuss various urban roads and the concepts of traffic management in a town

## **(19EE0233) INDUSTRIAL INSTRUMENTATION**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to

- Identify and explain the types of errors occurring in measurement systems.
- Differentiate among the types of data transmission and modulation techniques.
- Apply digital techniques to measure voltage, frequency and speed.
- Analyse the working principles of different Signal Analyzers and Digital meters.
- Understand the operation of several types of transducers.
- Choose suitable Transducers for the measurement of non-electrical quantities.

## **(19ME0350) MECHANICAL MEASUREMENTS & CONTROL SYSTEMS**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- State the basic principles of measurement systems and explain its performance characteristics
- Distinguish the types of various temperature and pressure measurement instruments and finds the best one for the industrial applications
- Explicate the principle of measurement of Speed, Acceleration and Vibration instruments and describe its working
- Illustrate the operation of Fuel level, measurement of Flow and Humidity
- Measurement instruments and also state the applications of various control systems
- Identify the appropriate device for the measurement of temperature, pressure, speed, stress, humidity, flow velocity etc., and justify its use through characteristics and performance.
- Classify the various types of control systems for the measurement of temperature, speed and position

## **(19EC0449) ELEMENTS OF EMBEDDED SYSTEMS**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to

- Differentiate between general computing system and the embedded system, also recognize the classification of embedded systems.
- Enumerate and describe the components of an embedded system.
- Learn about open source electronics platform.
- Program an embedded system by interfacing sensors & actuators.
- Identify the basic building blocks of Internet of Things and characteristics.
- Implement their own ideas in various application areas of Embedded systems and IoT.

## **(19HS0814) INTELLECTUAL PROPERTY RIGHTS**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to

- Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights
- Identify different types of intellectual properties, ownership rights and the scope of the protection
- Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work
- Able to identify, apply, and assess ownership rights, registration processes for IP rights

- To discern the approaches for intellectual property management and intellectual property audits
- Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level

### **(19CS0512) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs
- Read and make elementary modifications to Java programs that solve real-world problems
- Validate input in a Java program
- Identify and fix defects and common security issues in code.
- Execute a Java program using Javadoc
- Execute a Java program using Java Swings

### **(19CS0513) OPERATING SYSTEMS LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to

- Understand and implement basic services and functionalities of the operating system using system calls
- Use modern operating system calls and synchronization libraries in software/hardware interfaces
- Understand the benefits of thread over process and implement synchronized programs using multithreading concepts
- Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority
- Implement memory management schemes and page replacement schemes
- Understand the concepts of deadlock in operating systems and implement them in multiprogramming system.

### **(19CS0514) OBJECT ORIENTED ANALYSIS AND DESIGN LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of the course students will be able to

- Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation
- Describe the importance of systems analysis and design in solving complex problems
- Explain how the object-oriented approach differs from the traditional approach to systems analysis and design

- Understand the role and function of each UML model in developing object oriented software
- Exhibit software development process
- Recognize the difference between various object relationships: inheritance, association, whole-part, and dependency relationships.

### **(19HS0805) ENVIRONMENTAL SCIENCE**

#### **COURSE OUTCOMES (COs)**

On successful completion of the course students will be able to

- Recognize the physical, chemical and biological components of the earth's systems and show how they function.
- Characterize and analyze human impacts on the environment.
- Integrate facts, concepts and methods from multiple disciplines and apply to Environmental Problems.
- Create informed opinions about how to interact with the environment on both a personal and a social level.
- Perform independent research on human interactions with the environment.
- Recognize the ecological basis for regional and global environmental issues

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**DEPARTMENT OF CSIT**

**I B. Tech – I Sem.**

**(19HS0830) ALGEBRA AND CALCULUS**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Develop the use of matrix algebra techniques that is needed by engineers for Practical applications
2. Utilize mean value theorems to real life problems
3. Familiarize with functions of several variables which is useful in optimization
4. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems
5. Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions.

**(19HS0851) SEMICONDUCTOR PHYSICS**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Explain concepts of free electron theory and energy bands in solids.
2. Identify the applications of semiconductors in electronic devices.
3. Explain the applications of magnetic materials.
4. Evaluate the Maxwell equations and asses the EM wave propagation in nonconducting medium.
5. Apply the basic properties of nano-materials in various engineering branches.

**(19ME0302) ENGINEERING GRAPHICS**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Graphically construct and understand the importance of mathematical curves in engineering applications
2. Able to draw the basic views related to projections of Points, Lines and Planes
3. Able to draw the projections of geometrical solids and sectional view of solids
4. Understand the concept of projection and acquire visualization skills, development of surfaces and interpenetrations of solids
5. To draw multi view orthographic and other projections including isometric

**(19CS0501) PYTHON PROGRAMMING**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Solve the problems using control structures, input and output statements.
2. Summarize the features of lists, tuples, dictionaries, strings and files
3. Experience the usage of standard libraries, objects, and modules
4. Solve the problems using Object Oriented Programming Concepts
5. Build the software for real time applications using python 6. Install various Python packages

### **(19HS0855) SEMICONDUCTORS PHYSICS LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. To explore the application of Interference and Diffraction by doing concerned experiments.
2. Elucidate the concepts of Physics through involvement in the experiment by applying theoretical knowledge.
3. To understand the concept of energy gap, B-H curve and resonance phenomena in LCR circuits.
4. Develop an ability to apply the knowledge of physics experiments in the later studies.

### **(19CS0502) PYTHON PROGRAMMING LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Write, Test and Debug Python Programs
2. Implement Conditionals and Loops for Python Programs
3. Use functions and represent Compound data using Lists, Tuples and Dictionaries
4. Read and write data from & to files in Python and develop Application using Pygame
5. Build software for real needs.
6. Ability to work on a real life Project, implementing R Analytics to create Business 7. insights.

### **(19ME0301)WORKSHOP PRACTICE LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Apply wood working skills in real world applications.
2. Build different parts with metal sheets in real world applications.
3. Apply fitting operation in various applications.
4. Apply different types of basic electric circuit connections.
5. Demonstrate soldering and brazing.

### **Part B - IT WORKSHOP**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Identify the basic computer peripherals.
2. Gain sufficient knowledge on assembling and disassembling a PC.
3. Learn the installation procedure of Windows and Linux OS.



4. Acquire knowledge on basic networking infrastructure.
5. Learn productivity tools like Word, Excel and Power point.
6. Acquire knowledge on basics of internet and worldwide web.

## **I B. Tech – II Sem.**

### **(19HS0801) APPLIED CHEMISTRY**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Apply Nernst equation for calculating electrode and cell potentials, differentiate between pH metry, potentiometric and conductometric titrations, explain the theory of construction of battery and fuel cells, solve problems based on cell potential.
2. Apply Schrodinger wave equation to hydrogen and particle in a box, illustrate the molecular orbital energy level diagram of different molecular species, semiconductors and insulators discuss the magnetic behavior and colour of complexes.
3. Explain the different types of polymers and their applications, explain the preparation, properties and applications of Bakelite, Nylon-66, and carbon fibres, describe the mechanism of conduction in conducting polymers, discuss Buna-S and Buna-N elastomers and their applications.
4. Explain the different types of spectral series in electromagnetic spectrum, understand the principles of different analytical instruments, Explain the different applications of analytical instruments.
5. Explain the band theory of solids for conductors, semiconductors and insulators, explain supramolecular chemistry and self assembly, demonstrate the application of Rotaxanes and Catenanes as artificial molecular machines

### **(19HS0810) COMMUNICATIVE ENGLISH**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. To understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information.
2. To employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information.
3. To Participate in informal discussions and speak clearly on a specific topic or in general.
4. To Comprehend, discuss and respond to academic texts and use appropriate language for description and interpretation in writing
5. To form sentences using proper grammatical structures and correct word forms

### **(19HS0835) PROBABILITY & STATISTICS**

#### **COURSE OUTCOMES (COs)**

After completion of this course, a successful student will be able to:

1. Have acquired ability to participate effectively in group discussions
2. Have developed ability in writing in various contexts
3. Have acquired a proper level of competence for employability
4. To understand the basic notions of discrete and continuous probability.
5. To understand the methods of statistical inference and the role that sampling distributions play in those methods.

**(19EE0240) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING  
COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Determine the equivalent impedance of given network by using network reduction techniques.
2. Determine the current through any element and voltage across any element
3. Apply the network theorems suitably.
4. Analyze the operating principles of motor and transformer.
5. Analyze the operating principles of major electronic devices, its characteristics and applications.
6. Design and analyze the DC bias circuitry of BJT and FET.

**(19CS0503) DIGITAL LOGIC DESIGN**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Understand the working of logic families and logic gates.
2. Design and implement Combinational and Sequential logic circuits.
3. Understand the process of Analog to Digital conversion and Digital to Analog conversion.
4. Design and develop sequential logic circuits
5. Use PLDs to implement the given logical problem.

**(19HS0803) APPLIED CHEMISTRY LAB**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Determine the cell constant and conductance of solutions
2. Prepare advanced polymer materials
3. Estimate the Iron and Calcium in cement
4. Calculate the hardness of water

**(19HS0811) COMMUNICATIVE ENGLISH LAB**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.

2. Apply communication skills through various language learning activities.
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
5. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

### **(19HS0817) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Ability to understand, connect up and explain basics of Indian traditional Knowledge in modern scientific perspective.

### **II B.Tech. – I Sem.**

#### **(19EC0421) MICROPROCESSORS AND MICROCONTROLLERS**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to:

1. Understand the evolution of computers, processors, and its applications
2. Explain the various software and hardware parts of a microprocessors and computer
3. Understand the architectures of 8085 microprocessor and 8051 microcontroller system
4. Analyze the programming model of 8085 Microprocessor & 8051 microcontroller development environment.
5. Implement the techniques of interfacing memories, various I/O devices, sensors and actuators with microprocessor and microcontrollers
6. Design and develop various microprocessor/microcontroller-based systems for the real life problems

#### **(19CS0504) COMPUTER ORGANIZATION & ARCHITECTURE**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Understand the CPU design and computer arithmetic
2. Understand the design of control unit
3. Understand the memory hierarchy and its impact of cost and performance.
4. Discuss hardware requirements for cache memory and virtual memory.
5. Design algorithms to exploit pipelining and multiprocessors
6. Use memory and I/O devices effectively

#### **(19CS0505) C and DATA STRUCTURES**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Recognize the programming elements of C Programming language
2. Select the control structure for solving the problem
3. Apply modular approach for solving the problem
4. Solve mathematical problems using C Programming language
5. Develop the applications using stacks and queues
6. Construct the linked lists for various applications and perform sorting techniques

### **(19CS0506) DATABASE MANAGEMENT SYSTEMS**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Develop relational algebra expressions for queries and optimize them.
2. Design the databases using E\_R method for a given specification of requirements.
3. Apply Normalization techniques on given database.
4. Determine the transaction atomicity, consistency, isolation, and durability for a given transaction-processing system.
5. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.
6. Understand Physical Storage Media and RAID concepts.

### **(19CE0136) WATER TECHNOLOGY**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Underline the importance of water and describe the mechanism of hydrological cycle
2. Describe various elements associate with public water supply
3. Describe water quality criteria and standards, and their relation to public health
4. Recognize the cause of water pollution and influence of climatic changes on water resources
5. Summarize various water conservation techniques in practice
6. Explain need for watershed management and implement various Plans for watershed management

### **(19EE0238) GENERATION OF ENERGY THROUGH WASTE**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Analyse agro based, forest residue and industrial waste conversion processes.
2. Manufacture of Pyrolytic oils and gases
3. Manufacture of charcoal, yields and applications
4. Understand various types of gasifiers operation
5. Understand inclined and fluidized bed combustors operation
6. Understand types of biogas plants and biomass energy programme in India

## **(19ME0349) FUNDAMENTALS OF MECHANICAL ENGINEERING**

### **COURSE OUTCOMES**

At the end of the course, the student will be able to:

1. List the types of Engineering materials and also describe alloying, Heat treatment Processes.
2. Recognize the importance of IC Engines in automobiles and the classification of air compressors
3. Distinguish various types of air conditioning systems for house and Industrial applications
4. Explicate the working of various Power plants like nuclear, Hydro & thermal power plants
5. Classify various types modern machining processes and determine the best suitable process to machine a component.
6. Apply the working principles of CAD, CAM and CIM in the operation of Robotic manufacturing and quality control systems

## **(19EC0448) INTRODUCTION TO COMMUNICATION SYSTEMS**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Demonstrate knowledge in elements of Analog Digital and Wireless Communication Systems.
2. Analyze the analog modulated and demodulated systems.
3. Understand the principle involved in different modulation techniques
4. Understand the basic principles of baseband and pass band digital modulation schemes
5. Analyze probability of error performance of digital systems and are able to design digital communications.
6. Implement various Keying and accessing techniques in real time wireless communication systems

## **(19HS0813) MANAGEMENT SCIENCE**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to:

1. Utilize appropriate theoretical frameworks to real life business and managerial problems
2. Identify appropriate operational risks and develop appropriate responses to them
3. Apply human resource principles to recruit, select and manage employees to achieve organizational goals
4. Enact strategy, including contingent plans for the effective management of the organization
5. Identify, plan, and implement the projects and evaluate the performance of the projects
6. Analyze effective application of latest developments to diagnose and solve organizational problems

## **(19EC0424) MICROCONTROLLER AND APPLICATIONS LAB**

### **COURSE OUTCOMES**

On successful completion of this course, students will be able to:

1. Familiar with keil programming environment
2. Demonstrate arithmetic, logical and string operations using assembly language programming.
3. Develop embedded C language programs for various applications using 8051 microcontroller.
4. Explore the provided example code and online resources for extending knowledge about the capabilities of the 8051 microcontrollers
5. Test, debug, and deploy the 8051 microcontroller-based systems
6. Design and develop own microprocessor/microcontroller-based solutions for the real-world problems

## **(19CS0507) C and DATA STRUCTURES LAB**

### **COURSE OUTCOMES (COs)**

On Successful completion of this course, the student will be able to:

1. Read, understand and trace the execution of programs written in C language
2. Develop C programs for simple applications making use of basic constructs, arrays and strings
3. Develop C programs involving functions, recursion, pointers, and structures
4. Select the data structure appropriate for solving the problem
5. Illustrate the working of stack and queue
6. Implement searching and sorting algorithms

## **(19CS0508) DATABASE MANAGEMENT SYSTEMS LAB**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Develop relational algebra expressions for queries and optimize them.
2. Design the databases using E\_R method for a given specification of requirements.
3. Apply Normalization techniques on given database.
4. Determine the transaction atomicity, consistency, isolation, and durability for a given transaction-processing system.
5. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.
6. Execute DDL, DML, DCL commands

## **(19HS0816) INDIAN CONSTITUTION**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to:

1. Explain the key concepts of political economy.
2. Analyse the significant developments in the political ideologies.
3. Describe the salient features of the constitution of India interpret, integrate and critically.

4. Analyse the political economy of Indian international relations and gain knowledge in Judiciary system.
5. Apply their knowledge and skills acquired to write various competitive examinations.
6. Analyse the constitutional rights in relating to Practical life.

## **II B.Tech – II Sem.**

### **(19HS0836) DISCRETE MATHEMATICS**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Write an argument using logical notation and determine if the argument is or is not valid.
2. Demonstrate the ability to write and evaluate a proof or outline the basic structure of and give examples of each proof technique described.
3. Understand the basic principles of sets and operations in sets.
4. Demonstrate an understanding of relations and functions and be able to determine their properties.
5. Determine when a function is 1-1 and "onto".
6. Demonstrate different traversal methods for trees and graphs.
7. Model problems in Computer Science using graphs and trees.

### **(19CS0509) FORMAL LANGUAGES AND AUTOMATA THEORY**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to:

1. Compare, understand and analyze different languages, grammars, Automata and Machines and appreciate their power and convert Automata to Programs and Functions.
2. Construct finite Automats for various problems.
3. Design automata, regular expressions and context-free grammar accepting and generating a certain language, design of new grammar and languages.
4. Define Push Down Automata performing simple tasks and equivalence of PDA and CFGs.
5. Find solutions to the problems using Turing machines.
6. Distinguish between computability, decidability and un-decidability problems.

### **(19CS0510) OBJECT ORIENTED PROGRAMMING THROUGH JAVA**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Implement simple abstract data types and design implementations using abstraction functions.
2. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
3. Implement Exception handling with synchronization.
4. Execute programs on Multithreading and String handling concepts.
5. Design applications with an event-driven graphical user interface.

6. Design and Implementation of Application Programming Interfaces.

### **(19CI0601) PRINCIPLES OF OPERATING SYSTEMS**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to:

1. Describe the important computer system resources and the role of operating system in their management policies and algorithms.
2. Understand the process management policies and scheduling of processes by CPU.
3. Analyze the requirement for process synchronization and coordination handled by operating system.
4. Describe and analyze the memory management and its allocation policies.
5. Categorize the storage management policies with respect to different storage management technologies
6. Study the need for special purpose operating system with the advent of new emerging technologies

### **(19CE0143) FUNDAMENTALS OF URBAN PLANNING**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to:

1. Recognize issues related to town planning and discuss the objectives, necessity and stages of town planning
2. Summarize importance of zoning, can classify various town planning practices and can conduct surveys for town planning
3. Classify the residential building, list the agencies involved in improving house and review the problems associated with residential housing
4. Discuss the issues associated with slums and recognize the methods to improve condition of slums
5. Interpret norms laid down for public and industrial building and can summarize building byelaws
6. List and discuss various urban roads and the concepts of traffic management in a town

### **(19EE0233) INDUSTRIAL INSTRUMENTATION**

#### **COURSE OUTCOMES (COs)**

successful completion of this course, students will be able to:

1. Identify and explain the types of errors occurring in measurement systems.
2. Differentiate among the types of data transmission and modulation techniques.
3. Apply digital techniques to measure voltage, frequency and speed.
4. Analyse the working principles of different Signal Analyzers and Digital meters.
5. Understand the operation of several types of transducers.
6. Choose suitable Transducers for the measurement of non-electrical quantities.



## **(19ME0350) MECHANICAL MEASUREMENTS & CONTROL SYSTEMS**

### **COURSE OUTCOMES**

Students undergoing this course can

1. State the basic principles of measurement systems and explain its performance characteristics
2. Distinguish the types of various temperature and pressure measurement instruments and finds the best one for the industrial applications
3. Explicate the principle of measurement of Speed, Acceleration and Vibration instruments and describe its working
4. Illustrate the operation of Fuel level, measurement of Flow and Humidity Measurement instruments and also state the applications of various control systems
5. Identify the appropriate device for the measurement of temperature, pressure, speed, stress, humidity, flow velocity etc., and justify its use through characteristics and performance.
6. Classify the various types of control systems for the measurement of temperature, speed and position

## **(19EC0449) ELEMENTS OF EMBEDDED SYSTEMS**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to:

1. Differentiate between general computing system and the embedded system, also recognize the classification of embedded systems.
2. Enumerate and describe the components of an embedded system.
3. Learn about open source electronics platform.
4. Program an embedded system by interfacing sensors & actuators.
5. Identify the basic building blocks of Internet of Things and characteristics.
6. Implement their own ideas in various application areas of Embedded systems and IoT.

## **(19HS0814) INTELLECTUAL PROPERTY RIGHTS**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to:

1. Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights
2. Identify different types of intellectual properties, ownership rights and the scope of the protection
3. Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work
4. Able to identify, apply, and assess ownership rights, registration processes for IP rights
5. To discern the approaches for intellectual property management and intellectual property audits
6. Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level

## **(19CS0512) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs
2. Read and make elementary modifications to Java programs that solve real-world problems
3. Validate input in a Java program
4. Identify and fix defects and common security issues in code.
5. Execute a Java program using Javadoc
6. Execute a Java program using Java Swings

## **(19CI0602) PRINCIPLES OF OPERATING SYSTEMS LAB**

### **COURSE OUTCOMES (COs)**

On successful

completion of this course, students will be able to:

1. Understand and implement basic services and functionalities of the operating system using system calls
2. Use modern operating system calls and synchronization libraries in software/ hardware interfaces
3. Understand the benefits of thread over process and implement synchronized programs using multithreading concepts
4. Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, and Priority
5. Implement memory management schemes and page replacement schemes
6. Understand the concepts of deadlock in operating systems and implement them in multiprogramming system.

## **( 19CS0514) OBJECT ORIENTED ANALYSIS AND DESIGN LAB**

### **COURSE OUTCOMES (COs)**

On successful completion of the course students will be able to:

1. Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation
2. Describe the importance of systems analysis and design in solving complex problems
3. Explain how the object-oriented approach differs from the traditional approach to systems analysis and design
4. Understand the role and function of each UML model in developing object oriented software
5. Exhibit software development process
6. Recognize the difference between various object relationships: inheritance, association, whole-part, and dependency relationships

## **(19HS0805) ENVIRONMENTAL SCIENCE**

### **COURSE OUTCOMES(COs)**

On successful completion of the course students will be able to:

1. Recognize the physical, chemical and biological components of the earth's systems and show how they function.

2. Characterize and analyze human impacts on the environment.
3. Integrate facts, concepts and methods from multiple disciplines and apply to environmental Problems.
4. Create informed opinions about how to interact with the environment on both a personal and a social level.
5. Perform independent research on human interactions with the environment.
6. Recognize the ecological basis for regional and global environmental issues

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY :: PUTTUR  
(AUTONOMOUS)**

**DEPARTMENT OF AGRICULTURE ENGINEERING**

**I B.Tech – I Sem.**

**(19HS0848) ENGINEERING PHYSICS**

**COURSE OUTCOMES**

After completing this course students will be able to

1. Explains various terms related to Vectors & Scalars and Newton's laws of motion.
2. Apply the principles of acoustics in designing of buildings.
3. Explains the applications of ultrasonics in various engineering fields.
4. Explains various terms related to waves and Oscillations.
5. Explains the importance of various mechanical properties of materials.
6. Apply the basic properties of nano materials in various engineering branches.

**(19HS0830) ALGEBRA AND CALCULUS**

**COURSE OUTCOMES**

1. Develop the use of matrix algebra techniques that is needed by engineers for Practical applications
2. Utilize mean value theorems to real life problems
3. Familiarize with functions of several variables which is useful in optimization
4. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinate systems
5. Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of special functions.

**(19HS0810) COMMUNICATIVE ENGLISH**

**COURSE OUTCOMES**

1. To understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information.
2. To employ suitable strategies for skimming and scanning to get the general idea of a text and locate specific information.
3. To Participate in informal discussions and speak clearly on a specific topic or in general.
4. To Comprehend, discuss and respond to academic texts and use appropriate language for description and interpretation in writing.
5. To form sentences using proper grammatical structures and correct word forms.

**(19CE0101) ENGINEERING MECHANICS**

## **COURSE OUTCOMES**

1. Construct free body diagrams and develop appropriate equilibrium equations.
2. Understand the concepts of friction and to apply in real life problems.
3. Determine the centroid for composite sections.
4. Determine the Moment of Inertia for composite sections.

## **(19HS0852) ENGINEERING PHYSICSLAB**

## **COURSE OUTCOMES**

The students will be able to

1. Operate various optical instruments.
2. Estimate wavelength of laser and particles size using laser.
3. Plot the intensity of the magnetic field of induction along the axis of circular coil carrying current with distance.
4. Evaluate the acceptance angle of an optical fiber and numerical aperture.
5. Determine energy loss by B-H curve.

## **(19HS0811) COMMUNICATIVE ENGLISHLAB**

## **COURSE OUTCOMES**

1. Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
2. Apply communication skills through various language learning activities.
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professional settings.
5. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

## **(19ME0301) WORKSHOP PRACTICELAB**

## **COURSE OUTCOMES**

1. Apply wood working skills in real world applications.
2. Build different parts with metal sheets in real world applications
3. Apply fitting operation in various applications
4. Apply different types of basic electric circuit connections
5. Demonstrate soldering and brazing.

**I B.Tech – II Sem.**

## **(19HS0802) ENGINEERING CHEMISTRY**

## **COURSE OUTCOMES**

1. List the differences between temporary and permanent hardness of water, explain the principles of reverse osmosis and electro dialysis. Compare quality of drinking water with BIS and WHO standards.
2. Apply Nernst equation for calculating electrode and cell potentials, apply Pilling-Bedworth rule for corrosion and corrosion prevention, demonstrate the corrosion prevention methods and factors affecting corrosion, compare different batteries and their applications
3. Explain different types of polymers and their applications, solve the numerical problems based on Calorific value, select suitable fuels for IC engines, explain calorific values, octane number, refining of petroleum and cracking of oils.
4. Explain the constituents of Composites and its classification identify the factors affecting the refractory material, illustrate the functions and properties of lubricants, and demonstrate the phases and reactivity of concrete formation.
5. summarize the applications of SEM, TEM and X-ray diffraction in surface characterization, explain the synthesis of colloids with examples, outline the preparation of nanomaterials and metal oxides identify the application of colloids and nanomaterials in medicine, sensors and catalysis

## **(19HS0831) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS**

### **COURSE OUTCOMES**

1. Solve the differential equations related to various engineering fields
2. Identify solution methods for partial differential equations that model physical processes
3. Interpret the physical meaning of different operators such as gradient, curl and divergence
4. Estimate the work done against a field, circulation using vector calculus
5. Students will become familiar with applications of surface and volume integrals

## **(19EE0240) BASIC ELECTRICAL AND ELECTRONIC ENGINEERING**

### **COURSE OUTCOMES**

Upon completion of the course, students will:

1. Determine the equivalent impedance of given network by using network reduction techniques.
2. Determine the current through any element and voltage across any element
3. Apply the network theorems suitably.
4. Analyze the operating principles of motor and transformer.
5. Analyze the operating principles of major electronic devices, its characteristics and applications.

6. Design and analyze the DC bias circuitry of BJT and FET.

### **(19CS0501) PYTHON PROGRAMMING**

#### **COURSE OUTCOMES**

At the end of the course, the student will be able to

1. Making Software easily right out of the box
2. Solve the problems using control structures, input and output statements
3. Summarize the features of lists, tuples, dictionaries, strings and files
4. Experience the usage of standard libraries, objects, and modules
5. To build the software for real needs.

### **(19ME0302) ENGINEERING GRAPHICS**

#### **COURSE OUTCOMES**

1. Graphically construct and understand the importance of mathematical curves in engineering applications
2. Able to draw the basic views related to projections of Points, Lines and Planes
3. Able to draw the projections of geometrical solids and sectional view of solids
4. Understand the concept of projection and acquire visualization skills, development of surfaces and interpenetrations of solids
5. To draw multi view orthographic and other projections including isometric

### **(19HS0806) ENGINEERING CHEMISTRY LAB**

#### **COURSE OUTCOMES**

1. Determine the cell constant and conductance of solutions
2. Prepare advanced polymer materials
3. Estimate the Iron and Calcium in cement
4. Calculate the hardness of water
5. Determination of conductivity of an acid

### **(19CS0502) PYTHON PROGRAMMING LAB**

#### **COURSE OUTCOMES:**

After completion of this course, a successful student will have

1. Ability to program on basic concepts, control structures.
2. Ability to implement data structures and their operations
3. Ability to work on object oriented programming
4. Ability to handle exceptional handling and plotting of graphical entities.

5. Ability to develop any real world problem

### **(19HS0816) INDIAN CONSTITUTION**

#### **COURSE OUTCOMES**

1. Explain the key concepts of political economy
2. Analyse the significant developments in the political ideologies
3. Describe the salient features of the constitution of India interpret, integrate and critically
4. Analyse the political economy of Indian international relations and gain knowledge in Judiciary system
5. Apply their knowledge and skills acquired to write various competitive examinations

#### **II B.Tech – I Sem.**

### **(19ME0305) ENGINEERING THERMODYNAMICS**

**(Common to MECH & AGE)**

#### **COURSE OUTCOMES (COs)**

Upon completion of the course the student can

1. Describe the Basic concepts of thermodynamics such as temperature, pressure, system, Properties, process, state, cycles and equilibrium.
2. Explain the Basic laws of thermodynamics and their applications.
3. Interpret the Concepts of enthalpy, entropy and other thermodynamic properties of ideal gas Process
4. Analyze different Thermodynamic cycles and efficiencies related problems
5. understanding the behavior of pure substances, usage of steam tables and Mollier chart in solving steam related problems
6. Understanding the various Methods of Improving cycle performances with solving steam related problems.

### **(19CE0150) STRENGTH OF MATERIALS**

**(Common to MECH & AE)**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Summarize the basic principles of elasticity, theory of failures and apply them to estimate the stress and strain for axial members
2. Draw shear force and bending moment diagrams under different loading conditions
3. Study the theories related to the bending stress, shear stress distribution and torsional stress for beams of different cross sections and their applications
4. Describe the slope and deflection of beam and calculate the slope and deflection for



- statically determinate beams by using different methods
5. Classify different type of column and derive Euler's equation for long columns with different end conditions
  6. Analyze the pressure vessels subject to internal and external fluid pressure

**(19CE0104) SURVEYING & GEOMATICS**  
**(Common to CE & AGE)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. **Classify** and **explain** the surveying and its principles
2. **Use** the principles of Chain and Compass survey to **construct** traverse and **correct** the error of chain and tape while measuring distances
3. **Prepare** LS & CS profiles and contour map using levelling instrument
4. To **measure** horizontal and vertical angles **using** theodolite and tachometric surveying and their by **compute** the horizontal and vertical distances
5. To **calculate, design** and **set** various types of horizontal curves
6. To **describe** the working principles of EDM and total station

**(19AGO701) GREENHOUSE TECHNOLOGY**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Be proficient about identify the types and structures of existing greenhouse.
2. Students will learn the different systems for climate control in greenhouse and their management.
3. Familiar with the techniques of light management and CO<sub>2</sub> enrichment used for increasing and control crop production.
4. Learn the site selection and structural design of greenhouse
5. Understand the different types of material used in greenhouse
6. Learn about the economy of greenhouse construction

**(19CE0136) WATER TECHNOLOGY**  
**(Open Elective-I)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Underline the importance of water and describe the mechanism of hydrological cycle
2. Describe various elements associate with public water supply
3. Describe water quality criteria and standards, and their relation to public health
4. Recognize the cause of water pollution and influence of climatic changes on water resources

5. Summarize various water conservation techniques in practice
6. Explain need for watershed management and implement various Plans for watershed management

**(19EE0238) GENERATION OF ENERGY THROUGH WASTE  
(Open Elective-I)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Analyse agro based, forest residue and industrial waste conversion processes.
2. Manufacture of Pyrolytic oils and gases
3. Manufacture of charcoal, yields and applications
4. Understand various types of gasifier operation
5. Understand inclined and fluidized bed combustor operation
6. Understand types of biogas plants and biomass energy programme in India

**(19ME0349) FUNDAMENTALS OF MECHANICAL ENGINEERING  
(Open Elective-I)**

**COURSE OUTCOMES (COs)**

At the end of the course, the student will be able to

1. List the types of Engineering materials and also describe alloying, Heat treatment Processes.
2. Recognize the importance of IC Engines in automobiles and the classification of air compressors
3. Distinguish various types of air conditioning systems for house and Industrial applications
4. Explicate the working of various Power plants like nuclear, Hydro & thermal power plants
5. Classify various types modern machining processes and determine the best suitable process to machine a component.
6. Apply the working principles of CAD, CAM and CIM in the operation of Robotic manufacturing and quality control systems

**(19EC0448) INTRODUCTION TO COMMUNICATION SYSTEMS  
(Open Elective-I)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Demonstrate knowledge in elements of Analog Digital and Wireless Communication Systems.

2. Analyze the analog modulated and demodulated systems.
3. Understand the principle involved in different modulation techniques
4. Understand the basic principles of baseband and pass band digital modulation schemes
5. Analyze probability of error performance of digital systems and are able to design digital communications.
6. Implement various Keying and accessing techniques in real time wireless communication systems

**(19CS0550) RELATIONAL DATABASE MANAGEMENT SYSTEM  
(Open Elective-I)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Develop relational algebra expressions for queries and optimize them.
2. Design the databases using E\_R method for a given specification of requirements.
3. Apply Normalization techniques on given database.
4. Determine the transaction atomicity, consistency, isolation, and durability for a given transaction-processing system.
5. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.
6. Understand Physical Storage Media and RAID concepts.

**(19HS0813) MANAGEMENT SCIENCE  
(Open Elective-I)**

**COURSE OUTCOMES: (COs)**

On successful completion of this course, the student will be able to

1. Utilize appropriate theoretical frameworks to real life business and managerial problems
2. Identify appropriate operational risks and develop appropriate responses to them
3. Apply human resource principles to recruit, select and manage employees to achieve organizational goals
4. Enact strategy, including contingent plans for the effective management of the organization
5. Identify, plan, and implement the projects and evaluate the performance of the projects
6. Analyze effective application of latest developments to diagnose and solve organizational problems.

**(19CE0106) STRENGTH OF MATERIALS LAB**  
**(Common to CE, MECH & AGE)**

**COURSE OUTCOMES (COs)**

On successful completion of this course the student should be able to

1. **Conduct** tension test on mild steel bar and **plot** stress strain curve
2. **Conduct** compression test on wood, brick and concrete and can **calculate** their compression test
3. **Conduct** impact test on metal specimens
4. **Find** hardness of different materials
5. **Determine** modulus of elasticity of given material of beam by studying deflection for different loads
6. **Determine** tensile and torsional strength of mild steel bars and **find** stiffness of a helical spring

**(19CE0107) SURVEYING LABORATORY**  
**(Common to CE & AGE)**

**COURSE OUTCOMES (COs)**

On completion of the course, the students will be able to

1. **Calculate** the area of given polygon by chain and plane table surveying
2. **Determine** the elevation of various points **using** leveling instruments
3. **Compute** the angles, distance and height by compass, theodolite, tacheometry and total station
4. **Setting out** the curve by theodolite and tacheometry
5. **Describe** the concept of foundation marking
6. **Use** total station for carrying basic operations

**(19ME0310) COMPUTER AIDED MACHINE DRAWING LAB**  
**(Common to MECH & AGE)**

**COURSE OUTCOMES (COs)**

At the end of this course, the Student will be able to

1. Draw the conventional representation of various materials and machine components with the help of software.
2. Design various thread profiles.
3. Explain the step to draw Machine elements such as Bolt, Nut and Keys.
4. Preparation of the part or assembly drawings as per the conventions
5. Interpret the machine drawings that in turn in the preparation of the part drawings
6. Identify the importance of linking the functional and visualization aspects in the preparation of assembly drawings.

**(19HS0805) ENVIRONMENTAL SCIENCE**  
**(Non-Credit Course)**

**COURSE OUTCOMES (COs)**

1. Recognize the physical, chemical and biological components of the earth's systems and show how they function.
2. Characterize and analyze human impacts on the environment.
3. Integrate facts, concepts and methods from multiple disciplines and apply to environmental Problems.
4. Create informed opinions about how to interact with the environment on both a personal and a social level.
5. Perform independent research on human interactions with the environment.
6. Recognize the ecological basis for regional and global environmental issues

**II B.Tech – II Sem.**

**(19HS0833) NUMERICAL METHODS, PROBABILITY & STATISTICS**  
**(Common to CE, ME & AGE)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

1. To develop the mathematical skills of the students in the areas of numerical methods.
2. Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraic equations.
3. Work out numerical differentiation and integration whenever and wherever routine methods are not applicable.
4. A good understanding of the laws of probability axioms and rules.
5. Understanding of moments of discrete and continuous random variables as well as be familiar with common named discrete and continuous random variables.
6. Calculate and interpret the correlation and Regression between two variables.

**(19CE0151) FLUID MECHANICS & HYDRAULIC  
MACHINERY**  
**(Common to MECH & AG)**

**COURSE OUTCOMES**

After completion of this course the student will be able to

1. State Newton's Law of Viscosity, discuss and calculate fluid properties
2. Define Pascal's Law and apply it for measuring pressure devices
3. Classify various fluid flows and derive continuity, Euler's, Bernoulli's, Impulse Momentum, Darcy Weisback Equation and applying them for fluid flow problems and pipe flow problems

4. Analyze impact of jets on vanes and develop velocity triangle
5. Discuss operation principals of hydroelectric power plant
6. Explain the principals of pumps and turbine

**(19AG0702) FARM MACHINERY & EQUIPMENT-I**

**COURSE OUTCOMES (COS)**

After completion of this course the student will be able to

1. What is the importance of the Farm Mechanization in agriculture?
2. Classify the types of tillage and tillage tools.
3. Determine the various forces acting on tillage tools
4. Distinguish the various methods involved in sowing, inter cultivation and plant protection operation.
5. Categorize the various types of sowing, inter cultivation and plant protection equipment.
6. Utilize the transplanting concepts in agriculture field.

**(19AG0703) PRINCIPLES OF AGRONOMY & SOIL SCIENCE**

**COURSE OUTCOMES (COs)**

1. Knowledge about Indian Agriculture and importance, present status, scope and future prospect.
2. Identification of Soil formation, classification, physical, chemical properties and important crops and crop seeds.
3. Comprehensive knowledge on rocks and minerals, their composition and the types of soils formed from different parent materials.
4. Understand the role of soil forming factors and processes in soil formation
5. Compare various soil physical, chemical and biological properties and their impact on plant growth.
6. The knowledge gained in this course will be useful in understanding the behavior of soils in crop production and management

**(19CE0143) FUNDAMENTALS OF URBAN PLANNING**

**(Open Elective-II)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Recognize issues related to town planning and discuss the objectives, necessity and stages of town planning
2. Summarize importance of zoning, can classify various town planning practices and can conduct surveys for town planning
3. Classify the residential building, list the agencies involved in improving house and review the problems associated with residential housing

4. Discuss the issues associated with slums and recognize the methods to improve condition of slums
5. Interpret norms laid down for public and industrial building and can summarize building bye-laws
6. List and discuss various urban roads and the concepts of traffic management in a town

**(19EE0233) INDUSTRIAL INSTRUMENTATION**  
**(Open Elective-II)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Identify and explain the types of errors occurring in measurement systems.
2. Differentiate among the types of data transmission and modulation techniques.
3. Apply digital techniques to measure voltage, frequency and speed.
4. Analyse the working principles of different Signal Analyzers and Digital meters.
5. Understand the operation of several types of transducers.
6. Choose suitable Transducers for the measurement of non-electrical quantities.

**(19ME0350) MECHANICAL MEASUREMENTS & CONTROL SYSTEMS**  
**(Open Elective-II)**

**COURSE OUTCOMES (COs)**

Students undergoing this course can

1. State the basic principles of measurement systems and explain its performance characteristics
2. Distinguish the types of various temperature and pressure measurement instruments and find the best one for the industrial applications
3. Explicate the principle of measurement of Speed, Acceleration and Vibration instruments and describe its working
4. Illustrate the operation of Fuel level, measurement of Flow and Humidity Measurement instruments and also state the applications of various control systems
5. Identify the appropriate device for the measurement of temperature, pressure, speed, stress, humidity, flow velocity etc., and justify its use through characteristics and performance.
6. Classify the various types of control systems for the measurement of temperature, speed and position

**(19EC0449) ELEMENTS OF EMBEDDED SYSTEMS**  
**(Open Elective-II)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, students will be able to

1. Differentiate between general computing system and the embedded system, also recognize the classification of embedded systems.
2. Enumerate and describe the components of an embedded system.
3. Learn about open source electronics platform.
4. Program an embedded system by interfacing sensors & actuators.
5. Identify the basic building blocks of Internet of Things and characteristics.
6. Implement their own ideas in various application areas of Embedded systems and IoT.

**(19CS0551) JAVA PROGRAMMING**  
**(Open Elective-II)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Implement simple abstract data types and design abstraction functions.
2. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
3. Apply object-oriented design patterns for problem solving.
4. Implement Exception handling with synchronization.
5. Execute programs on Multithreading and String handling concepts.
6. Design applications with an event-driven graphical user interface.

**(19HS0814) INTELLECTUAL PROPERTY RIGHTS**  
**(Open Elective-II)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights
2. Identify different types of intellectual properties, ownership rights and the scope of the protection
3. Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work
4. Able to identify, apply, and assess ownership rights, registration processes for IP rights
5. To discern the approaches for intellectual property management and intellectual property audits
6. Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level



## **(19CE0112) FLUID MECHANICS & HYDRALIC MACHINERY LAB**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student should be able to

1. **Calibrate** Venturimeter & Orificemeter
2. **Calculate** losses inflows
3. **Estimate** the efficiency of different pumps
4. **Study** the performance of different turbines
5. **Study** importance of liquid properties and its methods of determination
6. **Calculate** forces and pressure due to fluid action under different conditions

## **(19AG0704) FARM MACHINERY & EQUIPMENT-I LAB**

### **COURSE OUTCOMES (COs)**

Students will be familiar with

1. List out the various types of sowing, inter cultivation and plant protection equipment.
2. Classify the types of sprayer and duster.
3. Determine the performance of MB plough, disc plough, disc harrow and cultivator
4. Compare the different types of seed drills.
5. Categorize the various types of sowing, inter cultivation and plant protection equipment.
6. Measure the nozzle discharge and field capacity of sprayer and duster.

## **(19AG0705) PRINCIPLES OF AGRONOMY & SOIL SCIENCE LAB**

### **COURSE OUTCOMES (COs)**

Students will be familiar with

1. Students will know principles of agriculture practices, modern systems of farming of agricultural crops and best cropping management suitable in local climate.
2. Basic idea about seasonal cropping patterns and use of fertilizers, common agricultural practices
3. The student will Identification of crops and their varieties, seeds, manures, fertilizers and weeds.
4. To use laboratory techniques to determine soil physical properties, including texture, bulk density, particle density, and porosity.
5. To use laboratory techniques to determine soil chemical properties, including pH, electrical conductivity, cation exchange capacity, and macronutrient levels:
6. To use soil surveys and laboratory techniques to identify characteristics of an unknown soil sample.

**(19HS0817) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**  
**(Non-Credit Course)**

**COURSE OUTCOMES (COs)**

Ability to understand, connect up and explain basics of Indian traditional Knowledge in modern scientific perspective.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Master of Business Administration**

**I MBA – I Semester**

**(19MB9001) MANAGEMENT & ORGANIZATIONAL BEHAVIOUR**

**Course Outcomes:**

After the completion of course Students will be able to:

- Able to describe the basic principles, levels, skills of management and management theories and apply the concepts in real world.
- Analyze the various managerial functions to be performed and decision making in different contexts.
- Recognize, differentiate and assess for an individual, the concept of perception, values, attitudes and personality.
- Comprehend the various theories of motivation, leadership, and explore group dynamics for the benefit of the organizations.
- Apply leadership skills in different organizational contexts and lead the people.

**(19MB9002) ACCOUNTING FOR MANAGERS**

**Course Outcomes:**

After the completion of course Students will be able to:

- Develop and understand the nature and purpose of financial statements in relationship to decision making.
- Determine the useful life and value of the depreciable assets.
- Recognize the relationship between the financing, investing and dividend decisions of the firm during the given point of time.
- Explain how cost volume profit analysis is to be applied by managers to answer various operating decisions, such as what level sales required to break even, how many units of Products are to be sold in order to earn a target level of profit.
- Gain an insight to a broad range of cost accounting concepts and their terminology

**(19MB9003) BUSINESS LAW AND REGULATIONS**

**Course Outcomes:**

After the completion of course Students will be able to:

- Gain an insight into various laws in the country to regulate business aspects
- Identify the legal principles in making contractual agreements.
- Recognize the importance of business law in economic, political and on social context.
- Analyze the legal issues involved in the formation and winding up of a company.
- Explain to compute Income Tax and various forms of Taxes.

**(19MB9004) BUSINESS STATISTICS FOR MANAGERS**

**Course Outcomes:**

After the completion of course Students will be able to:

- Implement managerial applications of statistical methods in business problems
- Measure a central value of an observation and variation of an observation with its central value
- Gain better numerical understanding and its key applications to make valid findings and conclusions of data that has collected through different sources.
- Relate all possible kinds of relationships of dependent variables with independent variables
- Formulate hypothesis and test the same with tools of hypothesis testing to draw a proper conclusions about population.

**(19MB9005) MANAGERIAL ECONOMICS****Course Outcomes:**

After the completion of course Students will be able to:

- Assess the importance of micro economics in business management
- Assess the roles of managers as economists in firms
- Analyze the internal and external decisions to be made by managers
- Analyze the demand and supply conditions and assess the position of a company
- Design competitive strategies, including costing, pricing, product differentiation, according to the natures of products and the structures of the markets.

**(19MB9006) MANAGEMENT INFORMATION SYSTEMS****Course Outcomes:**

After the completion of course Students will be able to:

- Explain the importance of information system in decision making.
- Determine information system requirements for all management levels by describing the differences between various types of information systems.
- Apply probability theory in decision making situations.
- Apply an ERP system to manage a company.
- Implement and evaluate all aspects management information systems

**(19MB9007) BUSINESS COMMUNICATION****Course Outcomes:**

After the completion of course Students will be able to:

- Apply business communication strategies and principles to prepare effective communication for domestic and international business situations.
- Utilize the skill of writing business letters, memos, general warning, and caution and danger letters in an organization.
- Analyze the verbal and nonverbal communications and lead the people effectively.
- Deliver an effective oral business presentation. Communicate via electronic mail, Internet, and other technologies.

- Select appropriate organizational formats and channels used in developing and presenting business messages.

### **(19HS0811) COMMUNICATIVE ENGLISH LAB**

#### **Course Outcomes:**

- Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
- Apply communication skills through various language learning activities.
- Analyse the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
- Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
- Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

#### **I MBA – II Semester**

### **(19MB9008) HUMAN RESOURCE MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding of the concept of human resource management and its relevance in organizations.
- Explain the current theory and practice of recruitment and selection. This includes but is not limited to the supply of human resource and the advantages and disadvantages of external and internal recruiting.
- Assess the relevant recruitment and selection, and performance appraisal methods to be used in different contexts.
- Develop, implement, and evaluate compensation, employee orientation, training, and development programs.
- Demonstrate the significance of contemporary issues such as diversity management, talent management and so on to both employers and employees

### **(19MB9009) FINANCIAL MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate the applicability of the concept of Financial Management; understand its objectives and role of a Financial Manager.
- Analyze and evaluate the investment decisions.
- Manage the working capital requirements of a firm
- Apply the Leverage and EBIT EPS Analysis associated with financial data of the firm
- Demonstrate an understanding of the Cost of capital.

## **(19MB9010) MARKETING MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate strong conceptual knowledge in the functional area of marketing management.
- Develop an understanding of various facets of Marketing management
- Demonstrate the ability to take decisions and plan, develop, execute and control marketing strategies
- Ensure various marketing programs for the attainment of organizational marketing goals.
- Demonstrate analytical skills in identification and resolution of problems pertaining to marketing management.

## **(19MB9011) BUSINESS RESEARCH METHODS**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop understanding on various kinds of business research concepts.
- Gain knowledge on Research process and hypothesis development with different research design.
- Demonstrate adequate knowledge on sampling procedure and data collection methods.
- Apply knowledge of measurement & scaling techniques as well as the quantitative data analysis for research problems.
- Assess the importance of Research Report writing in systematic way.

## **(19MB9012) OPERATIONS MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Identify the elements of operations management and various transformation processes to enhance productivity and competitiveness.
- Analyze and evaluate various facility alternatives and their capacity decisions.
- Develop a balanced line of production & scheduling and sequencing techniques in operation environments
- Develop aggregate capacity plans and MPS in operation environments.
- Plan and implement suitable materials handling principles and practices in the operations.

## **(19MB9013) OPERATIONS RESEARCH**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Recognize the characteristics of different types of decision-making environments
- Apply appropriate decision making approaches and tools to be used in different environments.
- Build and solve Transportation Models and Assignment Models.

- Design new simple models, like: CPM, MSPT to improve decision –making
- Develop critical thinking and objective analysis of decision problems.

**(19MB9014)ADVANCED STUDIES ON INDIAN ECONOMY & POLICY**

**Course Outcomes:**

After the completion of course Students will be able to:

- Analyze the characteristics of Indian economy and sectorial contribution towards economy in the historic period and also in the current scenario.
- Familiarize with the various components of business environment and able to assess the dynamics of the environment.
- Recognize the industrial policies that have made significant contribution to the growth of the Indian economy
- Appreciate and assess the impact government policies towards the business.
- Analyze the policies towards international trade, role of export-import bank, and the components balance of payments that cause disequilibrium.

**(19MC9151) FUNDAMENTALS OF COMPUTER AND INFORMATION SYSTEM LAB**

**Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate ability to create documents and Excel sheets for information storage
- Develop the documentation of using MS-Word.
- Sort the data and apply the mathematical calculation using MS-Excel.
- Develop the business presentation using MS-PowerPoint
- Gain an understanding of techniques of Google search engine.

**(19HS0815) HUMAN VALUES AND PROFESSIONAL ETHICS FOR MANAGER  
(AUDIT COURSE)**

**Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the moral issues in a society to live in harmony in the society
- Maintain professional, personal ethics and avoid discriminatory practices.
- Handle ethical dilemmas in various functional disciplines and live in balance with environment
- Realize the significance of mutual trust and abiding by the code of conduct in the organizations and as well in the society.
- Gain an insight into ethics, responsibilities, code of conduct in organizations.

**II MBA – I Semester**

**(19MB9015) BUSINESS ETHICS AND CORPORATE GOVERNANCE**

**Course Outcomes:**

After the completion of course Students will be able to:

- Apply various ethical principles in business and corporate social responsibility practices
- Recognize how personal ethics can influence behavior and apply in decision making
- Explain the ethical challenges facing the various functional departments
- Identify the organizational and cultural variables that impact ethical judgment
- Analyze various ethical codes in corporate governance
- Identify organizational policies and systems that employ ethical conduct

**(19MB9016) ENTREPRENEURSHIP DEVELOPMENT****Course Outcomes:**

After the completion of course Students will be able to:

- Discern distinct entrepreneurial traits and identify the successful elements of successful entrepreneurial ventures
- Consider the legal and financial conditions for starting a venture and to assess the opportunities and constraints for new ventures
- Design strategies for the successful implementation of ideas
- Comprehend the evaluation of business opportunity from the prospective of an investor
- Identify the most suitable sources of finance for start-ups
- Write and execute their own business plan

**(19MB9017) SPIRITUAL MANAGEMENT****Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the values and the importance of value education in a society.
- Gain an understanding towards spirituality, and discern to the challenges of value adoption.
- Appreciate the major religions and the sources of values and understand the divine concept.
- Handle the principles of integrity, character development and live in balance with environment
- Realize the significance of meditation and emotional maturity for the code of conduct in the organizations and as well in the society
- Develop environmental awareness and maintain and assess personal progress to create harmony in professional as well as personal life

**(19MB9018) BASICS OF BUSINESS PROCESS OUTSOURCING****Course Outcomes:**

After the completion of course Students will be able to:



- Develop an understanding about the basics of business process outsourcing and the challenges of Off shoring.
- Analyze the opportunities, issues and problems, components that control the business process outsourcing industry.
- Demonstrate the ability to handle the aspects of health care BPOs and financial services BPOs.
- Realize the significance of outsourcing and assessing the new trends in the BPO organizations
- Develop appropriate technologies and management patterns to create careers in BPOs.
- Realize the new opportunities in various other sectors that can offer BPOs.

### **(19MB9019) AGRI-BUSINESS MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Understand the fundamentals of management with reference to agribusiness
- Acquaint with agricultural contribution towards Indian economy
- Realize the significance of environment affecting agribusiness and recognize the various sources of finance towards agri business
- Apply the managerial functions and its applications with reference to agribusiness
- Learn the concepts and process of Agricultural Marketing and Cooperation
- Get knowledge about the recent developments in Agribusiness Management

### **(19MB9020) EXPORT AND IMPORT MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the theories of international trade, balance of trade and adjustment mechanisms.
- Get an insight into various instruments that control the international trade and avoid discriminatory practices
- Realize the significance of export marketing, contracts and the role of promotion councils
- Handle the payment methods, risks and various financing strategies in export and import process
- Recognize the different agencies involved in EXIM process and their role in the international trade
- Observe and explore the international environmental factors, international institutions that control the trade.

## **(19MB9021) INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about investment management and trading securities
- Examine and value the major investment vehicles and strategies to allocate funds
- Make decisions of allocation and selection of assets based on trade-off between risk and return, risk mitigating tools and investment avenues.
- Define the objectives in constructing and managing a portfolio and learn to create an investment policy statement.
- Develop knowledge of modern portfolio theory and effect of diversification on investment portfolios
- Gain knowledge to measure and evaluate portfolio performance and to manage the risk.

## **(19MB9022) SALES AND DISTRIBUTION MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an understanding about the roles and responsibilities of the Sales Managers
- Manage and enhance the sales force productivity and performance.
- Get an insight towards distribution channels, their organization structures and to make value addition to channels.
- Plan and implement an effective sales strategy for their organizations.
- Design and implement distribution channel strategy.
- Manage the Channels efficiency and effectiveness across countries

## **(19MB9023) PERFORMANCE MANAGEMENT SYSTEMS**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an insight towards performance management and performance appraisal.
- Compare and contrast various organizational performance management programs and best practices and define attributes of effective performance management systems.
- Assess how increased employee involvement can contribute to effective performance and coach employees to identify career paths and resources available to support individual development.
- Practically experience a number of tools which are critical to the new performance management systems.
- Realize the value of and drawbacks of modern performance management systems such as 360, MBO conducted in the organizations.
- Develop an understanding towards the issues involved in effective performance management

## **(19MB9024) ENTERPRISE RESOURCE PLANNING**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Make basic use of Enterprise software, and its role in integrating business functions
- Analyze the strategic options for ERP identification and adoption.
- Develop and design the modules used in ERP systems
- Create reengineered business processes for successful ERP implementation.
- Customize the existing modules of ERP systems.
- Examine the places where formal development approaches of ERP systems can be fruitful and where they may not be so helpful.

## **(19MB9025) RISK MANAGEMENT AND INSURANCE**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the Principles, essential features and objectives of risk management.
- Gain knowledge of the range of financial and financial related risks facing organizations.
- Examine the role of public policy including social insurance in personal financial planning and risk management.
- Determine approach to risk management through risk identification, risk measurement and risk management (or mitigation)
- Identify, understand operational risk and how to manage it.
- Assess significance of insurance policies and calculation of insurance premiums for living and non – living objects.

## **(19MB9026) ADVERTISING AND SALES PROMOTION MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about various types of advertising and its forms.
- Realize the significance of advertising agency and the client agency relationship through selection of media
- Handle advertising budget and measure the effectiveness of advertising.
- Comprehend the values and ethics in advertising and apply in practice
- Identify various suitable sales promotion tools and techniques for various groups
- Organize and measure the effectiveness of sales promotion campaigns

## **(19MB9027) KNOWLEDGE MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the key theories and models that inform knowledge management
- Critically apply theory to organisations in order to identify and justify effective knowledge management strategies and activities
- Access and evaluate essentials relating to knowledge management
- Communicate clearly and implement effectively varying formats and technologies
- Design problem solutions based upon research findings and critical assessment of current theory and practice
- Develop an insight towards the future of knowledge management from industry perspective

### **(19MB9028) DATA WAREHOUSING AND MINING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an understanding towards Data Warehouse fundamentals, Data Mining Principles
- Design data warehouse with dimensional modeling and apply OLAP operations.
- Identify appropriate data mining algorithms to solve real world problems
- Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining
- Describe complex data types with respect to spatial and web mining.
- Apply and select suitable methods for data a

### **(19MB9029) FINANCIAL MARKETS AND SERVICES**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate an awareness of the current structure and regulation of the Indian financial services sector.
- Apply concepts relevant to financial markets and financial institutions, such as the flow of funds, levels of interest rates and interest rate differentials
- Identify the functions of financial markets and institutions and examine their impact on the level of interest rates and interest differentials.
- Describe the instruments, participants and operation of the money market and role of intermediaries in the primary market
- Explore the integration of international financial markets and analyze the implications for financial managers.
- Evaluate and create strategies to promote financial products and services

### **(19MB9030) CONSUMER BEHAVIOUR**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate how knowledge of consumer behaviour can be applied to marketing.
- Identify and explain factors which influence consumer behaviour.

- Relate internal dynamics such as personality, perception, learning motivation and attitude to the choices consumers make.
- Realize the principal factors that influence consumers as individuals and decision makers with an application to the buying decision process.
- Develop marketing strategies that are consumer based and create and enhance customer
- Discern the concept of Consumerism and legislative responses to consumerism, and marketer responses to consumer issues

### **(19MB9031) TRAINING AND DEVELOPMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the role of training and development in human resources management.
- Describe the psychology of the learning process on which training is based.
- Analyze the training needs of an organization.
- Assess, design, access and implement various methods, techniques and sources of training.
- Evaluate the value of the training once completed from the individual employee and the organization's viewpoint.
- Develop an appropriate training strategy for today's organization

### **(19MB9032) SUPPLY CHAIN MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Appreciate the evolution and identify the role of supply chain management in the economy
- Identify and evaluate the drivers of supply chain management
- Analyze the importance of make or buy decisions and identify appropriate suppliers
- Appraise the importance of supply chain networks
- Assess the risk associated with supply chain practices and take better decisions
- Familiarize with and apply various computer based supply chain optimization tools

### **(19MB9033) COST AND MANAGEMENT ACCOUNTING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the role of cost accounting in the business management of manufacturing and non- manufacturing companies.
- Apply accounting methods of cost calculation and interpret cost accounting statements.
- Analyze and evaluate information for cost ascertainment, planning, control and decision making

- To know the various stock valuation methods adopted by various business organisations.
- Gain an understanding between the relationship between cost accounting, financial accounting and management accounting role in decision making.
- Prepare a budget and use budgets for performance evaluation after flexing the budget.

### **(19MB9034) PRODUCT AND BRAND MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an insight into the fundamental concepts of product and brand development
- Use the brand positioning framework to develop a brand, keep it relevant, expand a brand internationally, and reposition a brand
- Use tools and metrics to measure branding and interpret brand performance
- Recognize the importance of using branding strategies in an organization.
- Develop an understanding about the differences in branding to various sectors
- Assess and apply branding strategies to various products across different sectors.

### **(19MB9035) HUMAN RESOURCE PLANNING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about how to plan for human resources and implement techniques of man power forecasting and inventorying
- Analyze the role of recruitment and selection in relation to the organization's business
- Competency to recruit, select and appraise the performance of the employees
- Handle employee issues such as employee separation and evaluate new trends in managing the staff in organizations
- Appraise succession plans and critical staffing objectives and evaluate the complexities of downsizing issues and the role of HR planning in the process of downsizing
- Develop appropriate technologies and management patterns to improve business

### **(19MB9036) E – BUSINESS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the E- Markets and E- business infrastructure and trends
- Identify various procurement methods, their benefits and risks and assess different options for integration of organizations' information systems with e-procurement suppliers.
- Analyze different types of portal technologies and deployment methodologies commonly used in the industry for security and reliability of E- business.
- Analyze the effectiveness of network computing and cloud computing policies in a multi-location organization.
- Analyze real business cases regarding their e-business strategies and transformation processes and choices.

- Integrate theoretical frameworks with business strategies.

### **(19MB9037) INDUSTRY ANALYSIS AND REPORT PRESENTATION**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an understanding of the dynamics of a specific industry.
- Compare various issues particular to an industry.
- Develop cross-functional perspective of the functioning of a business enterprise and an industry.
- Develop awareness about the future prospective problems based on secondary source of data.
- Learn and examine the trends of growth or decline in industry.
- Analyze the issues of an industry and an enterprise with respect to set basic parameters

### **(19MB9038) BUSINESS SIMULATION LAB**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the EXCEL lessons
- Get familiarize with basic to intermediate skills for using Excel in the classroom vis-à-vis Business Applications
- Hands on experience on MS Excel Utilities
- Create solutions for Data Management and Reporting
- Gain an understanding about the SPSS and experts in handling data files and carry out basic statistical analysis
- Test basic hypothesis using t tests, Chi Square tests and ANOVA.

## **II MBA – II Semester**

### **(19MB9039) STRATEGIC MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Describe major theoretical concepts, background work and research output in the field of strategic management.
- Develop an understanding of the strategic management process and the functional strategies
- Conduct analysis using various tools and frameworks to make strategic decisions
- Explain the basic concepts, principles and practices associated with strategy formulation and implementation
- Analyze various strategies and explore appropriate strategic implementation at business and corporate levels
- Analyze and evaluate critically real life company situations and develop creative solutions, using a strategic management perspective

### **(19MB9040) GREEN BUSINESS MANAGEMENT**

**Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate an understanding of comprehensive systemic analysis across both physical and behavioural dimensions involving society, the environment, and the economy.
- Analyze the role of environmental sustainability in the promotion of comprehensive justice and equity.
- Gain an insight towards the basic sustainability concepts of evolutionary processes, inter-generational debt, socio-political adaptation, climate change, ecosystem services, and environmental justice
- Articulate a comprehensive world view that integrates diverse approaches to sustainability.
- Realize the significance of environmental reporting and green product management
- Identify how globalized processes impact socio ecological systems. Develop appropriate technologies and management patterns to create harmony with the environment

**(19MB9041) WORLD TRADE ORGANIZATION & INTELLECTUAL PROPERTY RIGHTS****Course Outcomes:**

After the completion of course Students will be able to:

- Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP
- Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development
- Identify activities and constitute IP infringements and the remedies available to the IP owner
- Describe the precautions steps to be taken to prevent infringement of proprietary rights in products and technology development.
- Be familiar with the processes of Intellectual Property Management (IPM) and various approaches for IPM and conducting IP and IPM auditing and explain how IP can be managed as a strategic resource and suggest IPM strategy.
- Be able to anticipate and subject to critical analysis arguments relating to the development and reform of intellectual property right institutions and their likely impact on creativity and innovation.

**(19MB9042) CROSS CULTURAL MANAGEMENT****Course Outcomes:**

After the completion of course Students will be able to:

- Appreciate the critical role of culture in international business and the importance of managing cultural differences
- Analyze the interacting spheres of culture including organizational culture, professional culture, national culture, and industry culture.
- Discern the influence of culture on different functions of management including communication, negotiation, marketing, leadership, motivation, human resource management and teams.
- Display an understanding of cultural difference in interactions with different nationalities and an awareness of and sensitivity to cross-cultural issues.



- Understand and explain issues of cultural awareness when conducting international business
- Build mind-set and skill-set of a competent leader who appreciates and leverages diversity in talents and organizations s/he works with

### **(19MB9043) INNOVATIVE TECHNOLOGY MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Account for the importance of technological development and innovation for economic growth and increased competitiveness on a firm level
- Critically discuss a firm's need to have a strategic and integrated approach to be able to successfully manage innovation and technical development,
- Analyse complex innovation processes in firms both internally and externally.
- Explore and better manage the effects of new technology on people and work systems
- Demonstrate that the effective management of technological innovation requires the integration of people, processes and technology
- Recognize opportunities for the commercialization of innovation

### **(19MB9044) ORGANIZATIONAL CULTURE & TEAMWORK**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the concepts in the field of management and develop skills to apply the concepts for business problems
- Describe strategies used by managers to create and maintain a consistent organizational culture
- Recognize the role of management in communicating and teaching organizational culture to employees and subordinates across borders
- Understanding and manipulating organisational/corporate culture to engender greater organisational flexibility and productivity
- Demonstrate an understanding of how to uphold international negotiations
- Demonstrate self-awareness, sensitivity, and openness to diverse people and cultures

### **(19MB9045) FINANCIAL DERIVATIVES**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the various financial derivative securities (Futures, Forwards and Options).
- Describe standard derivative contracts, their properties and functionality.
- Analyze the role and relationship between forward and futures prices.
- Apply scientific methods for valuation of options and other derivatives, in continuous and discrete time.

- Interpret and apply risk measures that are commonly used in risk management.
- Describe how swaps can reduce market risks and use a simulation to assess a risk hedging strategy based on interest rate swaps

### **(19MB9046) SERVICES MARKETING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding understand the characteristics of services, understand consumer behavior in services, align service design and standards, delivering service, managing services promises
- To segment markets for services and create value in the market for new services
- Implement pricing and promotion strategies for services
- Focus on the role of marketing communication and set communication strategies for service marketing
- Plan and execute the delivery of services based on the requirement.
- Develop appropriate strategies for marketing of the services

### **(19MB9047) ORGANIZATIONAL CHANGE AND DEVELOPMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding and appreciation of the various concepts of organizational development
- Learn how to apply some of the key concepts and tools organizational development and change leadership and management.
- Discuss and analyze diagnostic tools used to assess organizational effectiveness.
- Identify major types of organizational development interventions.
- Demonstrate how to evaluate organizational development interventions
- Apply human resource intervention techniques in different management scenarios.

### **(19MB9048) DATA COMMUNICATION AND NETWORK ANALYSIS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the concept of Data communication and networks, layered architecture and their applications
- Evaluate data communication link considering elementary concepts of data link layer protocols for error detection and correction.
- Analyse and Set up protocol designing issues for Communication networks.
- Apply various network layer techniques for designing subnets and supernets and analyse packet flow on basis of routing protocols.

- Estimate the congestion control mechanism to improve quality of service of networking application
- Understand and design application layer protocols and internet applications such as network security

### **(19MB9049) INTERNATIONAL FINANCIAL MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Analyse, apply and evaluate information within the global financial environment of foreign exchange to solve problems and make informed decisions.
- Review the problems of dealing in foreign currency and the advantages and disadvantages of overseas funding
- Demonstrate the use of foreign exchange derivatives and other methods to manage foreign exchange exposure and risk
- Describe the issues pertaining to cross-border investment decisions and financing MNCs
- Analyse the complexities associated with management of cost of funds in the capital Structure in MNCs
- Analyse, evaluate and synthesize both quantitative and qualitative financial information to influence problem solving and decision making

### **(19MB9050) INTERNATIONAL MARKETING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the major issues related to international marketing
- To assess an organization's ability to enter and analyse various strategies to enter and compete in international markets
- Identify and analyse opportunities within international marketing environments
- Handle new product development and branding in international markets
- Realize the factors that affect the distribution channels and structures in international markets and take appropriate decisions
- Develop an understanding towards the procedures and documentation in the export and import process in the country and apply in practice

### **(19MB9051) INTERNATIONAL HUMAN RESOURCE MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about importance of Human resource at international level and also identify the differences between domestic and international human resource management
- To understand and assess the various cultural and human variables that influence in the workplace.

- Understand the nature, sources and different methods for recruiting people at international level and apply them along with compensation of human resources based on their skills.
- Perform the functional roles of HRM in International context especially in recruitment and selection, performance management, training, learning and development and repatriation.
- Apply different appraisal methods and trainings that are available for International staffing.
- Assess about the industrial relations in other nations and also to manage people in different locations.

### **(19MB9052) CORPORATE INFORMATION MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Define an information system from both a technical and business perspective and distinguish between computer literacy and information systems literacy
- Identify the major management challenges to building and using information systems in organizations
- Identify managerial risks related to information system organization processing and utilizing
- Explain how enterprise systems and industrial networks create new efficiencies for businesses
- Apply outsourcing of business activities and manage the risk and relationship with outsourcing agencies
- Highlight the role of projects in modern day business organizations and sensitize the complexities of project management.

### **(19MB9053) SEMINAR ON CONTEMPORARY ISSUES OF MANAGEMENT**

After the completion of course Students will be able to:

- Develop an understanding about the issues in the business enterprises across various industrial sectors
- Practice and maintain communication, logical and analytical skills learnt in the MBA program
- Construct new ability to practice new problem solving skills and use these skills in personal life.
- Demonstrate necessary skills to handle day-to-day managerial responsibilities, such as making speeches, giving effective presentations and maintaining one's poise in private and public
- Develop proactive thinking to perform effectively in the dynamic socio economic business systems
- Learn the etiquette essentials to perform in various communication roles as business managers

### **(19MB9054) PROJECT WORK & VIVA VOCE**

#### **Course Outcomes:**

- Plan, and engage in, an independent and sustained critical investigation and evaluation of a chosen research topic relevant to environment and society
- Systematically identify relevant theory and concepts, relate these to appropriate methodologies and evidence, apply appropriate techniques and draw appropriate conclusions
- Engage in systematic discovery and critical review of appropriate and relevant information sources
- Appropriately apply qualitative and/or quantitative evaluation processes to original data
- Understand and apply ethical standards of conduct in the collection and evaluation of data and other resources
- Communicate research concepts and contexts clearly and effectively both in writing and orally

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Department of MCA**

**MCAI Year-I Semester**

**(19HS0810) COMMUNICATIVE ENGLISH**

**Course Outcomes:**

1. To understand social or transactional dialogues spoken by native speakers of English and identify the context, topic, and pieces of specific information.
2. To employ suitable strategies for skimming and scanning to get the general idea of and extend locate specific information.
3. To Participate in informal discussions and speak clearly on a specific topic or in general.
4. To Comprehend, discuss and respond to academic texts and use appropriate language for description and interpretation in writing
5. To form sentences using proper grammatical structures and correct word forms.

**(19HS0835) PROBABILITY & STATISTICS**

**Course Outcomes:**

1. Have acquired ability to participate effectively in group discussions
2. Have developed ability in writing in various contexts
3. Have acquired a proper level of competence for employability
4. To understand the basic notions of discrete and continuous probability.
5. To understand the methods of statistical inference and the role that sampling distributions play in those methods.

**(19HS0836) DISCRETE MATHEMATICS**

**Course Outcomes:**

1. Have acquired ability to participate effectively in group discussions
2. Have developed ability in writing in various contexts
3. Have acquired a proper level of competence for employability
4. Be able to apply basic counting techniques to solve combinatorial problems
5. Be able to specify and manipulate basic mathematical objects such as sets, functions, and relations

**(19MC9101) COMPUTER PROGRAMMING AND PROBLEM SOLVING**

**Course Outcomes:**

1. Students will be able to apply problem solving techniques in designing the solutions for a wide range of problems.
2. Students will be able to write, compile and debug programs in C language.
3. Students will be able to design programs involving decision structures, loops and functions.
4. Students will be able to explain the difference between call by value and call

- by reference
5. Students will be able to understand the dynamics of memory by the use of pointers.

### **(19MC9102) COMPUTER ORGANIZATION**

#### **Course Outcomes:**

1. Able to design digital circuits by simplifying the Boolean functions
2. Able to understand the organization and working principle of computer hardware components
3. Able to understand mapping between virtual and physical memory
4. Acquire knowledge about multiprocessor organization and parallel processing
5. Able to trace the execution sequence of an instruction through the processor.

### **(19HS0811) COMMUNICATIVE ENGLISH LAB**

#### **Course Outcomes:**

1. Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
2. Apply communication skills through various language learning activities.
3. Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
4. Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
5. Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

### **(19MC9103)C PROGRAMMINGLAB**

#### **Course Outcomes:**

Upon completion of the subject, students will be able to

1. Write, compile and debug programs in C language.
2. Apply Problem solving techniques to find solutions to problems.
3. Able to use C language features effectively and implement solutions using C language.
4. Able to improve logical skills.
5. Design programs involving decision structures, loops and functions.
6. Explain the difference between call by value and call by reference
7. Understand the dynamics of memory by the use of pointers.
8. Design programs involving files.

### **(19MC9104)P.C.SOFTWARELAB**

#### **Course Outcomes:**

1. Able to disassemble and assemble the PC back to working condition.
2. Able to know installation of softwares.

3. Able to understand mapping between virtual and physical memory.
4. Able to know Software troubleshooting and Hardware Troubleshooting.
5. Able to work on MS Office tools.

## **MCA I Year– II Semester**

### **(19MB9056) ACCOUNTING & FINANCIAL MANAGEMENT**

#### **Course Outcomes:**

1. Develop the ability to use the fundamental accounting equation to analyze the effect of Business transactions on an organization's accounting records and financial statements
2. Demonstrate the applicability of the concept of Financial Management to understand its objectives and role of a Financial Manager
3. Equip with the knowledge of accounting process and preparation of final accounts of sole trader
4. Demonstrate the identification of importance of capital structure and the sources of finance
5. Demonstrate the ability to apply cost volume profit analysis by managers to answer various operating decisions, such as what level sales required to break even, how many units of products are to be sold in order to earn a target level of profit

### **(19MC9105) OBJECT ORIENTED PROGRAMMING THROUGH C++**

#### **Course Outcomes:**

1. Students who have completed this course able to:
2. Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
3. Understand fundamentals of object-oriented programming in C++, including defining classes, invoking methods, using class libraries, etc.
4. Debugging and running the program
5. Have the ability to write a computer program to solve specified problems.
6. Able to do the C++ Inheritance & Exception Handling concepts.

### **(19MC9106) DATA STRUCTURES**

#### **Course Outcomes:**

1. Learn how to use data structure concepts for realistic problems.
2. Ability to identify appropriate data structure for solving computing problems in C language.
3. Ability to solve problems independently and think critically.
4. Able to search and sort the elements in graphs and trees.
5. Ability to solve linked list, queues and hash tables.



### **(19MC9107)OPERATINGSYSTEMS**

#### **Course Outcomes:**

1. Able to understand the operating system components and its services
2. Implement the algorithms in process management and solving the issues of IPC
3. Able to demonstrate the mapping between the physical memory and virtual memory
4. Able to understand file handling concepts in OS perspective
5. Able to understand the operating system components and services with the recent OS

### **(19MC9108)SYSTEMSOFTWARE**

#### **Course Outcomes:**

1. Able to differentiate different instruction formats among machines.
2. To have an understanding of foundations of design of assemblers.
3. Able to distinguish between loaders and linkers.
4. Able to develop the own source code of Macro processor.
5. To have an understanding of issues in device drivers.

### **(19MC9109) PROGRAMMING IN C++ LAB**

#### **Course Outcomes:**

After completion of this course, the students would be able to

1. Understand programming language concepts, particularly C++ and object-oriented concepts.
  2. Write, debug, and document well-structured C++ applications
  3. Effectively create and use objects from predefined class libraries
- Understand the behavior of primitive data types, object references, and arrays
4. Apply decision and iteration control structures to implement algorithms.
  5. Implement interfaces, inheritance, and polymorphism as programming techniques.

### **(19MC9110) DATA STRUCTURES THROUGH C++ LAB**

#### **Course Outcomes:**

1. Learn how to use data structure concepts for realistic problems.
2. Ability to identify appropriate data structure for solving computing problems in C language.
3. Ability to solve problems independently and think critically.
4. Able to search and sort the elements in graphs and trees.
5. Ability to solve linked list, queues and hash tables.

### **(19MC9111) OPERATING SYSTEMS LAB**

**Course Outcomes:**

Upon completion of this course the students should:

1. Understand process management, concurrent processes and threads
2. How to allocate and free memory
3. Able to solve deadlock if occur
4. Compare performance of processor scheduling algorithms
5. Produce algorithmic solutions to process synchronization problems

**MCA II Year– I Semester****(19MC9112)COMPUTER NETWORK****Course Outcomes:**

1. Able to trace the flow of information from one node to another node in the network
2. Able to Identify the components required to build different types of networks
3. Able to understand the functionalities needed for data communication into layers
4. Able to choose the required functionality at each layer for given application
5. Able to understand the working principles of various application protocols
6. Acquire knowledge about security issues and services available

**(19MC9113)JAVAPROGRAMMING****Course Outcomes:**

Students who have completed this course able to:

1. Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
2. Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
3. Have the ability to write a computer program to solve specified problems.
4. Able to do the java collection framework programs.
5. Work with GUI, Event handling mechanism.

**(19MC9114) DATABASE MANAGEMENT SYSTEM****Course Outcomes:**

1. Understand the basic concepts of the database and data models.
2. Design a database using ER diagrams and map ER into Relations and normalize the relations.
3. Acquire the knowledge of query evaluation to monitor the performance of the DBMS.
4. Develop a simple database applications using normalization.
5. Acquire the knowledge about different special purpose databases and to critique how they differ from traditional database systems.

**(19MC9115) ADVANCED PROGRAMMING (PYTHON & R LANGUAGES)**

**Course Outcomes:**

At the end of the course the student will be able to:

1. Making Software easily right out of the box.
2. Experience with an interpreted Language.
3. To build software for real needs.
4. Prior Introduction to testing software
5. Ability to Work on a real life Project, implementing R Analytics to create Business Insights.
6. Ability to analyze the data and results using R, a flexible and completely Cross - platform.
7. Ability to use a wide range of analytical methods and produce presentation quality graphics.

**(19MC9116) DESIGN AND ANALYSIS OF ALGORITHMS****Course Outcomes:**

1. Analyze the complexity of the algorithms
2. Use techniques divide and conquer, greedy to solve the problems.
3. Able to solve problems on dynamic programming, backtracking, branch and bound.
4. Identify and analyze criteria and specifications appropriate to new problems, and choose the appropriate algorithmic design technique for their solution.
5. Able to prove that a certain problem is NP-Complete.

**(19MC9117) JAVA PROGRAMMING LAB****Course Outcomes:**

After completion of this course, the students would be able to

1. Understand programming language concepts, particularly Java and object-oriented concepts, data types.
2. Effectively create and use objects from predefined class libraries
3. Apply decision and iteration control structures to implement algorithms
4. Implement interfaces, inheritance, and polymorphism as programming techniques.
5. Implement Java collection frame work as programming techniques.

**(19MC9118) DATABASE MANAGEMENT SYSTEM LAB****Course Outcomes:**

1. Able to master the basic concepts and understand the applications of database systems.
2. Able to construct an Entity-Relationship (E-R) model and Relational Algebra.
3. Understand and apply database normalization principles.
4. Able to construct SQL queries to perform CRUD operations on database. (Create, Retrieve, Update, Delete)
5. Understand principles of database transaction management, database

recovery, security.

### **(19MC9119) ADVANCED PROGRAMMING LAB**

#### **Course Outcomes:**

1. Design experiments using WEKA tool for Data mining applications
2. Able to write programs on operations using Python and R Programs.
3. Able to solve programs on Data Structures using Python and R
4. Ability to work on Files
5. Ability to work on Functions.

### **MCA II Year–II Semester**

### **(19MC9120) DATA WAREHOUSING AND DATA MINING**

#### **Course Outcomes:**

Upon Completion of the course, the students will be able to

1. Preprocess the data for mining applications
2. Apply the association rules for mining the data
3. Cluster the high dimensional data for better organization of the data
4. Evolve Multidimensional Intelligent model from typical system
5. Evaluate various mining techniques on complex data objects

### **(19MC9121)WEB TECHNOLOGIES**

#### **Course Outcomes:**

Student is able to:

1. Design and execute applications in java beam
2. Do the server side programming, maintain sessions.
3. Establish the DB connections and access the data.
4. Ability to work on MVC architecture
5. Design pages using PHP and AJAX.

### **(19MC9122)SOFTWAREENGINEERING**

#### **Course Outcomes:**

1. Get an insight into the processes of software development
2. Able to understand the problem domain for developing SRS and various models of software engineering
3. Able to Model software projects into high level design using DFD diagrams
4. Able to Measure the product and process performance using various metrics
5. Able to Evaluate the system with various testing techniques and strategies

**(19MC9123)SOFTWARETESTING  
(ELECTIVE– I)**

**Course Outcomes:**

1. Test the software by applying testing techniques to deliver a product free from bugs
2. Evaluate the web applications using bug tracking tools.
3. Investigate the scenario and the able to select the proper testing technique
4. Explore the test automation concepts and tools
5. Deliver quality product to the clients by way of applying standards such as TQM, Six Sigma
6. Evaluate the estimation of cost, schedule based on standard metrics

**(19MC9124)ARTIFICIALINTELLIGENCE  
(ELECTIVE– I)**

**Course Outcomes:**

At the end of this course:

1. Student should have a knowledge and understanding of the basic concepts of AI including Search.
2. Student can solve the Game Playing problems.
3. Student can able to use to planning and learning techniques
4. Student should be able to use this knowledge and understanding of appropriate principles and guidelines to synthesise solutions to tasks in AI and to critically evaluate alternatives.
5. Student can have ability to use the expert system

**(19MC9125)DISTRIBUTED SYSTEMS  
(ELECTIVE– I)**

**Course Outcomes:**

After completion of this course, the student is:

1. Able to explain what a distributed system is, why you would design a system as a distributed system, and what the desired properties of such systems are;
2. Able to list the principles underlying the functioning of distributed systems, describe the problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of their solutions;
3. Able to recognize how the principles are applied in contemporary distributed systems, explain how they affect the software design, and be able to identify features and design decisions that may cause problems;
4. Able to design a distributed system that fulfills requirements with regards to key distributed systems properties (such as scalability, transparency, etc.), be able to recognize when this is not possible, and explain why
5. Able to build distributed software and higher – level middleware and languages.

**(19MC9126)LINUX PROGRAMMING  
(ELECTIVE– I)**

**Course Outcomes:**

1. Work confidently in Linux environment.
2. Work with different text processing commands
3. Work with shell script to automate different tasks as Linux administration.
4. Able to communicate with processes and memory.
5. Work confidently with the socket.

**(19MC9127)NETWORKSECURITY  
(ELECTIVE– I)**

**Course Outcomes:**

1. Understand the most common type of cryptographic algorithm
2. Understand the Public-Key Infrastructure
3. Understand security protocols for protecting data on networks
4. Understand vulnerability assessments and the weakness of using passwords for authentication
5. Be able to configure simple firewall architectures

**(19MC9128)HUMANCOMPUTERINTERACTION  
(ELECTIVE–II)**

**Course Outcomes:**

1. Find innovative ways of interacting with computers
2. Help the disabled by designing non-traditional ways of interacting
3. Use cognitive psychology in the design of devices for interaction
4. Able to apply models from cognitive psychology.
5. Able to perform effectively on menus and windows

**(19MC9129)SOCIALNETWORKSANDSEMANTICWEB  
(ELECTIVE– II)**

**Course Outcomes:**

1. Understand semantic web basics, architecture and technologies
2. Able to represent data from a chosen problem in XML with appropriate semantic tags obtained or derived from the ontology
3. Able to understand the semantic relationships among these data elements using Resource Description Framework (RDF)
4. Able to design and implement a web services application that “discovers” the data and/or other web services via the semantic web
5. Able to discover the capabilities and limitations of semantic web technology for social networks

**(19MC9130)COMPUTER GRAPHICS  
(ELECTIVE– II)**

**Course Outcomes:**

1. Gain proficiency in 3D computer graphics API programming
2. Able to draw line, circle and ellipse using algorithms
3. Enhance the perspective of modern computer system with modeling, analysis and interpretation of 2D and 3D visual information.
4. Able to transform the 2D and 3D objects.
5. Able to design Animation for the objects.

**(19MC9131)INTERNETOFTHINGS  
(ELECTIVE– II)**

**Course Outcomes:**

1. Ability to combine sensors, servos, robotics, Arduino chips, and more with various or the Internet,
2. Ability to create interactive, cutting-edge devices.
3. Better idea of the overview of necessary steps to take the idea of IOT concept through production
4. Ability to manage memory and performance of battery life
5. Ability to design a printed circuit boards.

**(19MC9132)E-COMMERCE  
(ELECTIVE– II)**

**Course Outcomes:**

1. Recognize the impact of Information and Communication technologies, especially of the Internet in business operations
2. Recognize the fundamental principles of e-Business and e-Commerce
3. Distinguish the role of Management in the context of e-Business and e-Commerce
4. They can know the added value, risks and barriers in the adoption of e-Business and e-Commerce
5. Examine applications of e-Commerce in relation to the applied strategic.

**(19MC9133) DATA WAREHOUSING AND DATA MINING LAB**

**Course Outcomes:**

After undergoing the course students will be able to

1. Synthesize the data mining fundamental concepts and techniques from multiple perspectives.
2. Develop skills and apply data mining tools for solving practical problems
3. Advance relevant programming skills.
4. Ability to clustering data and pattern evaluation
5. Gain experience and develop research skills by reading the data mining literature.

### **(19MC9134)WEB TECHNOLOGIESLAB**

#### **Course Outcomes:**

Student is able to:

1. Design and execute applications in java beam
2. Do the server side programming, maintain sessions.
3. Establish the DB connections and access the data.
4. Ability to work on MVC architecture
5. Design pages using PHP and AJAX.

### **(19MC9135) SOFTWARE ENGINEERING & UML LAB**

#### **Course Outcomes:**

1. Able to prepare various phases of Spiral model.
2. Able to draw E-R diagram, DFD diagrams for the project
3. Able to draw UML diagrams for the project
4. Able to develop PERT and CPM project schedule methods.
5. Able to analyze and prepare RMMM plan.

### **MCA III Year– I Semester**

### **(19MC9136)CLOUD COMPUTING**

#### **Course Outcomes:**

1. Compare the strengths and limitations of cloud computing
2. Identify the architecture, infrastructure and delivery models of cloud computing
3. Choose the appropriate cloud player, Programming Models and approach.
4. Address the core issues of cloud computing such as security, privacy and Interoperability
5. Design Cloud Services and Set a private cloud

### **(19MC9137).NETTECHNOLOGIES**

#### **Course Outcomes:**

1. Aware of .net framework components.
2. Creating simple data binding applications in VB or C# using ADO.Net connectivity.
3. Performing Database operations for windows form.
4. Able to create a web applications.
5. Creating user interactive web pages.

### **(19MC9138) MOBILE APPLICATION DEVELOPMENT**

#### **Course Outcomes:**

1. Students understood the aspects of mobile programming that make it unique from programming for other platforms



2. Students can design and develop sophisticated mobile interfaces.
3. Students program mobile applications for the Android operating system by use basic features.
4. Able to work on advanced phone features.
5. Ability to deploy applications to the Android marketplace for distribution

**(19MC9139) CYBERSECURITY  
(ELECTIVE-III)**

**Course Outcomes:**

1. After learning the course the students should be able to:
2. Understand cyber-attack and System Vulnerability Scanning.
3. Knowledge on cyber laws.
4. Able to protect themselves and ultimately society from cyber-attacks.
5. Knowledge on Web application tools.
6. Understand Cyber Crimes and types.

**(19MC9140)SOFTWAREPROJECTMANAGEMENT  
(ELECTIVE– III)**

**Course Outcomes:**

1. Understand the activities during the project scheduling of any software application.
2. Learn the risk management activities and the resource allocation for the projects.
3. Can apply the software estimation and recent quality standards for evaluation of the software projects.
4. Acquire knowledge and skills needed for the construction of highly reliable software project.
5. Able to create reliable, replicable cost estimation that links to the requirements of project planning and managing

**(19MC9141)NEURALNETWORKS&FUZZYLOGIC  
(ELECTIVE– III)**

**Course Outcomes:**

1. To Expose the students to the concepts of feed forward neural networks
2. To provide adequate knowledge about feedback networks.
3. To teach about the concept of fuzziness involved in various systems. To provide adequate knowledge about fuzzy set theory.
4. To provide comprehensive knowledge of fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm.
5. To provide adequate knowledge of application of fuzzy logic control to real time systems.

**(19MC9142)BIGDATA ANALYTICS  
(ELECTIVE– III)**

**Course Outcomes:**

1. The students will be able to:
2. Work with big data platform and analyze the big data analytic techniques for useful business applications.
3. Design efficient algorithms for mining the data from large volumes.
4. Analyze the HADOOP and Map Reduce technologies associated with big data analytics
5. Explore on Big Data applications Using Pig and Hive
6. Understand the fundamentals of various bigdata analysis techniques

**(19MC9143)MODELDRIVEN FRAMEWORK  
(ELECTIVE– III)**

**Course Outcomes:**

1. The student should be able to
2. Have learnt the different types of server client concepts
3. Learn the design of EJB architecture
4. Deploy EJB for specific applications
5. Build an application using CORBA
6. Build an application using COM

**(19MC9144)BIO –INFORMATICS  
(ELECTIVE– IV)**

**Course Outcomes:**

The students will be able to:

1. Describe the contents and properties of the most important bioinformatics databases, perform text- and sequence-based searches.
2. Analyze and discuss the results in light of molecular biological knowledge
3. Explain the major steps in pairwise and multiple sequence alignment.
4. Explain the principle for, and execute pairwise sequence alignment by dynamic programming
5. Predict the secondary and tertiary structures of protein sequences.

**(19MC9145)IMAGEPROCESSING  
(ELECTIVE– IV)**

**Course Outcomes:**

1. Able to enhance images using enhancement techniques.
2. Able to restore images using restoration techniques and methods used in digital image processing
3. Able to transform the image in digital image processing.
4. Able to compress images using compression techniques used in digital image processing

5. Able to segmentation of images using digital image processing.

**(19MC9146) DESIGN PATTERNS  
(ELECTIVE– IV)**

**Course Outcomes:**

1. Students demonstrate a thorough understanding of patterns and their underlying principles
2. Students know what design pattern to apply to a specific problem
3. Students demonstrate what tradeoffs need to be made when implementing a design pattern
4. Students can able draw class diagrams for different patterns.
5. Students will be able to use design patterns when developing software

**(19MC9147)MACHINELEARNING  
(ELECTIVE– IV)**

**Course Outcomes:**

The student will be able to:

1. Identify the machine learning algorithms which are more appropriate for various types of learning tasks in various domains
2. Implement machine learning algorithms on real datasets
3. Implement decision tree learning.
4. Demonstrate knowledge on Bayesian Learning.
5. Demonstrate linear models for Regression

**(19MC9148)ENTERPRISERESOURCEPLANNING  
(ELECTIVE– IV)**

**Course Outcomes:**

After completing this course, student will be able to

1. Classify different processes of the organization and relationship among all processes.
2. Examine systematically the planning mechanisms in an enterprise, and identify all components in an ERP system and the relationships among the components;
3. To describe the Generic Model of ERP and General ERP Implementation Methodology.
4. To apply the concepts of BPR, SCM and CRM.
5. To demonstrate knowledge of SAP and Oracle Apps.

**(19MC9149)CLOUD COMPUTINGLAB**

**Course Outcomes:**

1. The student should be able to Design and Implement applications on the Cloud.
2. Ability to Design application on SaaS

3. Ability to Design application on PaaS
4. Use the cloud tool kits.

#### **(19MC9150).NETTECHNOLOGIESLAB**

##### **Course Outcomes:**

1. Create Simple application using web controls
2. Work with States of ASP.NET Pages
3. Query textbox and Displaying records & Display records by using database Datalist link control & Databinding using dropdownlist control Inserting record into a database & Deleting record into a database
4. Databinding using datalist control & Datalist control templates Databinding using datagrid & Datagrid control template.
5. Datagrid hyperlink & Datagrid button column Datalist event & Datagrid paging Creating own table format using datagrid

#### **(19MC9151) MOBILE APPLICATION DEVELOPMENT LAB**

##### **Course Outcomes:**

At the end of the course, the student should be able to:

1. Design and implement various mobile applications using emulators.
2. Design applications on animations.
3. Deploy applications using layout and form controls.
4. Deploy applications with multiple activities
5. Deploy applications to hand-held devices

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Masters of Technology**

**Department of Civil Engineering (R19)**

**STRUCTURAL ENGINEERING**

**COURSE OUTCOMES**

1. Recognize appropriate research problem, errors in selecting a research problem, Scope and objectives of research
2. Critically assess research methods pertinent to technology innovation research
3. Identify, explain, compare, and prepare the key elements of a research proposal/report
4. Skill to understand the need of intellectual property rights, IPR protection to inventors
5. Develop procedural knowledge to Legal System and solving the problem relating to intellectual property rights for further research work and investment in R & D

**(19CE1001) ADVANCED STRUCTURAL ANALYSIS**

**COURSE OUTCOMES**

After completion of this course, the student shall understand

1. Analysis of continuous beam by stiffness & flexibility matrix methods
2. Analysis of Rigid Jointed frames by Stiffness & flexibility matrix methods
3. Analysis of Pin Jointed Structures by Stiffness & Flexibility matrix methods
4. Formation global & element stiffness matrix, direct stiffness method
5. Equation solution Techniques

**19CE1002) ADVANCED SOLID MECHANICS**

**COURSE OUTCOMES**

After completion of this course, the student shall understand

1. Two dimensional analysis of stress and strain
2. Three dimensional analysis of stress and strain

**(19CE1008) THEORY OF THIN PLATES AND SHELLS**

**COURSE OUTCOMES**

1. Analyze the plates using Navier's and Levy's method
2. Analyze the circular, rectangular and square plates by finite difference method
3. Design the curved shells and roofs
4. Design the various folded plate structures

## **(19CE1009) THEORY AND APPLICATIONS OF CEMENT COMPOSITES**

### **COURSE OUTCOMES**

1. Formulate constitutive behaviour of composite materials – Ferrocement, SIFCON and Fibre Reinforced Concrete
2. Mechanical properties of cement composites
3. Admixtures and special uses of cements.
4. X-ray diffraction and SEM analysis of materials.

## **(19CE1010) THEORY OF STRUCTURAL STABILITY**

### **COURSE OUTCOMES**

The student shall be able to

1. Analyze elastic and inelastic buckling of bars
2. Understand the various numerical methods for treatment of stability problems and buckling of rectangular cross-sectional beams and plates

## **(19CE1011) STRUCTURAL HEALTH MONITORING**

### **COURSE OUTCOMES:**

At the end of the course, students will be able to

1. Diagnose the distress in the structure understanding the causes and factors.
2. Assess the health of structure using static field methods.
3. Assess the health of structure using dynamic field tests.
4. Suggest repairs and rehabilitation measures of the structure.

## **(19CE1012) STRUCTURAL OPTIMIZATION**

### **COURSE OUTCOMES**

At the end of the course, students will be able to

1. Use Variational principle for optimization
2. Apply optimization techniques to structural steel and concrete members.
3. Design using frequency constraint.

## **(19CE1003) STRUCTURAL DESIGN LAB**

### **COURSE OUTCOMES**

At the end of the course, students will be able to

1. Design and Detail all the Structural Components of Frame Buildings.
2. Design and Detail complete Multi-Storey Frame Buildings.

## **(19CE1004) ADVANCED CONCRETE LAB**

### **COURSE OUTCOMES**

At the end of the course, students will be able to

1. Design high grade concrete and study the parameters affecting its performance.
2. Conduct Non Destructive Tests on existing concrete structures.
3. Apply engineering principles to understand behaviour of structural/ elements.

### **I M.Tech – II Sem.**

## **(19CE1005) FEM IN STRUCTURAL ENGINEERING**

### **COURSE OUTCOMES**

After completion of this course, the student shall understand

1. The history of FEM, methods of functional approximation
2. Principles of Elasticity, isoperimetric formulation
3. Finite element analysis of plates

## **(19CE1006) STRUCTURAL DYNAMICS**

### **COURSE OUTCOMES**

After completion of this course, the student shall understand the concepts OD

1. Structural dynamics-single and multi-degree of freedom systems
2. Free and Forced vibrations
3. Practical Vibration analysis

## **(19CE1013) ADVANCED STEEL DESIGN**

### **COURSE OUTCOMES**

After completion of this course, the student shall be able to

1. Design light Gauge steel compression and Flexural members
2. Analyze and design Transmission towers
3. Analyze and design continuous beams and portal frames using plastic theory
4. Design steel Tension members and laterally restrained beams using limit state method

## **(19CE1014) DESIGN OF FORMWORK**

### **COURSE OUTCOMES**

1. Select proper formwork, accessories and material.
2. Design the form work for Beams, Slabs, columns, Walls and Foundations.
3. Design the form work for Special Structures.
4. Understand the working of flying formwork.

## **(19CE1015) DESIGN OF HIGH RISE STRUCTURES**

### **COURSE OUTCOMES**

1. Analyze design and detail Transmission/ TV tower, Mast and Trestles with different loading conditions.
2. Analyses design and detail the RC and Steel Chimney.
3. Analyses design and detail the tall buildings subjected to different loading conditions using relevant codes.
4. Analysis and design of dynamic approach OF STRUCTURAL DESIGN USING is Code provisions.

## **(19CE1016) DESIGN OF MASONRY STRUCTURES**

### **COURSE OUTCOMES:**

1. Understand the masonry design approaches.
2. Analyses Reinforced Masonry Members.
3. Determine interactions between members.
4. Determine shear strength and ductility of Reinforced Masonry members
5. Check the stability of wall
6. Perform elastic and in elastic analysis of masonry walls.

## **(19CE1017) DESIGN OF ADVANCED CONCRETE STRUCTURES**

### **COURSE OUTCOMES**

After completion of this course, the student shall able to (as per 13456 2000),

1. Estimation of crack width and Redistribution of moments in Reinforced concrete beam.
2. Design of deep beams, ribbed (voided) slabs.
3. Design of Grid floors, flat slabs.
4. Design of plain concrete walls.
5. Design of shear walls.

## **(19CE1018) ADVANCED DESIGN OF FOUNDATIONS**

### **COURSE OUTCOMES**



At the end of the course, students will be able to

1. Decide the suitability of soil strata for different projects.
2. Design shallow foundations deciding the bearing capacity of soil.
3. Analyze and design the pile foundation.
4. Understand analysis methods for well foundation

### **(19CE1019) SOIL STRUCTURE INTERACTION**

#### **COURSE OUTCOMES**

At the end of the course, students will be able to

1. Understand soil structure interaction concept and complexities involved.
2. Evaluate soil structure interaction for different types of structure under various conditions of loading and subsoil characteristics.
3. Prepare comprehensive design oriented computer programs for interaction problems based on theory of sub grade reaction such as beams, footings, rafts etc.
4. Analyze different types of frame structure founded on stratified natural deposits with linear and non-linear stress-strain characteristics
5. Evaluate action of group of piles considering stress-strain characteristics of real soils.

### **(19CE1020) DESIGN OF INDUSTRIAL STRUCTURES**

#### **COURSE OUTCOMES**

1. Explain various types of industrial structures and its design methodologies
2. Design bunkers, silo.
3. Design chimney and towers.
4. Design various industrial floors.

### **(19CE1007) MODEL TESTING LAB**

#### **COURSE OUTCOMES**

At the end of the course, students will be able to

1. Understand the response of structures.
2. Prepare the models.
3. Conduct model testing for static loading
4. Conduct model testing for free and forced vibrations

### **(19HS0829) CONSTITUTION OF INDIA**

## **COURSE OUTCOMES**

Student undergoing this course can

1. Explain the key concepts of political economy
2. Analyse the significant developments in the political ideologies
3. Describe the salient features of the constitution of India interpret, integrate and critically
4. Analyse the political economy of Indian international relations and gain knowledge in Judiciary system
5. Apply their knowledge and skills acquired to write various competitive examinations

## **II M. TECH - I SEM. (SE)**

### **(19CE1021) DESIGN OF PRESTRESSED CONCRETE STRUCTURES**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Discuss about the historical development and its principles of prestressed concrete
2. Analyze the methods of prestressing and its losses
3. Predict the deflection and its importance in Prestressed concrete
4. Define flexural, shear & torsional resistance in prestressed concrete
5. Discuss and analyze composite members in prestressed concrete
6. Analysis and design of statically indeterminate beams

### **(19CE1022) ANALYSIS OF LAMINATED COMPOSITE PLATES**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Analyze the rectangular composite plates using the analytical solutions
2. Analyze the composite plates using advanced finite element method
3. Precise the various numerical methods for the stress analysis
4. Analyze the discretion of classical plates theory by using spatial approximations
5. Develop the finite element method by stiffness matrix & Numerical integration
6. Analyze the computation of stresses by using rectangular laminated plates

### **(19CE1023) FRACTURE MECHANICS OF CONCRETE STRUCTURES**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Describe the Basics Concepts of Fracture Mechanics & its Mechanism
2. Identify and classify cracking of concrete structures based on fracture mechanics.
3. Perform Stresses at Crack Tip and different Criteria involved
4. Explain the fatigue and fatigue crack grow rate
5. Describe the basic concepts of CTOD and COD
6. Explain the fracture resistance of materials

### **(19CE1024) DESIGN OF PLATES AND SHELLS**

#### **COURSE OUTCOMES (COs)**

*On successful completion of this course, the student will be able to*

1. *Analyze and design thin plates with deflection*
2. *Analyze and design of laterally loaded, uniformly loaded circular plates*
3. *Analyze and design thin shells using approximate solutions*
4. *Analyze different types of plates (rectangular and circular) under different boundary connections by various classical methods and approximate methods*
5. *Analyze and design of prismatic folded plate system*
6. *Analyze and design of doubly curved shells*

### **(19HS0824) BUSINESS ANALYTICS**

#### **COURSE OUTCOMES (COs)**

On successful completion of course student will be able to

1. Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.
2. Design alternatives to solve business problems utilizing quantitative analysis, critical thinking and sound ethical decision making.
3. Summarize, process and transform data for obtaining meaningful conclusions
4. Interpret data using latest data analytics tools to address organisational problems
5. Organize and critically apply the concepts and methods of business analytics
6. Assess decision problems and build models for creating solutions using business analytical tools.

### **(19ME3121) INDUSTRIAL SAFETY**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Explain the Points of factories act 1948 for health and safety.
2. Define the term Cost & its relation with replacement economy.
3. Recognize the Concept of Wear, Corrosion and its Prevention methods
4. Understand the Concept of sequence of fault finding activities and the importance of decision tree

5. Elaborate the importance of scheduled preventive maintenance of mechanical and electrical equipment.
6. Distinguish between Periodic and Preventive maintenance of equipment's.

### **(19ME3021) ADVANCES IN OPERATIONS RESEARCH**

#### **COURSE OUTCOMES**

1. On successful Completion of this course the student will be able to
2. Create mathematical models of the real time situations.
3. Implement Transportation and Assignment problems to solve in real time industry
4. Choose the best strategy of Game and capable of identifying the suitable queuing Theory
5. Enumerate fundamental techniques and apply it to solve various optimization areas
6. Investigate, study, Apply knowledge in Replacement models and Inventory Control Models
7. Understand the Inventory control Models

### **(19ME3022) COMPOSITE MATERIALS**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Explain the Fundamental concept of composite materials.
2. Classify different types of composite materials.
3. Describe the Fabrication and processing of composite materials.
4. Illustrate the Methods of preparation of Metal matrix Composites and polymer matrix composites
5. Discuss about the Mechanical behavior of composite materials.
6. Explain the application of composite materials.

### **(19EE2128) WASTE TO ENERGY**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Analyse agro based, forest residue and industrial waste conversion processes.
2. Manufacture of Pyrolytic oils and gases
3. Manufacture of charcoal, yields and applications
4. Understand various types of gasifiers operation
5. Understand inclined and fluidized bed combustors operation
6. Understand types of biogas plants and biomass energy programme in India



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**

**(AUTONOMOUS)**

**Control Systems (M.Tech)**

**Department of Electrical and Electronics Engineering (EEE)**

**IM.Tech-I Sem.(CS)**

**(19HS0823) RESEARCH METHODOLOGY AND INTELLECTUAL PROPERTY RIGHTS**

**COURSE OUTCOMES**

1. Recognize appropriate research problem, errors in selecting a research problem, Scope and objectives of research problem.
2. Critically assess research methods pertinent to technology innovation research.
3. Identify, explain, compare, and prepare the key elements of a research proposal/report.
4. Skill to understand the need of intellectual property rights, IPR protection to inventors.
5. Develops procedural knowledge to Legal System and solving the problem relating to intellectual property rights for further research work and investment in R&D.

**(19EE2001) MATHEMATICAL METHODS IN CONTROL SYSTEMS**

**COURSE OUTCOMES**

Students will be able to

1. Apply matrix properties and functions to a given problem
2. Use eigenvalues and eigenvectors
3. Find out responses of linear systems to any given input signal

**(19EE2002) NON-LINEAR SYSTEMS**

**COURSE OUTCOMES**

Students will be able to

1. Explore tools for stability analysis and response evaluation of control problems with significant nonlinearities
2. Identify the design problem and distinguish between the control strategies
3. Correlate between design parameters and the system performance

**(19EE2003) ROBOTICS AND AUTOMATION**

**COURSE OUTCOMES**

Students will be able to

1. Obtain forward, reverse kinematics and dynamics model of the industrial robot arm

2. Propose and synthesize control law for a given application
3. Classify robots and decide specifications depending on the applications

### **(19EE2004) DIGITAL CONTROL SYSTEMS**

#### **COURSE OUTCOMES**

Students will be able to

1. Model digital filters and systems
2. Analyse digital systems in time domain and frequency domain
3. Model and analyse digital systems in state space representation
4. Design controllers for digital systems in state space representation

### **(19EE2005) NON-LINEAR CONTROL SYSTEMS**

#### **COURSE OUTCOMES**

Students will be able to

1. Application of deeper ideas from mathematics and specifically from geometry to engineering problems
2. Analyse and design nonlinear controllers with the aid of software tools

### **(19EE2006) SYSTEMS BIOLOGY**

#### **COURSE OUTCOMES**

Students will be able to

1. Understand and apply mathematical models to design a particular system
2. Apply feed-forward loop to design a biological control system

### **(19EE2122) SCADA SYSTEM AND APPLICATIONS**

#### **COURSE OUTCOMES**

1. Can be able to work with PLC
2. Can be able to work with PLC
3. Can Understand how PLC and SCADA help in power system automation
4. Able to understand the functioning of different hardware components in SCADA
5. Can be able to understand the applications of SCADA in different industries

### **(19EE2007) DESIGN ASPECTS IN CONTROL SYSTEMS**

#### **COURSE OUTCOMES**

Students will be able to

1. Model a control system given its parameters
2. Decide gains of the controllers like PI, PID in a given control system

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**(19HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

**COURSE OUTCOMES**

1. To recognize and demonstrate the style and conventions of research writing.
2. To improve the clarity and coherence of their written proposal.
3. Able to use a variety of sentence patterns.
4. To enhance their revision and proofreading skills.
5. To use effective strategies and techniques to construct their academic projects.

**IM.Tech – IISem.**

**(19EE2010) OPTIMAL CONTROL THEORY**

**COURSE OUTCOMES**

Students will be able to

1. Combine the mathematical methods used in optimal control to derive the solution to variations of the problems studied in the course
2. Use the standard algorithms for numerical solution of optimal control problems and use Matlab to solve fairly simple but realistic problems
3. Integrate the tools learnt during the course and apply them to more complex problems

**(19EE2011) INDUSTRIAL AUTOMATION**

**COURSE OUTCOMES**

Students will be able to

1. To identify potential areas for automation and justify need for automation
2. To select suitable major control components required to automate a process or activity
3. To translate and simulate a real time activity using modern tools and discuss the benefits of automation.
4. To identify suitable automation hardware for the given application.
5. To recommend appropriate modeling and simulation tool for the given manufacturing application.

**(19EE2012) ADVANCED CONTROL SYSTEMS**

**COURSE OUTCOMES**

Students will be able to

1. Apply the concepts of linear algebra and their applications to control system
2. Analyze the system dynamics and Lyapunov stability theory
3. Design linear quadratic controller



## **(19EE2013)ADVANCEDROBOTICS**

### **COURSEOUTCOMES**

Studentswillbeableto

1. Ableto design aroboticcontrol
2. Ableto applynon-linear techniques to anycontrol problem
3. Ableto model mobile robot

## **(19EE2014)ADAPTIVELEARNINGCONTROLSYSTEMS**

### **COURSEOUTCOMES**

Studentswill beableto

1. Understanddetailedknowledgeof classicalsystemidentificationandthedevelopmentandproperties ofvarious methods
2. Understanddetailedknowledgeofon-lineparameterestimation
3. Understand knowledge of adaptive control systems and their development andproperties
4. Understandknowledge ofmethodsandtoolsforstabilityanalysisofadaptivesystems

## **(19EE2015)MODELREDUCTION INCONTROLSYSTEMS**

### **COURSEOUTCOMES**

Studentswill be ableto

1. Apply modelreductiontechniquesfor agivencontroldesignproblem
2. Designcontrol loopsfor alltechniques
3. Knowmodernmethods

## **(19EE2116)ADVANCED DIGITAL SIGNALPROCESSING**

### **COURSEOUTCOMES**

Studentswill be ableto

1. Gainknowledgeaboutthetimedomainandfrequencydomainrepresentati  
onsaswellanalysisofdiscrete timesignals and systems
2. Studythedesign techniquesfor IIRand FIRfilters and their realizationstructures.
3. Acquire knowledge about the finite word length effects in  
implementation ofdigitalfilters.
4. Acquireknowledgeaboutthevariouslinearsignalmodelsandestimati  
onofpowerspectrumof stationaryrandom signals
5. DesignofoptimumFIRandIIRfilters

## (19HS0829) CONSTITUTION OF INDIA

### COURSE OUTCOMES

1. Explain the key concepts of political economy
2. Analyse the significant developments in the political ideologies
3. Describe the salient features of the constitution of India interpret, integrate and critically
4. Analyse the political economy of Indian international relations and gain knowledge in Judiciary system
5. Apply their knowledge and skills acquired to write various competitive examinations

### M.Tech, II Year 1<sup>st</sup> Semester

## (19EE2021) MACHINE LEARNING TECHNIQUES

### Course Outcomes

Students will be able to

1. Distinguish between, supervised, unsupervised and semi-supervised learning
2. Apply the appropriate machine learning strategy for any given problem
3. Suggest supervised, unsupervised or semi-supervised learning algorithms for any given problem
4. Design systems that use the appropriate graph models of machine learning
5. Modify existing machine learning algorithms to improve classification efficiency

## (19EE2022) STOCHASTIC CONTROL

### Course Outcomes

Students will be able to

1. Apply design Stochastic models for a given system
2. Design Stochastic Stability problems
3. Design linear and non-linear filtering systems

## (19EE2023) COMPUTATIONAL METHODS

### Course Outcomes

Students will be able to

1. Know the concept and steps of problem solving - mathematical modelling, solution and implementation
2. Knowledge and understanding of, and the ability to use, mathematical techniques

3. Understand and apply mathematical reasoning

### **(19HS0824) BUSINESS ANALYTICS**

#### **Course Outcomes:**

Students will be able to:

- Design, device, and query relational databases for operative data.
- Design, implement, populate and query data warehouses for informational data.
- To integrate very large datasets to make business decisions.
- Evaluate the use of data from acquisition through cleansing, warehousing, analytics, and visualization to the ultimate business decision.
- Evaluate the key concepts of business analytics.
- Determine when to implement relational versus document-oriented database structures.

### **(19ME3121) INDUSTRIAL SAFETY**

#### **COURSE OUTCOMES:**

Students undergoing this course are able to

1. Understand the points of factories act 1948 for health and safety.
2. Understand the cost & its relation with replacement economy.
3. Understand the concepts of Wear and Corrosion Prevention
4. Understand the concepts of sequence of fault finding activities
5. Understand the Program and schedule of preventive maintenance of mechanical and electrical equipment.
6. Understand the Periodic Maintenance of Equipments

### **(19ME3021) ADVANCES IN OPERATIONS RESEARCH**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Create mathematical models of the real time situations.
2. Implement Transportation and Assignment problems to solve in real time industry  
3. Choose the best strategy of Game and capable of identifying the suitable queuing theory
4. Enumerate fundamental techniques and apply it to solve various optimization areas
5. Investigate, study, Apply knowledge in Replacement models and
6. Understand the Inventory control Models

### **(19CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**

#### **Course Outcomes:**

Student can access the present value and future value for money

- Student can apply the principals of Benefit & Cost Analysis and
- Break-Even comparison

- Student can calculate the depreciation cost for construction equipment and can estimate the cost for construction equipment
- Can prepare profit and loss, balance sheet etc

### **(19ME3022) COMPOSITE MATERIALS**

#### **COURSE OUTCOMES**

Upon completion of this course, the students will have an overview of

1. Fundamental concept of composite materials.
2. Different types of composite materials.
3. Fabrication and processing of composite materials.
4. MMC & CMC
5. Mechanical behavior of composite materials.
6. Application of composite materials.

### **(19EE2128) WASTE TO ENERGY**

#### **Course Outcomes:**

Students will be able to:

- To study fundamentals of industrial waste conversion devices
- To understand Manufacture of pyrolytic oils and gases, yields and applications
- To understand the Equilibrium and kinetic consideration in gasifier operation
- To understand the Thermochemical conversion

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)  
Masters of Technology  
Power Electronics (M.Tech)  
Department of Electrical and Electronics Engineering (EEE)**

**IM.Tech-I Sem.**

**(19HS0823) RESEARCH METHODOLOGY AND INTELLECTUAL PROPERTY RIGHTS**

**COURSE OUTCOMES**

1. Recognize appropriate research problem, errors in selecting a research problem, Scope and objectives of research problem.
2. Critically assess research methods pertinent to technology innovation research.
3. Identify, explain, compare, and prepare the key elements of a research proposal/report.
4. Skill to understand the need of intellectual property rights, IPR protection to inventors.
5. Develops procedural knowledge to Legal System and solving the problem relating to intellectual property rights for further research work and investment in R&D.

**(19EE2101) ELECTRIC DRIVE SYSTEMS**

**COURSE OUTCOMES:**

Students will be able to:

1. Model and simulate electric drive systems
2. Design modulation strategies of power electronics converters, for drive application
3. Design appropriate current/voltage regulators for electric drives
4. Select and implement the drives for Industrial Process
5. Implement various variable speed drives in Electrical Energy Conversion System

**(19EE2102) MODELING AND ANALYSIS OF  
ELECTRICAL MACHINES**

**COURSE OUTCOMES:**

Students will be able to:

1. Knowledge about the dynamic behavior of rotating machines.
2. Able to understand equivalent circuit of synchronous machines.
3. To understand various practical issues of different machines.

**(19EE2103) ADVANCED POWER ELECTRONIC CIRCUITS**

**COURSE OUTCOMES:**

Students will be able to:

1. Knowledge about analysis and design of Load Commutated CSI and PWM CSI. Learn analysis and design of series Inverters.
2. Acquire knowledge about analysis and design of Switched Mode Rectifiers, APFC.
3. DC-DC converters & Resonant converters

**(19EE2104) OPTIMAL AND ADAPTIVE CONTROL**

**COURSE OUTCOMES:**

Students will be able to:

1. Knowledge in the mathematical area of calculus of variations so as to apply these for solving optimal control problems.
2. Problem formulation, performance measure and mathematical treatment of optimal control problems.
3. Acquire knowledge on solving optimal control design problems by taking into
4. Consideration the physical constraints on practical control systems.
5. To obtain optimal solutions to controller design problem taking into consideration the limitation on control energy in the real practical world.

**(19EE2105) POWER QUALITY**

**COURSE OUTCOMES:**

Students will be able to:

1. Acquire knowledge about the harmonics, harmonic introducing devices and effect of harmonic on system equipment and loads
2. Develop analytical modeling skills needed for modeling and analysis of harmonics in networks and components
3. Introduce the student to active power factor correction based on static VAR compensators and its control techniques
4. Introduce the student to series and shunt active power filtering techniques for harmonics

**(19EE2107) STATIC VAR CONTROLLER AND**

**HARMONIC FILTERING**

**COURSE OUTCOMES**

Students will be able to:

1. Acquire knowledge about the fundamental principles of Passive and Active Reactive Power Compensation
2. Schemes at Transmission and Distribution level in Power Systems.
3. To introduce the student to various single phase and three-phase Static VAR Compensation schemes and their controls
4. To develop analytical modeling skills needed for modeling and analysis of such Static VAR

## **(19EE2108)PWM CONVERTERS AND APPLICATIONS**

### **COURSE OUTCOMES:**

Students will be able to:

1. Knowledge concepts and basic operation of PWM converters, including basic circuit operation and design
2. Learn the steady-state and dynamic analysis of PWM converters along with the applications like solid state drives and power quality
3. Able to recognize and use the following concepts and ideas: Steady-State and transient modelling and analysis of power converters with various PWM techniques.

## **(19EE2109)ENERGY MANAGEMENT**

### **COURSE OUTCOMES**

Students will be able to:

1. Acquire the background required for engineers to meet the role of energy managers and to acquire the skills and techniques required to implement energy management.
2. Identify and quantify the energy intensive business activities in an organization.
3. Knowledge about standard methodologies for measuring energy in the workplace and energy audit instruments.
4. Knowledge about energy efficient motors, load matching and selection of motors.
5. Acquire knowledge about reactive power management, capacitor sizing and degree of compensation.

## **(19HS0818)ENGLISH FOR RESEARCH PAPER WRITING**

### **COURSE OUTCOMES**

1. To recognize and demonstrate the style and conventions of research writing.
2. To improve the clarity and coherence of their written proposal.
3. Able to use a variety of sentence patterns.
4. To enhance their revision and proofreading skills.
5. To use effective strategies and techniques to construct their academic projects.

**IM.Tech – II Sem.**

## **(19EE2112)POWER ELECTRONIC CONVERTERS**

### **COURSE OUTCOMES:**

Students will be able to:

1. To understand the various power semiconductor devices.
2. To know the various conversion techniques of power semiconductor devices and its applications.

## **(19EE2113)DIGITAL CONTROL OF POWER ELECTRONICS AND**

## **DRIVE SYSTEMS**

### **COURSE OUTCOMES:**

Students will be able to:

1. Design static Scherbius and Kramer drives to implement slip power recovery schemes
2. Implement synchronous motor drives with fixed frequency and variable frequency sources
3. Implement speed control schemes for Brushless D.C. motors and Permanent Magnet Synchronous motors

## **(19EE2114) SWITCHED MODE AND RESONANT CONVERTERS**

### **COURSE OUTCOMES:**

1. Acquire knowledge about the principles of operation of non-isolated and isolated hard-switched DC-DC converters
2. Acquire knowledge on various loss components in a switched mode converter and choice of switching frequency with a view towards design of such converters

## **(19EE2115) INDUSTRIAL LOAD MODELLING AND CONTROL**

### **COURSE OUTCOMES:**

Students will be able to:

1. Knowledge about load control techniques in industries and its application.
2. Different types of industrial processes and optimize the process using tools like LINGO and LINGO.
3. Apply load management to reduce demand of electricity during peak time.
4. Apply different energy saving opportunities in industries

## **(19EE2116) ADVANCED DIGITAL SIGNAL PROCESSING**

### **COURSE OUTCOMES :**

Students will be able to:

1. Knowledge about the time domain and frequency domain representations as well as analysis of discrete time signals and systems.
2. Study the design techniques for IIR and FIR filters and their realization structures.
3. Acquire knowledge about the finite word length effects in implementation of digital filters.
4. Knowledge about the various linear signal models and estimation of power spectrum of stationary random.

## **(19EE2117) ADVANCED MICRO-CONTROLLER BASED SYSTEMS**

### **COURSE OUTCOMES**

Students will be able to:



1. To learn how to program a processor in assembly language and develop an advanced processor based system.
2. To learn configuring and using different peripherals in a digital system.
3. To compile and debug a Program.
4. To generate an executable file and use it.

**(19EE2118) DISTRIBUTED GENERATION**

**COURSE OUTCOMES**

Students will be able to:

1. To understand the planning and operational issues related to Distributed Generation.
2. Acquire Knowledge about Distributed Generation Learn Micro-Grids.

**(19EE2119) SMART GRIDS**

**COURSE OUTCOMES:**

Students will be able to:

1. Appreciate the difference between smart grid & conventional grid.
2. Apply smart metering concepts to industrial and commercial installations.
3. Formulate solutions in the areas of smart substations, distributed generation and wide area measurements.
4. Come up with smart grid solutions using modern communication technologies.

**(19HS0829) CONSTITUTION OF INDIA**

**COURSE OUTCOMES**

1. Explain the key concepts of political economy
2. Analyse the significant developments in the political ideologies
3. Describe the salient features of the constitution of India interpret, integrate and critically
4. Analyse the political economy of Indian international relations and gain knowledge in Judiciary system
5. Apply their knowledge and skills acquired to write various competitive examinations

**IIM.Tech – I Sem.**

**(19EE2123) SCADA SYSTEM AND APPLICATIONS**

**Course Outcomes**

Students will be able to:

- Describe the basic tasks of Supervisory Control Systems (SCADA) as well as their typical applications.
- Acquire knowledge about SCADA architecture, various advantages and disadvantages of each system.
- Knowledge about single unified standard architecture IEC 61850.
- To learn about SCADA system components: remote terminal units, PLCs, intelligent electronic devices, HMI systems, SCADA server.
- Learn and understand about SCADA applications in

transmission and distribution sector, industries etc.

#### **(19EE2124)FACTSANDCUSTOMPOWERDEVICES**

##### **CourseOutcomes:**

Students will be able to:

- Acquire knowledge about the fundamental principles of Passive and Active Reactive Power Compensation Schemes at Transmission and Distribution level in Power Systems.
- Learn various Static VAR Compensation Schemes like Thyristor/GTO Controlled.
- Reactive Power Systems, PWM Inverter based Reactive Power Systems and their controls.
- To develop analytical modeling skills needed for modeling and analysis of such Static VAR Systems

#### **(19EE2125)HVDC TRANSMISSION SYSTEMS**

##### **CourseOutcomes:**

Students will be able to:

- Choose intelligently AC and DC transmission systems for the dedicated application(s).
- Identify the suitable two-level/multilevel configuration for high power converters.
- Select the suitable protection method for various converter faults.

#### **(19HS0824)BUSINESSANALYTICS**

##### **CourseOutcomes:**

Students will be able to:

- Design, device, and query relational databases for operative data.
- Design, implement, populate and query data warehouses for informational data.
- To integrate very large datasets to make business decisions.
- Evaluate the use of data from acquisition through cleansing, warehousing, analytics, and visualization to the ultimate business decision.
- Evaluate the key concepts of business analytics.
- Determine when to implement relational versus document oriented database structures.

#### **(19ME3121)INDUSTRIALSAFETY**

##### **COURSE OUTCOMES:**

Students undergoing this course are able to

1. Understand the points of factories act 1948 for health and safety.
2. Understand the cost & its relation with replacement economy.
3. Understand the concepts of Wear and Corrosion Prevention
4. Understand the concepts of sequence of fault finding activities
5. Understand the Program and schedule of preventive maintenance of mechanical and electric equipment.
6. Understand the Periodic Maintenance of Equipments

## **(19ME3021)ADVANCESINOPERATIONSRESEARCH**

### **COURSEOUTCOMES**

On successful Completion of this course the student will be able to

1. Create mathematical models of real time situations.
2. Implement Transportation and Assignment problems to solve in real time industry  
3 choose the best strategy of Game and capable of identifying the suitable queuing theory
4. Enumerate fundamental techniques and apply it to solve various optimization areas
5. Investigate, study, Apply knowledge in Replacement models and
6. Understand the Inventory control Models

## **(19CE1028)COSTMANAGEMENTOFENGINEERINGPROJECTS**

### **COURSEOUTCOMES**

Student can access the present value and future value for money

- Student can apply the principals of Benefit & Cost Analysis and
- Break-Even comparison
- Student can calculate the depreciation cost for construction equipment and can estimate the cost for construction equipment
- Can prepare profit and loss, balance sheet etc

## **(19ME3123)COMPOSITE MATERIALS**

### **COURSEOUTCOMES**

Upon completion of this course, the students will have an overview of

1. Fundamental concept of composite materials.
2. Different types of composite materials.
3. Fabrication and processing of composite materials.
4. MMC & CMC
5. Mechanical behavior of composite materials.
6. Application of composite materials.

## **(19EE2128)WASTE TO ENERGY**

### **COURSEOUTCOMES:**

Students will be able to:

- To study fundamentals of industrial waste conversion devices
- To understand Manufacture of pyrolytic oils and gases, yields and applications
- To understand the Equilibrium and kinetic consideration in gasifier operation
- To understand the Thermochemical conversion

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**M.Tech (Thermal Engineering)**

**Department of Mechanical Engineering**

**M. Tech. – I Semester (T.E)**

**( 19HS0823) RESEARCH METHODOLOGY AND IPR**

**COURSE OUTCOMES**

1. Recognize appropriate research problem, errors in selecting a research problem, Scope and objectives of research
2. Critically assess research methods pertinent to technology innovation research
3. Identify, explain, compare, and prepare the key elements of a research proposal/report
4. Skill to understand the need of intellectual property rights, IPR protection to inventors
5. Develop procedural knowledge to Legal System and solving the problem relating to intellectual property rights for further research work and investment in R & D

**(19ME3101) THERMODYNAMICS AND COMBUSTION**

**COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the concepts of transient flow analysis and real gas mixture
2. Describe the concepts of Chemical composition
3. Have a broad knowledge on chemical equilibrium
4. Have a broad knowledge on the concepts of Nerst heat theorem
- 5 Identify the applications of the fuel cells and magneto hydro dynamic generators.

**(19ME3102) ADVANCED FLUID DYNAMICS**

**COURSE OUTCOMES**

Students undergoing this course

1. Knows about the governing equations in fluid dynamics. □
2. Be familiar with the concepts of potential and internal flows. □
3. Gains Knowledge on concepts of laminar boundary layers □
4. Understands the Characteristics and governing equations of turbulent flow.
5. Demonstrate the data analysis of fluids and design of experiments.

**( 19ME3112) NUCLEAR ENGINEERING**

**COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the power from fission and conversion and breeding.
2. Understand the concepts of criticality of thermal reactors.
3. Understand the concepts of solutions for simple cases of reactivity additions
4. Understand the Reactor safety philosophy and radiation protection standards
5. Understand the hear extraction method from reactor and safety precaution

### **( 19ME3113) ENERGY CONSERVATION AND MANAGEMENT**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the Initiating, Organizing and Managing, Energy Management Programs
2. Understand the concepts critical assessment of energy usage and Importance of energy management
3. Understand the concepts of Energy auditing.
4. Understand the relevant international standards and laws.
5. Understand the Planning and future strategy

### **( 19ME3122) ENERGY MANAGEMENT IN THERMAL SYSTEMS**

#### **COURSE OUTCOMES**

1. Students get an overview of energy, its importance and conservation
2. Students can audit the power plants with its parameters
3. Students understood the usage of energy in various thermal utilities
4. Students are aware of energy transmission and its protection
5. Students know about financial analysis techniques for energy utilities

### **(19ME3114) AIR-CONDITIONING SYSTEM DESIGN**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

- Understand the Parameters influencing the Effective Temperature.
- Understand the concepts summer, winter and year round air – conditioning systems.
- Understand the terms used in Air-Conditioning
- Understand the concepts of Humidification and dehumidification equipment.
- Understand the Design conditions and load calculation

### **( 19ME3115) JET PROPULSION AND ROCKETRY**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the improvement and applications of Jet Propulsion
- Understand the concepts practical air cooled blades Combustion Systems
  - Understand the concepts of thermodynamic flow analysis of Jet Propulsion
  - Understand the environmental considerations and applications of Solid propellant.
  - Understand the environmental considerations and applications of Liquid propellant.

### **( 19ME3123) FUELS AND COMBUSTION**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Demonstrate the different Characterizations of fuels.
2. Describe the various properties of different solid & liquid fuels used in combustion
3. Have a broad knowledge on different types of gaseous fuels and their applications
4. Differentiate between different types of combustion process used in Industrial Application
5. Identify the applications of different types of combustion equipment used in coal burning.

### **( 19ME3103) THERMAL ENGINEERING LAB**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Demonstrate the Performance of Heat Exchangers & Flame propagation analysis of Gaseous fuel.
2. Describe the Heat Balance sheet of an Engine
3. Have a broad knowledge on VCR engine
4. Differentiate between the performance analysis of Heat Pipe and Air conditioning unit
5. Identify the applications of solar flat plate collector.

#### **(19ME3104) COMPUTER AIDED ANALYSIS LAB**

##### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the Analysis of a truss member under loading.
2. Understand the concepts Analysis of Tapered plate under transverse load.
3. Understand the concepts of the flow of incompressible gas through an S-bend for laminar flow.
4. Understand the air flow over a simple geometry (aero foil) in a wind.
5. Analyze the given problem by applying basic principle to solve and demonstrate 1D and 2D heat transfer with conduction and convection boundary conditions.

#### **(19HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

##### **COURSE OUTCOMES**

1. To recognize and demonstrate the style and conventions of research writing.
2. To improve the clarity and coherence of their written proposal.
3. Able to use a variety of sentence patterns.
4. To enhance their revision and proofreading skills.
5. To use effective strategies and techniques to construct their academic projects.

#### **(19ME3105) ADVANCED HEAT TRANSFER**

##### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Describe the various modes of heat transfer.
2. Differentiate between different flow process of forced and free convection
3. Have a broad knowledge on Pool Boiling and Nusselt's theory
4. Differentiate between LMTD and NTU Methods
5. Have a broad knowledge on the Radiant heat exchange in grey, non-grey bodies

#### **(19ME3106) STEAM ENGINEERING**

##### **COURSE OUTCOMES**

Students undergoing this course are able to

1. Understand the combustion in boilers and flame temperature.
2. Understand the heat savings and application criteria
3. Understand the performance evaluation of accessories
4. Understand about conservation and waste minimization.
5. Understand the control and monitoring devices of boiler

#### **(19ME3116) REFRIGERATION AND CRYOGENICS**

##### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the working principle of refrigerator
2. Understand the design, selection of evaporators, condensers, control systems
3. Understand the different types of refrigeration systems.
4. Understand the concept of insulation.
5. Understand the concept of cryogenic system

#### **( 19ME3117 ) DESIGN OF HEAT EXCHANGERS**

##### **COURSE OUTCOMES**

Students undergoing this course

1. Learns about the various classifications of heat exchangers.
2. Understands the Design methodology and fouling factors of heat exchangers.
3. Knows about Double pipe Heat Exchangers.
4. Understand the concepts of design of Compact & Shell and Tube heat exchangers
5. Gains Knowledge on Mechanical Design of Heat Exchangers.

#### **( 19ME3124) CRYOGENIC ENGINEERING**

##### **COURSE OUTCOMES**

On completion of this course the student will be able

1. To have through knowledge on material properties for cryogenic applications
2. To know about the liquefaction of cryogenic fluids and its applications
3. To disseminate the methods of separation of cryogenic gases and purification
4. To understand the working of cryogenic refrigerators and its classification
5. To identify the methods of handling cryogenic fluids with insulations and instrumentation

#### **( 19ME3118) COMPUTATIONAL FLUID DYNAMICS**

##### **COURSE OUTCOMES**

Students undergoing this course are able to Understand

1. The experimental and hyperbolic equations.
2. The FDM, FVM Methodology and finite volume methods.
3. The flow domains, mesh and their importance.
4. The Diffusion Equation, Convection Equation.
5. The Staggered & Non Staggered Grid Systems.

#### **(19ME3119) MODELLING OF I.C ENGINES**

##### **COURSE OUTCOMES**

Students undergoing this course are able to

1. Understand the approaches of modeling, model building and integration methods
2. Understands the thermodynamic models of CI engines.
3. Understand the concept fuel spray behavior, turbulent interactions.
4. Understand the Mathematical models of SI Engines
5. Understand the modelling of charging systems.

#### **(19ME3125) INSTRUMENTATION FOR THERMAL ENGINEERING**

##### **COURSE OUTCOMES**

1. Student gets knowledge on characteristics of instruments and measuring instruments
2. The students acquire knowledge on microprocessor and element of micro computer
3. Students get knowledge on Measurement of Physical Quantities instruments
4. The Students are able to measure the advance technique instruments

5. The Students are acquire knowledge on Measurement analyzers

### **(19ME3107) COMPUTATIONAL FLUID DYNAMICS LAB**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Understand the experimental and hyperbolic equations.
2. Understand the geometry modeling and Grid Generation.
3. Understand the methodology of computational fluid dynamics.
4. Understand both flow physics and mathematical properties of governing N-S equations and define proper boundary conditions for solution.
5. Use CFD software to model relevant engineering flow problems and analyze the CFD results.

### **(19ME3108) THERMAL ENGINEERING VIRTUAL LAB**

#### **COURSE OUTCOMES**

Student undergoing this course

1. Understands Rise of Taylor Bubble, Gas-Liquid Two-Phase Flow, and Evaporation Loss.
2. Learns about Characteristics of an Air Lift Pump, Conductivity Probes and Signals in Two-Phase Flow, Bubble Generation, Growth and Departure.
3. Gains Knowledge on Steam Condensation, Two phase flow in a natural circulation loop and PV Diagram, load test, Torque crank angle curve on S.I engine.
4. Understands about the determination of cylinder Mean Effective Pressure and vibration analysis.
5. Knows about the variation of exhaust noise and torsional vibration of an engine.

### **(19HS0829) CONSTITUTION OF INDIA**

#### **COURSE OUTCOMES**

1. Explain the key concepts of political economy
2. Analyse the significant developments in the political ideologies
3. Describe the salient features of the constitution of India interpret, integrate and critically
4. Analyse the political economy of Indian international relations and gain knowledge in Judiciary system
5. Apply their knowledge and skills acquired to write various competitive examinations

### **(19ME3120) DESIGN OF SOLAR AND WIND SYSTEMS**

#### **COURSE OUTCOMES**

On successful completion of the course the student will be able to

1. Explain the Solar radiation estimation and measurement, solar energy

collectors

2. Describe the Concept of Nuclear reactor, nuclear waste disposal
3. Classify the Methods of wind energy conversion systems and Geothermal Energy
4. Express the Production, storage methods of Hydrogen
5. Describe the Direct energy conversion methods.
6. Importance of Nuclear Waste Disposal from power plants

### **(19ME3126)FINITE ELEMENT METHODS IN THERMAL ENGINEERING**



### **COURSE OUTCOMES**

On successful completion of the course the Students will be able to

1. Formulate the experimental and basic equations.
2. Describe the problems on bar, analysis of beams and frames.
3. Discuss the boundary layer condition and Numerical integration.
4. Explain the Generalist heat conduction equation.
5. Illustrate the processes mesh generation, boundary conditions.
6. Analyze the Analysis of Frames & Beams

### **(19ME3127) THERMAL MEASUREMENTS AND PROCESS CONTROLS**

### **COURSE OUTCOMES**

Upon completion of the course the Students will be able to

1. Understand the basic Instruments and general concepts.
2. Describe the working of different Pressure Measurement Instruments.
3. Illustrate different working of Flow measurement
4. Discuss about the Generalist Temperature Measurement Instruments.
5. Differentiate the difference of Velocity and density Measurement.
6. Describe the working of water level measuring Instruments

### **(19HS0824) BUSINESS ANALYTICS**

### **COURSE OUTCOMES**

On successful completion of course student will be able to

1. Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.
2. Design alternatives to solve business problems utilizing quantitative analysis, critical thinking and sound ethical decision making.
3. Summarize, process and transform data for obtaining meaningful conclusions
4. Interpret data using latest data analytics tools to address organizational problems
5. Organize and critically apply the concepts and methods of business analytics
6. Assess decision problems and build models for creating solutions using business analytical tools.

### **(19CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**

### **COURSE OUTCOMES**

On successful completion of the course, the student should be able to

1. Summarize the concept of strategic cost management, strategic cost analysis – Target costing, life cycle costing and Kaizen costing and the cost drive concept.
2. Describe the decision-making; relevant cost, differential cost, incremental cost and opportunity cost, objectives of a costing system.
3. Summarize the meaning and different types of project management and project execution, detailed engineering activities.
4. Understand the project contracts

5. Describe the cost behavior and profit planning types and contents, Bar charts and Network diagram.

6. Analyze by using quantitative techniques for cost management like PERT/CPM  
**(19EE2128) WASTE TO ENERGY**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Analyze agro based, forest residue and industrial waste conversion processes.
2. Describe the Manufacture of Pyrolytic oils and gases
3. Discuss about the methods of Manufacture of charcoal and its applications
4. Understand various types of gasifiers operation
5. Understand inclined and fluidized bed combustors operation
6. Understand types of biogas plants and biomass energy programme

### **(19ME3121) INDUSTRIAL SAFETY**

### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Explain the Points of factories act 1948 for health and safety.
2. Define the term Cost & its relation with replacement economy.
3. Recognize the Concept of Wear, Corrosion and its Prevention methods
4. Understand the Concept of sequence of fault finding activities and the importance of decision tree
5. Elaborate the importance of scheduled preventive maintenance of mechanical and electrical equipment.
6. Distinguish between Periodic and Preventive maintenance of equipments

### **(19ME3021) ADVANCES IN OPERATIONS RESEARCH**

### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Create mathematical models of the real time situations.
2. Implement Transportation and Assignment problems to solve in real time industry
3. Choose the best strategy of Game and capable of identifying the suitable queuing Theory
4. Enumerate fundamental techniques and apply it to solve various optimization

areas

5. Investigate, study, Apply knowledge in Replacement models and Inventory Control Models
6. Understand the Inventory control Models

### **(19ME3022) COMPOSITE MATERIALS**

### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Explain the Fundamental concept of composite materials.
2. Classify different types of composite materials.
3. Describe the Fabrication and processing of composite materials.

4. Illustrate the Methods of preparation of Metal matrix Composites and polymer matrix composites
5. Discuss about the Mechanical behavior of composite materials.
6. Explain the application of composite materials.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Computer Aided Design and Manufacturing**

**M. Tech. – I Semester (CAD&M)**

**(18HS0845) Computational Methods**

**Course Outcomes:**

At the end of the course student would demonstrate competence with understanding the theoretical and practical aspects of the use of computational methods. They would be able to establish the limitations, advantages, and disadvantages of different computational methods. Further, they would be able to implement computational methods for solving various engineering problems.

**(18ME3001) Computer Integrated Manufacturing**

**Course Outcome:**

The students will be able to:

- Solve the design problems of different type of transfer mechanism.
- perform design and analysis of automatic storage and retrieval system.
- evaluate the space requirements of different storage system.

**(18ME3011) Geometric Modeling**

**Course Outcomes:**

At the end of the course, the student will:

- understand the need for, and the different applications of geometric modelling techniques
- understand some of the technical solutions
- be able to reason about the range of solutions to problems involving 3D objects

**(18ME3012) CNC Technology & Programming**

**Course Outcomes:**

The students will be able to:

- Understand fundamentals of NC/CNC
- Learn and Write NC Part Programming
- Learn Tooling for NC/CNC
- Learn Maintenance and Trouble Shooting of CNC Machine Tools

**(18ME3013) Quality Engineering and Manufacturing**

**Course Outcomes:**

- Select and use rational sampling, conduct reliability tests and analyze data.
- Analyze the measurement system.
- Compute process capabilities.
- Understand quality engineering methods and tools.

**(18ME3014) Computer Aided Process Planning**

**Course Outcomes:**

At the end of the course, the student will be able to

- Generate the structure of automated process planning system and uses the principle of generative and retrieval CAPP systems for automation
- Select the manufacturing sequence and explains the reduction of total set up cost for a particular sequence
- Explain the generation of tool path and solve optimization models of machining processes
- Create awareness about the implementation techniques for CAPP

**(18ME3002) Computer Aided Design Lab****(18ME3003) Computer Aided Modeling Lab****(18HS0823) Research Methodology and IPR****Course Outcomes:**

- Understood the Meaning of research problem, Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem.
- Got the knowledge of How to get new ideas.
- Acquired the knowledge of various government and NGO or agencies for Research Funding.

**(18HS0818) English for Research Paper Writing****(18CE1029) Disaster Management****Course Outcomes:**

On completion of the course the students will have knowledge on

- Types of disasters and their effects on environment
- Causes of disasters
- Disaster management through engineering applications

**(18HS0825) Sanskrit for Technical Knowledge****Course Output**

Students will be able to

- Understanding basic Sanskrit language
- Ancient Sanskrit literature about science & technology can be understood
- Being a logical language will help to develop logic in students

**(18HS0826) Value Education****Course outcomes**

- Students will be able to:
- Knowledge of selfdevelopment.
- Learn the importance of Human values.

### **(18ME3004) Finite Element Methods**

#### **Course Outcomes:**

Students undergoing this course are able to

- Use finite element software to stimulate physical behaviors of Mechanical structures.
- Apply FEA principles for components and assembly design.

### **(18ME3005) Rapid Prototyping**

#### **Course Outcome**

- The student will be able to apply solid modeling concepts and techniques in RP
- Analyze and implement the different algorithms associated with STL file errors.
- Able to calculate the layer thickness in different layering techniques and carry out design manipulations for the generation of support structure.
- Able to identify, characterize and select the ideal materials for a given Rapid Prototyping system.

### **(18ME3015) Advances in Manufacturing Technology**

#### **Course Outcome:**

- Define and describe the fundamentals and principals of advanced manufacturing Technology
- Apply relevant theories to solve manufacturing problems
- Explain manufacturing processes via experimental and theoretical analyses
- Relate manufacturing theory to practice through laboratory experiments
- Improve a manufacturing process either working in a team or individually

### **(18ME3016) Advanced Optimization Techniques**

#### **Course Outcome:**

Upon completion of the subject, students will be able to:

- Explain the fundamental knowledge of Linear Programming and Dynamic Programming problems.
- Use classical optimization techniques and numerical methods of optimization.
- Describe the basics of different evolutionary algorithms.
- Enumerate fundamentals of Integer programming technique and apply different techniques to solve various optimization problems arising from engineering areas.

### **(18ME3017) Computer Graphics**

#### **Course Outcome:**

- Learn the principles and commonly used paradigms and techniques of computer graphics.
- Develop a facility with the relevant mathematics of computer graphics.
- Be able to write basic graphics application programs including animation .
- Be able to design programs to display graphic images to given specifications.

### **(18ME3018) Robotics**

#### **Course outcomes:**

- Upon completion of the course, students will be able to understand:
- Importance of robotics in today and future goods production
- Robot configuration and subsystems
- Principles of robot programming and handle with typical robot
- Working of mobile robots

**(18ME3006) Virtual Lab in Manufacturing Engineering**

**(18ME3007) Computer Aided Analysis Lab**

**(18HS0829) Constitution of India**

**(18HS0827) Pedagogy Studies**

**Course Outcomes**

Students will be able to understand:

- What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy

**(18HS0828) Stress Management by Yoga**

**(18HS0819) Personality Development through Life Enlightenment Skills**

**Course Outcomes**

Students will be able to:

- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity.
- Study of Neetishatakam will help in developing versatile personality of students.

**(18ME3019) Mechatronics**

**Course outcomes:**

- Classify various sensors, transducer and actuators according to the applications.
- Explain various system models and controllers.
- Select a controller for a mechanical and Mechatronics system.

**(18ME3020) Mechanics of Composites**

**Course Outcomes:**

- Upon completion of this course, the students will have an overview of the mechanical behavior and application of composite materials

### **(18HS0824) Business Analytics**

#### **Course Outcomes:**

- Design, device, and query relational databases for operative data.
- Design, implement, populate and query data warehouses for informational data.
- To integrate very large data sets to make business decisions.
- Evaluate the use of data from acquisition through cleansing, warehousing, analytics, and visualization to the ultimate business decision.

### **(18ME3121) Industrial Safety**

#### **Course Outcomes:**

Students undergoing this course are able to

- Understand the points of factories act 1948 for health and safety.
- Understand the cost & its relation with replacement economy.
- Understand the concepts of sequence of fault finding activities
- Understand the Program and schedule of preventive maintenance of mechanical and electrical equipment.

### **(18ME3021) Advances in Operations Research**

#### **Course Outcomes:**

Students undergoing this course are able to

- Upon completion of this course, the students can able to use the optimization techniques for use engineering and Business problems

### **(18CE1028) Cost Management of Engineering Projects**

#### **Course Outcomes:**

After completion of this course, the student shall be able to

- Implement generic and special Construction Project Management skills to a higher level
- Understand the special management skills required in multidisciplinary and global Construction Industry
- Integrate and apply theoretical concepts, ideas, tools and techniques to Construction practice.
- Can plan, execute, monitor and control construction projects using Construction Project Management Tools such as CPM & PERT

### **(18ME3022) Composite Materials**

#### **Course Outcomes:**

- Upon completion of this course, the students will have an overview of the mechanical behavior and application of composite materials.

### **(18EE2128) Waste to Energy**

#### **COURSE OUTCOMES**

*On successful completion of the course, the student should be able to*

1. *Summarize the concept of strategic cost management, strategic cost analysis – target*



*costing, life cycle costing and Kaizen costing and the cost drive concept.*

*2. Describe the decision-making; relevant cost, differential cost, incremental cost and*

*opportunity cost, objectives of a costing system.*

*3. Summarize the meaning and different types of project management and project*

*execution, detailed engineering activities.*

*4. Understand the project contracts.*

*5. Describe the cost behavior and profit planning types and contents, Bar charts and*

*Network diagram.*

*6. Analyze by using quantitative techniques for cost management like PERT/CPM.*

### **(19EE2128) WASTE TO ENERGY**

#### **COURSE OUTCOMES**

*On successful completion of this course, the student will be able to*

*1. Analyse agro based, forest residue and industrial waste conversion processes.*

*2. Describe the Manufacture of Pyrolytic oils and gases*

*3. Discuss about the methods of Manufacture of charcoal and its applications*

*4. Understand various types of gasifiers operation*

*5. Understand inclined and fluidized bed combustors operation*

*6. Understand types of biogas plants and biomass energy programme in India*

### **(19ME3121) INDUSTRIAL SAFETY**

#### **COURSE OUTCOMES**

*On successful completion of this course the student will be able to*

*1. Explain the Points of factories act 1948 for health and safety.*

*2. Define the term Cost & its relation with replacement economy.*

*3. Recognize the Concept of Wear, Corrosion and its Prevention methods*

*4. Understand the Concept of sequence of fault finding activities and the importance of decision tree*

*5. Elaborate the importance of scheduled preventive maintenance of mechanical and electrical equipment.*

*6. Distinguish between Periodic and Preventive maintenance of equipments*

### **(19ME3021) ADVANCES IN OPERATIONS RESEARCH**

#### **COURSE OUTCOMES**

*On successful Completion of this course the student will be able to*

*1. Create mathematical models of the real time situations.*

*2. Implement Transportation and Assignment problems to solve in real time industry*

*3. Choose the best strategy of Game and capable of identifying the suitable queuing Theory*

*4. Enumerate fundamental techniques and apply it to solve various optimization*

*areas*

*5. Investigate, study, Apply knowledge in Replacement models and Inventory Control Models*

*6. Understand the Inventory control Models*

## **(19ME3022) COMPOSITE MATERIALS**

### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. *Explain the Fundamental concept of composite materials.*
2. *Classify different types of composite materials.*
3. *Describe the Fabrication and processing of composite materials.*
4. *Illustrate the Methods of preparation of Metal matrix Composites and polymer matrix composites*
5. *Discuss about the Mechanical behavior of composite materials.*
6. *Explain the application of composite materials.*

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
(AUTONOMOUS)

**M.Tech. (Electronics and Communication Engineering)**

**Specialization: Digital Electronics & Communication Systems**

**Regulation-R19**

**I M.Tech. – I Semester**

**(19HS0823) RESEARCH METHODOLOGY AND IPR**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Recognize appropriate research problem, errors in selecting a research problem, Scope and objectives of research*
2. *Critically assess research methods pertinent to technology innovation research*
3. *Identify, explain, compare, and prepare the key elements of a research proposal/report*
4. *Skill to understand the need of intellectual property rights, IPR protection to inventors*
5. *Develop procedural knowledge to Legal System and solving the problem relating to intellectual property rights for further research work and investment in R & D*

**(19EC4001) ADVANCED DIGITAL SYSTEM DESIGN**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Knowledge of digital integrated circuit hardware design.*
2. *Analyze and design combinational and sequential digital circuits.*
3. *Identify the requirements and specifications of the system required for a given application.*
4. *Able to learn the benefits and drawbacks of various design methods.*
5. *Test the performance of combinational and sequential digital circuits.*

**(19EC4002) ADVANCED DIGITAL SIGNAL PROCESSING**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Know the analysis of discrete time signals.*
2. *To study the modern digital signal processing algorithms and applications.*
3. *Have an in-depth knowledge of use of digital systems in real time applications.*
4. *Apply the algorithms for wide area of recent applications in digital signal processing.*
5. *To study the modern filter design and implementation.*

**( 19EC4003) ANTENNA and RADIATING SYSTEMS**  
**(Programme Elective –I)**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Understanding the Basic Principles and Radiation of Antennas.*
2. *Recognizing Fundamental Parameters of Antennas.*
3. *Explain Dipole Antennas, Establish Mathematical Equations for Various Parameters of thin Linear Antenna.*
4. *Understanding the Various Types of Antenna Arrays.*
5. *Design Wire Antennas, Loop Antennas, Reflector Antennas, Lens Antennas, Horn Antennas and Micro Strip Antennas.*

**(19EC4004) DIGITAL COMMUNICATION TECHNIQUES**  
**(Programme Elective –I)**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectral efficiency.*
2. *Perform the time and frequency domain analysis of the signals in a digital communication system.*
3. *Select the blocks in a design of digital communication system.*
4. *Analyze Performance of spread spectrum communication system.*
5. *Analyze Performance of OFDM communication system.*

**(19EC4005) DSP PROCESSORS & ARCHITECTURES**  
**(Programme Elective –I)**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Understand the basics of Digital Signal Processing and transforms.*
2. *Able to distinguish between the architectural features of General purpose processors and DSP processors.*
3. *Understand the architectures of TMS320C54xx devices.*
4. *Able to write simple assembly language programs using instruction set of TMS320C54xx knowledge.*
5. *Can Interface various devices to DSP Processors.*

**(19EC4006) HIGH SPEED NETWORKS**  
**(Programme Elective –II)**

### **COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Gets an in-depth knowledge of High-Speed Networks and TCP/IP protocols.*
2. *Knows about the security and network management.*
3. *Analyze the cause of congestion, traffic slow down and related factors for Quality of Service.*
4. *Understand about ATM and Frame relay.*
5. *Explain the major techniques involved, and networks & systems issues for the design and implementation of High-Speed networks.*

### **(19EC4007) VOICE and DATA NETWORKS**

#### **(Programme Elective – II)**

### **COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Design a voice and data network.*
2. *Understand network terminology and network switching.*
3. *Understand about multiple access protocols.*
4. *Design a network with ip addresses and make subnets of the networks.*
5. *Understand quality of service in packet networks.*

### **(19EC4008) WIRELESS SENSOR NETWORKS**

#### **(Programme Elective – II)**

### **COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Able to understand the basic WSN technology and supporting protocols, with emphasis.*
2. *Able to understand the sensor network hardware and operating systems.*
3. *Able to understand the sensor network protocols and addresses physical layer issues.*
4. *Able to understand and differentiate database management systems, data storage and Query processing.*
5. *Able to design and deploy the sensor networks.*

### **(19EC4009) ADVANCED DIGITAL SIGNAL PROCESSING LAB (Virtual Lab)**

### **COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Understand the handling of discrete/digital signals using MATLAB.*
2. *Understand the basic operations of Signal processing.*
3. *Analyze the spectral parameter of window functions.*

4. *Design IIR, and FIR filters for band pass, band stop, low pass and high pass filters.*
5. *Design the signal processing algorithm using MATLAB & VLAB.*

### **(19EC4010) ADVANCED DIGITAL SYSTEM DESIGN LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Achieve Knowledge and Awareness of various components to design stable analog circuits.*
2. *Represent numbers and perform arithmetic operations.*
3. *Minimize the Boolean expression using Boolean algebra and design it using logic gates*
4. *Analyze and design combinational circuit.*
5. *Design and develop sequential circuits.*
6. *Translate real world problems into digital logic formulations using VHDL.*

### **(19HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

#### **COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *To recognize and demonstrate the style and conventions of research writing.*
2. *To improve the clarity and coherence of their written proposal.*
3. *Able to use a variety of sentence patterns.*
4. *To enhance their revision and proofreading skills.*
5. *To use effective strategies and techniques to construct their academic projects*

### **I M. Tech. – II Sem.**

#### **(19EC4011) WIRELESS COMMUNICATIONS**

##### **COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *To understand the basics of Wireless Communication.*
2. *To motivate the students to pursue research in the area of wireless communication.*
3. *Analyze and design receiver and transmitter diversity techniques.*
4. *Analyze Multiuser Systems, SSMA, CDMA network planning.*
5. *Summarize the principles of MIMO and specifications of communication standards.*

#### **(19EC4012) CODING THEORY & TECHNIQUES**

##### **COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Knowledge of properties and algorithms of linear block codes.*
2. *Apply coding theory and linear algebra in source coding and channel coding.*
3. *Understand various error control encoding and decoding techniques.*
4. *Knowledge of properties and algorithms of cyclic codes and convolution codes.*

5. *Analyze the performance of error control codes.*

**(19EC4109) INTRODUCTION TO IoT**  
**(Programme Elective – III)**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Discuss the world of current technologies.*
2. *Describe the major application areas of IoT.*
3. *Describe about the networking in IoT.*
4. *Apply the concepts of python programming in IoT.*
5. *Design & develop IoT applications using python.*

**(19EC4013) ADAPTIVE SIGNAL PROCESSING**  
**(Programme Elective – III)**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Comprehend adaptive system and functions.*
2. *Understand the design criteria for a linear adaptive processor.*
3. *Develop different adaptive modelling systems.*
4. *Understand the properties of Kalman filtering.*
5. *Understand the properties of Non-Linear Adaptive Filtering.*

**(19EC4014) COGNITIVE RADIO**  
**(Programme Elective – III)**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Demonstrate an understanding on software defined radio architecture and design principles.*
2. *Demonstrate an understanding on cognitive radio components, functions and capabilities.*
3. *Evaluate different spectrum sensing mechanisms in cognitive radio.*
4. *Analyse the spectrum management functions using cognitive radio systems and cognitive radio networks.*
5. *Demonstrate an understanding on cooperative communications.*

**(19EC4015) IMAGE & VIDEO PROCESSING**  
**(Programme Elective – IV)**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Describe and use the principles of digital image and video processing to develop image processing algorithms.*
2. *Implement (for example with MATLAB) and assess the developed image processing algorithms.*
3. *Explain algorithm design choices using the principles of digital image/video processing.*
4. *Develop image processing algorithms for a given practical image/video processing problem.*
5. *Solve more advanced problems in all areas mentioned above*
6. *Identify and explain the challenges, propose possible solutions, and explain the chosen algorithm design.*

**(19EC4016) PATTERN RECOGNITION AND MACHINE LEARNING**  
**(Programme Elective – IV)**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Able to understand the Bayesian approach to pattern recognition.*
2. *Able to Understand Linear Models for Regression and Classification.*
3. *Analyze the performance of neural networks.*
4. *Able to Understand Linear Discriminant Functions for Machine Learning.*
5. *Able to Understand Algorithm Independent Machine Learning.*

**(19EC4017) DETECTION & ESTIMATION OF SIGNALS**  
**(Programme Elective – IV)**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *To enable the students to acquire the fundamental concepts of Signal Detection and Estimation.*
2. *To get familiarize with different Hypotheses in detection and estimation problems*
3. *Use classical and Bayesian approaches to formulate and solve problems for parameter estimation from noisy signals.*
4. *To introduce the methods of Detection and estimation of signals in white and non-white Gaussian noise.*
5. *To enable the students to understand the time varying waveform detection and its estimation.*

**(19EC4018) ADVANCED COMMUNICATIONS LAB (Virtual Lab)**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Understand the concepts behind various digital signaling schemes for fading channels.*



2. *Understand the concept of co-channel interference & Signal to Interference and Noise Ratio.*
3. *Understand the importance of Sectoring & Handoff.*
4. *Understand the impact of shadowing and path loss exponent on boundary coverage probability.*
5. *Understand the various Path losses that occur in real time.*

### **(19EC4019) IMAGE & VIDEO PROCESSING LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Examine various types of images, intensity transformations and applying various filtering techniques.*
2. *Identify the suitable image enhancement and restoration techniques based upon the application.*
3. *Show how higher-level image concepts such as edge detection, segmentation, representation can be implemented and used.*
4. *To manipulate both binary and grayscale digital images using morphological filters and operators to achieve a desired result.*
5. *Apply image processing algorithms in practical applications.*

### **(19HS0829) CONSTITUTION OF INDIA**

#### **COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Explain the key concepts of political economy*
2. *Analyse the significant developments in the political ideologies*
3. *Describe the salient features of the constitution of India interpret, integrate and critically*
4. *Analyse the political economy of Indian international relations and gain knowledge in Judiciary system*
5. *Apply their knowledge and skills acquired to write various competitive examinations*

#### **II M.TechI Sem.**

### **(19EC4021 ) OPTICAL NETWORKS**

#### **(Programme Elective – V)**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Describe the various layers involved in network & Recall basic laws of optical physics.*
2. *Identify the necessity for using couplers and connectors in energy transmission.*

3. *Identify the various multiplexing the techniques.*
4. *Recall basic of multiplexers add/drop.*
5. *Identify different types of protection in SONET/SDH.*
6. *Explain the use of cost tradeoffs & Able to know the overview of access network.*

**(19EC4213) TESTING & TESTABILITY**  
**(Programme Elective – V)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Understand the elementary concepts of Testing and Testability.*
2. *Understand different types of faults associated with logic circuits and types of testing by employing fault models to the logic circuits.*
3. *Get complete knowledge about different methods of simulation and algorithms associated with testing.*
4. *Analyze BIST concepts and design self-test at Board Level.*
5. *Analyze Memory Test Requirements for MBIST and Embedded Core Testing.*
6. *Apply the concepts in testing which can help them design a better yield in IC design.*

**(19EC4022) RF AND MICROWAVE CIRCUIT DESIGN**  
**(Programme Elective – V)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Establish and develop the overall knowledge of RF and microwave circuits and devices and relation between different parameters.*
2. *Design impedance matching network for any transmission line or system and familiarity with passive microwave components.*
3. *Use Smith Chart in RF applications.*
4. *Model and analyze the characteristics of microwave semiconductor diodes and transistors.*
5. *Analyze and find applications and limitations of microwave tube Generators and Amplifiers.*
6. *Evaluate the Performance of RF active circuits through EDA tools.*

**(19HS0824) BUSINESS ANALYTICS**  
**(Open Elective)**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.*

2. Design alternatives to solve business problems utilizing quantitative analysis, critical thinking and sound ethical decision making.
3. Summarize, process and transform data for obtaining meaningful conclusions
4. Interpret data using latest data analytics tools to address organisational problems
5. Organize and critically apply the concepts and methods of business analytics
6. Assess decision problems and build models for creating solutions using business analytical tools.

**(19CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**  
**(Open Elective)**

**COURSE OUTCOMES (COs)**

On successful Completion of this course, the student will be able to

1. *Summarise the concept of strategic cost management, strategic cost analysis – target costing, life cycle costing and Kaizen costing and the cost drive concept.*
2. *Describe the decision-making; relevant cost, differential cost, incremental cost and opportunity cost, objectives of a costing system.*
3. *Summarise the meaning and different types of project management and project execution, detailed engineering activities.*
4. *Understand the project contracts,*
5. *Describe the cost behaviour and profit planning types and contents, Bar charts and Network diagram.*
6. *Analyse by using quantitative techniques for cost management like PERT/CPM.*

**(19EE2128) WASTE TO ENERGY**  
**(Open Elective)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Analyse agro based, forest residue and industrial waste conversion processes.*
2. *Manufacture of Pyrolytic oils and gases*
3. *Manufacture of charcoal, yields and applications*
4. *Understand various types of gasifiers operation*
5. *Understand inclined and fluidized bed combustors operation*
6. *Understand types of biogas plants and biomass energy programme in India*

**(19ME3121) INDUSTRIAL SAFETY**  
**(Open Elective)**

**COURSE OUTCOMES(COs)**

On successful completion of this course, the student will be able to

1. *Explain the Points of factories act 1948 for health and safety.*
2. *Define the term Cost & its relation with replacement economy.*

3. Recognize the Concept of Wear, Corrosion and its Prevention methods
4. Understand the Concept of sequence of fault finding activities and the importance of decision tree
5. *Elaborate the importance of scheduled preventive maintenance of mechanical and electrical equipment.*
6. *Distinguish between Periodic and Preventive maintenance of equipments.*

**(19ME3021) ADVANCES IN OPERATIONS RESEARCH**  
**(Open Elective)**

**COURSE OUTCOMES (COs)**

On successful Completion of this course the student will be able to

1. *Create mathematical models of the real time situations.*
2. *Implement Transportation and Assignment problems to solve in real time industry*
3. *Choose the best strategy of Game and capable of identifying the suitable queuing theory*
4. *Enumerate fundamental techniques and apply it to solve various optimization areas*
5. *Investigate, study, Apply knowledge in Replacement models and*
6. *Understand the Inventory control Models*

**(19ME3022) COMPOSITE MATERIALS**  
**(Open Elective)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Explain the Fundamental concept of composite materials.*
2. *Classify different types of composite materials.*
3. *Describe the Fabrication and processing of composite materials.*
4. *Illustrate the Methods of preparation of Metal matrix Composites and polymer matrix composites*
5. *Discuss about the Mechanical behavior of composite materials.*
6. *Explain the application of composite materials.*

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY :: PUTTUR**

**(AUTONOMOUS)**

**M.Tech. (Electronics and Communication Engineering)**

**Specialization: Embedded Systems**

**Regulation-R19**

## **I M.Tech – I Sem.**

### **(19HS0823) RESEARCH METHODOLOGY AND IPR**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Recognize appropriate research problem, errors in selecting a research problem, Scope and objectives of research*
2. *Critically assess research methods pertinent to technology innovation research*
3. *Identify, explain, compare, and prepare the key elements of a research proposal/report*
4. *Skill to understand the need of intellectual property rights, IPR protection to inventors*
5. *Develop procedural knowledge to Legal System and solving the problem relating to intellectual property rights for further research work and investment in R & D*

### **(19EC4101) EMBEDDED SYSTEM DESIGN**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

7. *Apply and analyse the applications in various processors and domains of embedded system*
8. *Analyse and develop embedded hardware and software development cycles and tools.*
9. *Analyse and understand a microprocessor and core of the embedded system.*
10. *Analyse to understand different concepts of a RTOS, sensors, memory interface, and communication interface.*
11. *Solve real world problems by doing projects using embedded systems.*

### **(19EC4102) SENSORS AND ACTUATORS**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Describe basic laws and phenomena that define behaviour of sensors and actuator.,*
2. *Analyse various premises, approaches, procedures and results related to sensors and actuators.*
3. *Create analytical design and development solutions for sensors and actuator.*
4. *Conduct experiments and measurements in laboratory and on real components, sensors and actuators.*
5. *Describe development and application of sensors and actuators,*
6. *Take part in team work and be able to independently present various professional materials.*

### **(19EC4103) STRUCTURAL DIGITAL SYSTEM DESIGN**

#### **(Programme Elective-I)**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Understand structural functionality of different digital blocks*
2. *Represent their designs in ASM charts*
3. *Realize their designs in ASM charts*
4. *Represent their designs in different modelling styles by using VHDL*
5. *Understand concept of Micro program and issues related to micro programming*

**(19EC4209) FPGA ARCHITECTURES & APPLICATIONS**  
**(Programme Elective-I)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Acquire Knowledge about Various Architectures and Device Technologies Of PLD's*
2. *Comprehend FPGA Architectures.*
3. *Describe FSM and Different FSM Techniques like Petrinets & Different Case Studies.*
4. *Acquire Knowledge on Hot Design Method*
5. *Analyze System Level Design and Their Application for Combinational and Sequential Circuits*

**(19EC4104) REAL TIME OPERATING SYSTEMS**  
**(Programme Elective-I)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Summarize the issues in real time computing*
2. *Explain and give examples of real time operating systems.*
3. *Solve scheduling problems and can apply them in real time applications in industry.*
4. *Design an RTOS and will be able to interpret the feasibility of a task set to accomplish or not.*
5. *Analyse the situation of fault occurrence and will be able to apply solutions accordingly.*

**(19EC4105) EMBEDDED NETWORKING**  
**(Programme Elective-II)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Analyse the use of embedded networks in real time applications.*
2. *Analyse fundamentals of embedded communication protocols.*
3. *Apply the concepts of embedded Ethernet in embedded networking.*
4. *Apply the knowledge of wireless embedded networking in the design of network embedded systems.*

**(19EC4011) WIRELESS COMMUNICATIONS**

**(Programme Elective-II)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *To understand the basics of Wireless Communication.*
2. *To motivate the students to pursue research in the area of wireless communication.*
3. *Analyze and design receiver and transmitter diversity techniques*
4. *Analyze Multiuser Systems, SSMA, CDMA network planning.*
5. *Summarize the principles of MIMO and specifications of communication standards.*

**(19EC4106) INTERNET PROTOCOLS**

**(Programme Elective-II)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Independently understand basic computer network technology.*
2. *Understand and explain Data Communications System and its components.*
3. *Enumerate the layers of the OSI model and TCP/IP.*
4. *Identify the different types of network devices and their functions within a network*
5. *Familiarity with the basic protocols of computer networks, and how they can be used to assist in network design and implementation.*

**(19EC4107) EMBEDDED SYSTEM DESIGN LAB**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Experience with a set of tools for embedded systems programming and debugging.*
2. *Experience with implementing several embedded systems with particular focus on the interaction ARM-926 with RTOS devices.*
3. *Design products using ARM-CORTEX processor and various analog and digital ICs.*

**(19EC4108) STRUCTURAL DIGITAL SYSTEM DESIGN LAB**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Different modeling styles available in VHDL and Verilog and difference between them*
2. *Difference between Verilog and VHDL*
3. *Representation of different digital modules in different modelling styles available in VHDL and Verilog*

## **(19HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

**(Audit Course)**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- 1. Familiarize students with the key concepts of linguistics and develop awareness of the latest trends in language study.*
- 2. Lead to a greater understanding of the human communicative action through an objective study of language.*
- 3. Know and appreciate the location of literature within humanities.*
- 4. Gain knowledge of research methods in literary studies and advanced knowledge of literature in the English language and literary theory.*
- 5. Carry out an independent, limited research project under supervision, in accordance with applicable norms, ideals and conditions for literary research.*
- 6. Improve common and basic scholarly requirements of logical and empirical rigor.*

**I M.Tech – II Sem.**

## **(19EC4109) INTRODUCTION TO IoT**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- 1. Discuss the world of current technologies.*
- 2. Describe the major application areas of IoT.*
- 3. Describe about the networking in IoT.*
- 4. Apply the concepts of python programming in IoT.*
- 5. Design & develop IoT applications using python.*

## **(19EC4110) ADVANCED MICROCONTROLLERS**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- 1. Describe the fundamentals of embedded systems*
- 2. Describe the fundamentals of ARM Processors*
- 3. Apply the knowledge of C & Assembly to program processor*
- 4. Examine the architecture of MSP430 Processor.*
- 5. Design applications based on MSP430 processors*

## **(19EC4111) HARDWARE SOFTWARE CO-DESIGN**



**(Programme Elective-III)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Acquire the knowledge on various models*
2. *Explore the interrelationship between Hardware and software in embedded system*
3. *Acquire the knowledge of firmware development process and tools*
4. *Evaluate the requirements of programming Embedded Systems, related software architectures and tool chain for Embedded Systems.*
5. *Understand validation methods and adaptability*

**(19EC4213) TESTING & TESTABILITY  
(Programme Elective-III)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Understand the elementary concepts of Testing and Testability.*
2. *Understand different types of faults associated with logic circuits and types of testing by employing fault models to the logic circuits.*
3. *Get complete knowledge about different methods of simulation and algorithms associated with testing.*
4. *Analyze BIST concepts and design self-test at Board Level.*
5. *Analyze Memory Test Requirements for MBIST and Embedded Core Testing.*

**(19EC4112) MICRO ELECTROMECHANICAL SYSTEMS  
(Programme Elective-III)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Develop an understanding of microscale physics for use in designing MEMS system applications.*
2. *Understand concepts of basic MEM devices and systems.*
3. *Acquires knowledge on mechanical terms used in MEMS.*
4. *Understand the two terminal MEMS and its characteristics.*
5. *Design digital and analog applications in various silicon-based MEMS structures.*

**(19EC4201) VLSI TECHNOLOGY  
(Programme Elective-IV)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Understands various parameters of MOSFET based logic circuits.*
2. *Draw layout of a given circuit.*
3. *Design and Analyze Combinational and sequential Circuits.*
4. *Floor Planning and Physical Design Flows.*
5. *Familiar with basics of Chip Design*

**(19EC4202) DIGITAL IC DESIGN**  
**(Programme Elective-IV)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Understand Static and dynamic power consumption in Integrated Chips.*
2. *Design CMOS based Combinational circuits and Memory modules.*
3. *Demonstrate the delay and power consumption in BiCMOS circuits.*
4. *Design and Analyse Layout of given circuit interms of various parameters.*
5. *Able to mimic and implement simple subsystems design.*

**(19EC4008) WIRELESS SENSOR NETWORKS**  
**(Programme Elective-IV)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Able to understand the basic WSN technology and supporting protocols, with emphasis.*
2. *Able to understand the sensor network hardware and operating systems.*
3. *Able to understand the sensor network protocols and addresses physical layer issues.*
4. *Able to understand and differentiate database management systems, data storage and Query processing.*
5. *Able to design and deploy the sensor networks.*

**(19EC4113) INTERNET OF THINGS LAB**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Identify the requirements for the real-world problems.*
2. *Conduct a survey of several available literatures in the preferred field of study.*
3. *Study and enhance software/ hardware skills.*
4. *Demonstrate and build the project successfully by hardware requirements, coding, emulating and testing.*
5. *Demonstrate an ability to work in teams and manage the conduct of the research study.*

**(19EC4114) MICROCONTROLLERS & INTERFACING LAB**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Design and Implement basic circuits that are used in embedded systems.*
2. *Develop code using appropriate tools.*
3. *Test the circuit performance with standard benchmark circuits.*
4. *Provide solid foundation on interfacing the external devices to the processor according to the user requirements to create novel products and solutions for the real time problems*

### **(19HS0829) CONSTITUTION OF INDIA**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Explain the key concepts of political economy*
2. *Analyse the significant developments in the political ideologies*
3. *Describe the salient features of the constitution of India interpret, integrate and critically*
4. *Analyse the political economy of Indian international relations and gain knowledge in Judiciary system*
5. *Apply their knowledge and skills acquired to write various competitive examinations*

### **II M.Tech. – I Sem.**

### **(19EC4002) ADVANCED DIGITAL SIGNAL PROCESSING (Common to ES & DECS) (Programme Elective-V)**

### **COURSE OUTCOMES(COs)**

On successful completion of this course, the student will be able to

1. *Analyze the Discrete-time signals*
2. *Understand the digital Signal Processing algorithms and its applications*
3. *Apply the knowledge of usage of Digital systems in real time applications*
4. *Apply the algorithms for recent trend applications in Digital Signal Processing*
5. *Understand the modern filter design and their implementation*
6. *Able to understand the parametric method for estimation of power spectral density*

### **(19EC4116) RADIO FREQUENCY IDENTIFICATION (Programme Elective-V)**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. *Understand the fundamentals of RFID technology.*
2. *Recognize the development history of RFID technology.*

3. *Understand the global privacy policy and regulations of RFID technology.*
4. *Analyze the impact of RFID in various sectors.*
5. *Describe various applications of RFID technology.*
6. *Analyze the implementation of RFID technology in various application areas.*

**(19EC4117) SYSTEM ON CHIP ARCHITECTURE**  
**(Programme Elective-V)**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Design processors keeping area, power and speed as constraints and to Deepen CMOS VLSI design knowledge.*
2. *Design full custom/ semicustom/ standard cells for ASIC.*
3. *Implement both hardware and software solutions, formulate hardware/software tradeoffs, and perform hardware/software codesign.*
4. *Implement network on chip technologies.*
5. *Analyze memories using reconfigurable architectures for rapid prototyping*
6. *Analyze system on chip and board based systems.*

**(19HS0824) BUSINESS ANALYTICS**  
**(Open Elective)**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

7. *Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.*
8. *Design alternatives to solve business problems utilizing quantitative analysis, critical thinking and sound ethical decision making.*
9. *Summarize, process and transform data for obtaining meaningful conclusions*
10. *Interpret data using latest data analytics tools to address organisational problems*
11. *Organize and critically apply the concepts and methods of business analytics*
12. *Assess decision problems and build models for creating solutions using business analytical tools.*

**(19CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**  
**(Open Elective)**

**COURSE OUTCOMES (COs)**

On successful Completion of this course, the student will be able to

7. *Summarise the concept of strategic cost management, strategic cost analysis – target costing, life cycle costing and Kaizen costing and the cost drive concept.*
8. *Describe the decision-making; relevant cost, differential cost, incremental cost and opportunity cost, objectives of a costing system.*

9. Summarise the meaning and different types of project management and project execution, detailed engineering activities.
10. Understand the project contracts,
11. Describe the cost behaviour and profit planning types and contents, Bar charts and Network diagram.
12. Analyse by using quantitative techniques for cost management like PERT/CPM.

**(19EE2128) WASTE TO ENERGY**  
**(Open Elective)**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

7. Analyse agro based, forest residue and industrial waste conversion processes.
8. Manufacture of Pyrolytic oils and gases
9. Manufacture of charcoal, yields and applications
10. Understand various types of gasifiers operation
11. Understand inclined and fluidized bed combustors operation
12. Understand types of biogas plants and biomass energy programme in India

**(19ME3121) INDUSTRIAL SAFETY**  
**(Open Elective)**

**COURSE OUTCOMES(COs)**

On successful completion of this course, the student will be able to

7. Explain the Points of factories act 1948 for health and safety.
8. Define the term Cost & its relation with replacement economy.
9. Recognize the Concept of Wear, Corrosion and its Prevention methods
10. Understand the Concept of sequence of fault finding activities and the importance of decision tree
11. Elaborate the importance of scheduled preventive maintenance of mechanical and electrical equipment.
12. Distinguish between Periodic and Preventive maintenance of equipments.

**(19ME3021) ADVANCES IN OPERATIONS RESEARCH**  
**(Open Elective)**

**COURSE OUTCOMES (COs)**

On successful Completion of this course the student will be able to

1. Create mathematical models of the real time situations.
2. Implement Transportation and Assignment problems to solve in real time industry
3. Choose the best strategy of Game and capable of identifying the suitable queuing theory
4. Enumerate fundamental techniques and apply it to solve various optimization areas

5. Investigate, study, Apply knowledge in Replacement models and
6. Understand the Inventory control Models

### **(19ME3022) COMPOSITE MATERIALS**

**(Open Elective)**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

7. Explain the Fundamental concept of composite materials.
8. Classify different types of composite materials.
9. Describe the Fabrication and processing of composite materials.
10. Illustrate the Methods of preparation of Metal matrix Composites and polymer matrix composites
11. Discuss about the Mechanical behavior of composite materials.
12. Explain the application of composite materials.

## **SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**

**(AUTONOMOUS)**

**M.Tech. (Electronics and Communication Engineering)**

**Specialization: VLSI**

**Regulation-R19**

**I M.Tech. – I Semester**

### **(19HS0823) RESEARCH METHODOLOGY AND IPR**

#### **COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Recognize appropriate research problem, errors in selecting a research problem, Scope and objectives of research*
2. *Critically assess research methods pertinent to technology innovation research*
3. *Identify, explain, compare, and prepare the key elements of a research proposal/report*
4. *Skill to understand the need of intellectual property rights, IPR protection to inventors*
5. *Develop procedural knowledge to Legal System and solving the problem relating to intellectual property rights for further research work and investment in R & D*

### **(18EC4201) VLSI TECHNOLOGY**

#### **COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. *Understands various parameters of MOSFET based logic circuit.*
2. *Draw layout of a given circuit.*
3. *Design and Analyze Combinational and sequential Circuits.*
4. *Floor Planning and Physical Design Flows.*
5. *Familiar with basics of Chip Design.*

### **(18EC4202) DIGITAL IC DESIGN**

#### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *Understand Static and dynamic power consumption in Integrated Chips.*
2. *Design CMOS based Combinational circuits and Memory modules.*
3. *Demonstrate the delay and power consumption in BiCMOS circuits.*
4. *Design and Analyze Layout of given circuit in terms of various parameters.*
5. *Able to mimic and implement simple subsystems design.*

### **(19EC4203) ASIC DESIGN**

#### **(Programme Elective-I)**

#### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *Demonstrate VLSI tool-flow and appreciate FPGA architecture.*
2. *Understand the issues involved in ASIC design, including technology choice, design management, tool-flow, verification, debug and test, as well as the impact of technologyscaling on ASIC design.*
3. *Understand the algorithms used for ASIC construction*
4. *Understand the basics of System on Chip, On chip communication architectures like AMBA, AXI an utilizing Platform based design.*
5. *Appreciate high performance algorithms available for ASICs.*

### **(19EC4204) SYSTEM MODELLING & SIMULATION**

**(Programme Elective-I)**

**COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *Understand the topics in digital logic design.*
2. *Understand modeling and verification with Hardware Description Language.*
3. *Understand the tunning filtering.*
4. *Understand the signals and events.*
5. *Understand the simulation software.*

**(19EC4101) EMBEDDED SYSTEM DESIGN**

**(Programme Elective-I)**

**COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *Apply and analyse the applications in various processors and domains of embedded system*
2. *To Analyse and develop embedded hardware and software development cycles and tools.*
3. *To Analyse and understand a microprocessor and core of the embedded system.*
4. *To Analyse to understand different concepts of a RTOS, sensors, memory interface, and communication interface.*
5. *To solve real world problems by doing projects using embedded systems.*

**(19EC4205) VERILOG HDL**

**(Programme Elective-I)**

**COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *Understand the basic concepts of Verilog HDL and write simple programs.*
2. *Design of Combinational and sequential logic circuits using user defined primitives, data types and operators.*
3. *Design and Simulate circuits using test vectors and to write the programs more effectively to reduce delay using Verilog tasks and directives.*
4. *Analyze Synthesis methodology of combinational and sequential logic and Finite State Machines.*
5. *Analyze MOS and CMOS circuits.*

**(19EC4206) ANALOG IC DESIGN**

**(Programme Elective-II)**

**COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *Analyze the Advanced MOS Modeling concept and also learn the behavior of Current Mirrors.*
2. *Develop mathematical modeling of op-amps.*
3. *Analyze the design of MOS based sample and hold circuits.*



4. Learn the design of data converters (ADC/DAC).
5. Analyze the concept of Over Sampling Converters.

**(19EC4015) IMAGE & VIDEO PROCESSING**  
**(Common to DECS & VLSI)**  
**(Programme Elective-II)**

**COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. Describe and use the principles of digital image and video processing to develop image processing algorithms.
2. Implement (for example with MATLAB) and assess the developed image processing algorithms.
3. Explain algorithm design choices using the principles of digital image/video processing.
4. Develop image processing algorithms for a given practical image/video processing problem.
5. Solve more advanced problems in all areas mentioned above
6. Identify and explain the challenges, propose possible solutions, and explain the chosen algorithm design.

**(19EC4207) DIGITAL ELECTRONIC CIRCUITS LAB (Virtual Lab)**

**COURSE OUTCOMES (COs)**

On Successful Completion of this Course ,the Student will be able to

1. Convert different type of codes and number systems which are used in digital communication and computer systems.
2. Employ the codes and number systems converting circuits and Compare different types of logic families.
3. Analyse different types of digital electronic circuit using various mapping and logical tools.
4. simplified circuit using various mapping and mathematical methods.
5. Design different types of with and without memory element digital electronic circuits for particular operation.

**(19EC4208) DIGITAL IC DESIGN LAB**

**COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

1. Achieve Knowledge and Awareness of various components to design stable analog circuits.
2. Minimize the Boolean expression using Boolean algebra and design it using logic gates
3. Analyse and design combinational circuit.
4. Design and develop sequential circuits
5. Translate real world problems into digital logic formulations using VHDL.

**(19HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *To recognize and demonstrate the style and conventions of research writing.*
2. *To improve the clarity and coherence of their written proposal.*
3. *Able to use a variety of sentence patterns.*
4. *To enhance their revision and proofreading skills.*
5. *To use effective strategies and techniques to construct their academic projects.*

**I M.Tech – II Sem.**

### **(19EC4209) FPGA ARCHITECTURES & APPLICATIONS**

#### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *Acquire Knowledge about Various Architectures and Device Technologies Of PLD's*
2. *Comprehend FPGA Architectures.*
3. *Describe FSM and Different FSM Techniques like Petrinets & Different Case Studies.*
4. *Acquire Knowledge on Hot Design Method*
5. *Analyze System Level Design and Their Application for Combinational and Sequential Circuits*

### **(19EC4210) LOW POWER VLSI DESIGN**

#### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *Analyze the low power MOSFET Device Behavior.*
2. *Analyze Low- Voltage Low Power CMOS /BiCMOS Logic Circuits.*
3. *Analyze and Design the Low Power Latches/Flipflops.*
4. *Learn Special Techniques for Low Power Clocks and Memories.*
5. *Analyze the Advanced Bi- CMOS Digital Circuits at low power.*

### **(19EC4211) NANO ELECTRONICS**

#### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *Able to understand nanoelectronics holds the capacity for mass production of high-Quality nanodevices.*
2. *Able to analyze the scaling of transistors and other devices to smaller and smaller sizes, which has provided the basis for this exponential growth.*
3. *Able to analyze and design different types random access memories.*
4. *Able to analyze different mass storage devices which are useful in electronic gadgets.*

5. Able to know in the near future from photonics, molecular electronics or revolutionary engineering solutions.

### **(19EC4212) ALGORITHMS FOR VLSI DESIGN AUTOMATION**

**(Programme Elective-III)**

#### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *To analyze & design Methodologies, Design Automation Tools and general-purpose methods for combinational optimization.*
2. *To analyze modeling and simulation of digital systems.*
3. *To analyze logic synthesis and verification of digital system's*
4. *To analyze high-level synthesis of digital systems.*
5. *To impart the knowledge about physical design automation of FPGA's and MCM's.*

### **(19EC4001) ADVANCED DIGITAL SYSTEM DESIGN**

**(Common to VLSI & DECS)**

**(Programme Elective-III)**

#### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *To impart the knowledge about Design of digital systems and sequential circuit design*
2. *To impart the knowledge about Fault Modeling, Test Pattern generation and different methods for fault diagnosis of Combinational circuits.*
3. *Analyze D – Algorithm, PODEM, Random testing, Transition Count Testing, Signature Analysis and Testing for bridging faults for Test pattern generation of digital system design.*
4. *Analyze the functionality of sequential circuits using different fault diagnosis & test methods.*
5. *Analyze fault models, diagnosis methods of PLA Design and Asynchronous sequential circuits.*

### **(19EC4213) TESTING & TESTABILITY**

**(Programme Elective-IV)**

#### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *Understand the elementary concepts of Testing and Testability.*
2. *Understand different types of faults associated with logic circuits and types of testing by employing fault models to the logic circuits.*
3. *Get complete knowledge about different methods of simulation and algorithms associated with testing.*
4. *Analyze BIST concepts and design self-test at Board Level.*
5. *Analyze Memory Test Requirements for MBIST and Embedded Core Testing.*

## **(19EC4104) REAL TIME OPERATING SYSTEM**

### **(Programme Elective-IV)**

#### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *Student will be able to summarize the issues in real time computing*
2. *Student will be able to explain and give examples of real time operating systems.*
3. *Student will be able to solve scheduling problems and can apply them in real time applications in industry.*
4. *Student can also design an RTOS and will be able to interpret the feasibility of a task set to accomplish or not.*
5. *Analyze the situation of fault occurrence and will be able to apply solutions accordingly.*

## **(19EC4214) SOLID STATE DEVICE MODELING AND SIMULATION**

### **(Programme Elective-IV)**

#### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *Able to analyze the principles of basic device modeling*
2. *Able to understand the changes introduced in the device models as well as contribute to the development of appropriate device models*
3. *Able to Analyze General Purpose Circuit Simulators*
4. *Able to Analyze mathematical techniques for device simulations*
5. *Able to Analyze Simulation of Semiconductor Devices*

## **(19EC4215) MIXED SIGNAL LAB**

#### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *Model analog circuit with, simulate, synthesis in Micro wind.*
2. *Understand chip level issues and need of testability.*
3. *Design OP-AMP circuits for specified applications*

## **(19EC4216) DIGITAL VLSI DESIGN LAB (VIRTUAL LAB)**

#### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course the Student will be able to

1. *Design and simulate list of combinational and sequential digital circuits using Modelism&Xilinx-VHDL language.*
2. *Understand the static and dynamic characteristics of CMOS Inverter.*
3. *Design and simulate the brawn array multiplier and ALU using Modelsim*

- and Xilinx-Verilog Language.*
4. *Characterize Combinational circuits using Pass Transistor logic*
  5. *Design & Analyse the sequential circuit*
  6. *Design RAM and FSM using Questa software.*

### **(19EC4216) DIGITAL VLSI DESIGN LAB (Virtual Lab)**

#### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course the Student will be able to

1. *Design and simulate list of combinational and sequential digital circuits using Modelism&Xilinx–VHDL language.*
2. *Understand the static and dynamic characteristics of CMOS Inverter.*
3. *Design and simulate the brawn array multiplier and ALU using Modelsim and Xilinx-Verilog Language.*
4. *Characterize Combinational circuits using Pass Transistor logic*
5. *Design & Analyse the sequential circuit*
6. *Design RAM and FSM using Questa software.*

### **(19HS0829) CONSTITUTION OF INDIA**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

6. *Explain the key concepts of political economy*
7. *Analyse the significant developments in the political ideologies*
8. *Describe the salient features of the constitution of India interpret, integrate and critically*
9. *Analyse the political economy of Indian international relations and gain knowledge in Judiciary system*
10. *Apply their knowledge and skills acquired to write various competitive examinations*

#### **II M.Tech.- I Sem.**

### **(19EC4218) SCRIPTING LANGUAGE FOR VLSI DESIGN AUTOMATION (Programme Elective-V)**

#### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course, the Student will be able to

1. *Develop the basic knowledge on data types of Perl*
2. *Design and revision of Perl scripts*
3. *Develop the knowledge of standard input , output and files in programming*
4. *Develop substantial knowledge on Modules and CGI Programming.*
5. *Debug the techniques appropriate for the Perl language*
6. *Compare and contrast different regular expressions using operators and control structures.*

## **(19EC4219) NANO MATERIALS AND NANOTECHNOLOGY**

**(Programme Elective-V)**

### **COURSE OUTCOMES (COs)**

On Successful Completion of this Course the Student will be able to

1. *Define the basic concepts of semiconductor nanostructures.*
2. *Illustrate the various parameters and explain about the characteristics of the magnetic nanostructures.*
3. *Understand the measurements performed for Nano sensors.*
4. *Analyze the different actuators.*
5. *Design the nanoparticles for different application fields based on molecular electronics.*
6. *Design the different nanostructured and nanomaterials for different applications*

## **(19EC4008) WIRELESS SENSOR NETWORKS**

**(Common to VLSI, DECS & ES)**

**(Programme Elective-V)**

### **COURSE OUTCOMES (COS)**

On successful completion of course, the student will be able to

1. *Understand the basic concepts of wireless sensor networks, sensing, computing and communication tasks*
2. *Understand the radio standards and communication protocols adopted in wireless sensor networks*
3. *Describe and explain the hardware, software and communication for wireless sensor network nodes*
4. *Understand the architectures, features, and performance for wireless sensor network systems and platforms*
5. *Describe and analyze the specific requirements of applications in wireless sensor networks for energy efficiency, computing, storage and transmission*
6. *Design and deploy the sensor networks*

## **(19HS0824) BUSINESS ANALYTICS**

**(Open Elective)**

### **COURSE OUTCOMES (COs)**

On successful completion of course, the student will be able to

13. *Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.*
14. *Design alternatives to solve business problems utilizing quantitative analysis, critical thinking and sound ethical decision making.*
15. *Summarize, process and transform data for obtaining meaningful conclusions*
16. *Interpret data using latest data analytics tools to address organisational problems*
17. *Organize and critically apply the concepts and methods of business analytics*

18. Assess decision problems and build models for creating solutions using business analytical tools.

### **(19CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**

**(Open Elective)**

#### **COURSE OUTCOMES (COs)**

On successful Completion of this course, the student will be able to

13. *Summarise the concept of strategic cost management, strategic cost analysis – target costing, life cycle costing and Kaizen costing and the cost drive concept.*
14. *Describe the decision-making; relevant cost, differential cost, incremental cost and opportunity cost, objectives of a costing system.*
15. *Summarise the meaning and different types of project management and project execution, detailed engineering activities.*
16. *Understand the project contracts,*
17. *Describe the cost behaviour and profit planning types and contents, Bar charts and Network diagram.*
18. *Analyse by using quantitative techniques for cost management like PERT/CPM.*

### **(19EE2128) WASTE TO ENERGY**

**(Open Elective)**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

13. *Analyse agro based, forest residue and industrial waste conversion processes.*
14. *Manufacture of Pyrolytic oils and gases*
15. *Manufacture of charcoal, yields and applications*
16. *Understand various types of gasifiers operation*
17. *Understand inclined and fluidized bed combustors operation*
18. *Understand types of biogas plants and biomass energy programme in India*

### **(19ME3121) INDUSTRIAL SAFETY**

**(Open Elective)**

#### **COURSE OUTCOMES(COs)**

On successful completion of this course, the student will be able to

13. *Explain the Points of factories act 1948 for health and safety.*
14. *Define the term Cost & its relation with replacement economy.*
15. *Recognize the Concept of Wear, Corrosion and its Prevention methods*
16. *Understand the Concept of sequence of fault finding activities and the importance of decision tree*
17. *Elaborate the importance of scheduled preventive maintenance of mechanical and electrical equipment.*
18. *Distinguish between Periodic and Preventive maintenance of equipments.*

## **(19ME3021) ADVANCES IN OPERATIONS RESEARCH**

**(Open Elective)**

### **COURSE OUTCOMES (COs)**

On successful Completion of this course the student will be able to

1. *Create mathematical models of the real time situations.*
2. *Implement Transportation and Assignment problems to solve in real time industry*
3. *Choose the best strategy of Game and capable of identifying the suitable queuing theory*
4. *Enumerate fundamental techniques and apply it to solve various optimization areas*
5. *Investigate, study, Apply knowledge in Replacement models and*
6. *Understand the Inventory control Models*

## **(19ME3022) COMPOSITE MATERIALS**

**(Open Elective)**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

13. *Explain the Fundamental concept of composite materials.*
14. *Classify different types of composite materials.*
15. *Describe the Fabrication and processing of composite materials.*
16. *Illustrate the Methods of preparation of Metal matrix Composites and polymer matrix composites*
17. *Discuss about the Mechanical behavior of composite materials.*
18. *Explain the application of composite materials.*



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Master of Technology**

**Department of Computer Science and Engineering**

**I M. Tech – I Sem.(CSE)**

**(19HS0823) RESEARCH METHODOLOGY AND IPR**

**Course Outcomes:**

At the end of this course, students will be able to:

- Recognize appropriate research problem, errors in selecting a research problem, Scope and objectives of research
- Critically assess research methods pertinent to technology innovation research
- Identify, explain, compare, and prepare the key elements of a research proposal/report
- Skill to understand the need of intellectual property rights, IPR protection to inventors
- Develop procedural knowledge to Legal System and solving the problem relating to intellectual property rights for further research work and investment in R& D

**(19HS0841) DISCRETE MATHEMATICS AND APPLICATIONS**

**Course Outcomes:**

After completion of the course, students will be able to:

- Understand the basic notions of discrete and continuous probability.
- Understand the methods of statistical inference and the role that sampling distributions play in those methods.
- Perform correct and meaningful statistical analysis, of simple to moderate complexity.

- Learning various engineering applications in computers.
- Understand the methodology of soft computing and bioinformatics.

### **(19CS5001) ADVANCED DATA STRUCTURES**

#### **Course Outcomes:**

Understand the implementation of symbol table using hashing techniques.

- Develop and analyze algorithms for red-black trees, B-trees and Splay trees.
- Develop algorithms for text processing applications.
- Understand the recent trends in Hashing Technique.
- Understand how to Applying Dynamic Programming to the LCS Problem
- Identify suitable data structures and develop algorithms for computational geometry Problems.

### **(19CS5010) MACHINE LEARNING**

#### **Course Outcomes:**

After completion of course, students would be able to:

- Extract features that can be used for a particular machine learning approach in various IOT Applications.
- Compare and contrast pros and cons of various machine learning techniques and to get an Insight of when to apply a particular machine learning approach.
- Mathematically analyze various machine learning approaches and paradigms.
- Understand the classification methods for IOT applications.
- Understand trends in various learning techniques of machine learning

### **(19CS501) WIRELESS SENSOR NETWORKS**

#### **Course Outcomes:**

After completion of course, students would be able to:

- Describe and explain radio standards and communication protocols for wireless sensor networks.
- Explain the function of the node architecture and use of sensors for various applications.
- Be familiar with architectures, functions and performance of wireless sensor networks systems and platforms.
- Be familiar with MAC Protocol Analysis.
- Describe the security system in wireless sensor networks.

### **(19CS5012) INTRODUCTION TO INTELLIGENT SYSTEMS**

#### **Course Outcomes:**

- Able to demonstrate knowledge of the fundamental principles of intelligent systems and would be able to analyse and compare the relative merits of a variety of AI problem solving techniques.
- Able to understand Biological foundations to intelligent systems.
- Able to demonstrate Knowledge of genetic algorithm.
- Understand Learning Techniques on uncertainty reasoning.
- A study of different learning and evolutionary algorithms.

### **(19CS5013) DATA SCIENCEII**

#### **Course Outcomes:**

- Explain how data is collected, managed and stored for data science;
- Understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists;
- Implement data collection and management scripts using Mongo DB
- Understand the different type of Data visualization tools.
- Understand the different application of Data Science.

### **(19CS5014) DISTRIBUTED SYSTEMS**

#### **Course Outcomes:**

- Able to demonstrate knowledge of the basic elements and concepts related to distributed system technologies;
- Able to demonstrate knowledge of the core architectural aspects of distributed systems;
- Able to design and implement distributed applications;
- Able to demonstrate knowledge of details the main underlying components of distributed systems (such as RPC, file systems);
- Able to use and apply important methods in distributed systems to support scalability and fault tolerance;
- Able to demonstrate experience in building large-scale distributed applications.

### **(19CS5015) ADVANCED WIRELESS AND MOBILE NETWORKS**

#### **Course Outcomes:**

After completion of course, students would be:

- Demonstrate advanced knowledge of networking and wireless networking and understand various types of wireless networks, standards, operations and use cases.
- Be able to design WLAN, WPAN, WWAN, Cellular based upon underlying propagation and performance analysis.
- Demonstrate knowledge of protocols used in wireless networks and learn simulating wireless networks.

- Design wireless networks exploring trade-offs between wire line and wireless links. Develop mobile applications to solve some of the real world problems.
- Able to understand Security in wireless Networks.

### **(19CS5002) ADVANCED DATA STRUCTURE S LAB**

#### **Course Outcomes:**

Understand the implementation of symbol table using hashing techniques.

- Develop and analyze algorithms for red-black trees, B-trees and Splay trees.
- Develop algorithms for text processing applications.
- Develop the recent trends in Hashing Technique.
- Identify suitable data structures and develop algorithms for computational geometry Problems.
- Implement various sorting, and graph traversal techniques.

### **(19CS5016) MACHINE LEARNING LAB**

#### **Course Outcomes:**

After completion of course, students would be able to:

- Experiment the features that can be used for a particular machine learning approach in various IOT Applications.
- Implement various machine learning approaches and paradigms.
- Implement the classification methods for IOT applications.
- Implement the trends in various learning techniques of machine learning

### **(19HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

#### **Course Outcomes:**

Students will be able to:

- Apply improved writing skills and level of readability.
- Understand what to write in each section.
- Understand the skills needed when writing a Title.
- Draft good quality of paper at very first-time submission.

### **I M. Tech – II Sem.(CSE)**

### **(19CS5003) ADVANCED ALGORITHMS**

#### **Course Outcomes:**

After completion of course, students would be able to:

- Analyze the complexity/performance of different algorithms.
- Determine the appropriate data structure for solving a particular set of problems.

- Categorize the different problems in various classes according to their complexity.
- Students should have an insight of recent activities in the field of the advanced data structure.

#### **(19CS5004) SOFT COMPUTING COURSE OUTCOMES:**

##### **Course Outcomes:**

After completion of course, students would be able to:

- Identify and describe soft computing techniques and their roles in building intelligent machines
- Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.
- Apply genetic algorithms to combinatorial optimization problems.
- Evaluate and compare solutions by various soft computing approaches for a given problem
- Apply Machine Learning Approach to Knowledge Acquisition

#### **(19CS5017) DATA PREPARATION AND ANALYSIS**

##### **Course Outcomes:**

After completion of course, students would be:

- Able to extract the data for performing the Analysis.
- Able to understand different technique used in data cleaning
- Able to understand design visualization.
- Learning various interactive methods.
- Learning Ethics in Profession

#### **(19CS5018) SECURE SOFTWARE DESIGN & ENTERPRISE COMPUTING**

##### **Course Outcomes:**

After completion of course, students would be:

- Learning the concepts in parallel programming, implementation of programs on GPUs, debugging and profiling parallel programs.
- Understand the different memory hierarchy of the system.
- Understand the concept of synchronization across CPU and GPU
- Learning various performance aspects and profiling tools.
- Case study on Image Processing, Graph algorithms, Simulations, Deep Learning & advance topic.

#### **(19CS5019) COMPUTER VISION**

##### **Course Outcomes:**

After completion of course, students would be able to:

- Developed the practical skills necessary to build computer vision applications.
- To have gained exposure to object and scene recognition and categorization from images.
- Understand different techniques used for edge detections and corner detection.
- Understanding the concept of pattern analysis and data processing.
- Develop and learning the classifiers and distinct models.

### **(19CS5020) HUMAN AND COMPUTER INTERACTION**

#### **Course Outcomes:**

After completion of course, students would be

- Understand the structure of models and theories of human computer interaction and vision.
- Design an interactive web interface on the basis of models studied.
- Understand various social Organizational issues.
- Learning and understanding various frameworks and develop the mobile applications.
- Understanding the web interfaced and learning the recent trends.

### **(19CS5021) GPU COMPUTING**

#### **Course Outcomes:**

After completion of course, students would be:

- Understanding of GPU architecture and APIs (OpenGL, GLSL, CUDA) with important practical applications.
- Understanding of both the traditional use of GPUs for rendering graphics, as well as the use of GPUs for general purpose computations (GPGPU), or GPU Computing.
- Understanding of parallel computations, memory subsystems and caches, texture mapping
- Understanding of System Issues in GPU
- Understanding of 3D computer graphics and mathematics related to GPU

### **(19CS5022) DIGITAL FORENSICS**

#### **Course Outcomes:**

After completion of course, students would be able to:

- Understand relevant legislation and codes of ethics.
- Computer forensics and digital detective and various processes, policies and procedures.
- E-discovery, guidelines and standards, E-evidence, tools and environment.
- Email and web forensics and network forensics
- Understand the awareness of legal aspects of forensics

### **(19CS5005) ADVANCED ALGORITHMS LAB**

#### **Course Outcomes:**

At the end of the course, Students are able to implement

- Different Sorting Techniques.
- 2. Graphs and its traversals.
- 3. Dynamic programming, Travelling sales person problem
- 4. Back tracking.

### **(19CS5006) SOFT COMPUTING LAB**

#### **Course Outcomes:**

At the end of the course, the students able to do the following:

- Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.
- Apply genetic algorithms to combinatorial optimization problems.
- Evaluate and compare solutions by various soft computing approaches for a given problem

### **(19CS5007) MINI PROJECT**

### **(19HS0816) CONSTITUTION OF INDIA**

#### **Course Outcomes:**

Students will be able to:

- Explain the key concepts of political economy.
- Analyse the significant developments in the political ideologies.
- Describe the salient features of the constitution of India interpret, integrate and critically.
- Analyse the political economy of Indian international relations and gain knowledge in Judiciary system.
- Apply their knowledge and skills acquired to write civil service examinations

### **II M. Tech – I Sem.(CSE)**

### **(19CS5023) BIG DATA ANALYTICS**

#### **Course Outcomes:**

On successful completion of the course students will be able to

- Understand how to leverage the insights from big data analytics
- Analyze data by utilizing various statistical and data mining approaches
- Perform analytics on real-time streaming data
- Develop Real Time Analytics Platform (RTAP) Applications
- Understand the various NoSql alternative database models

- Able to gain knowledge on Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data analytics

### **(19CS5024) DISTRIBUTED DATABASES**

#### **Course Outcomes:**

On successful completion of the course students will be able to

- Understand the Features of Distributed versus Centralized Databases
- Gain knowledge on Equivalence Transformations for Queries
- Understand Foundations of Distributed Concurrency Control and Distributed Deadlocks
- Understand Distributed object database management systems and Distributed Object Storage
- Understand Parallel Database Systems
- Performance Evaluation over the types of database available

### **(19CS5025) ADVANCED OPERATING SYSTEMS**

#### **Course Outcomes:**

On successful completion of the course students will be able to

- Discuss the various synchronization, scheduling and memory management issues
- Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of distributed operating system
- Discuss the various resource management techniques for distributed systems
- Identify the different features of real time and mobile operating systems
- Install and use available open source kernel
- Modify existing open source kernels in terms of functionality or features used

### **(19HS0824) BUSINESS ANALYTICS**

#### **Course Outcomes:**

On successful completion of the course students will be able to

- Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.
- Design alternatives to solve business problems utilizing quantitative analysis, critical thinking and sound ethical decision making.
- Summarize, process and transform data for obtaining meaningful conclusions
- Interpret data using latest data analytics tools to address organisational problems
- Organize and critically apply the concepts and methods of business analytics
- Assess decision problems and build models for creating solutions using business analytical tools.



### **(19ME3121) INDUSTRIAL SAFETY**

#### **Course Outcomes:**

Students undergoing this course are able to

- Understand the points of factories act 1948 for health and safety.
- Understand the cost & its relation with replacement economy.
- Understand the concepts of Wear and Corrosion Prevention
- Understand the concepts of sequence of fault finding activities
- Understand the Program and schedule of preventive maintenance of mechanical and electrical equipment.
- Understand the Periodic Maintenance of Equipment's

### **(19ME3021) ADVANCES IN OPERATIONS RESEARCH**

#### **Course Outcomes:**

On successful Completion of this course the student will be able to

- Create mathematical models of the real time situations.
- Implement Transportation and Assignment problems to solve in real time industry
- Choose the best strategy of Game and capable of identifying the suitable queuing theory
- Enumerate fundamental techniques and apply it to solve various optimization areas
- Investigate, study, Apply knowledge in Replacement models and
- Understand the Inventory control Models

### **(19CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**

#### **Course Outcomes:**

At the end of the course, the student should be able to

- Summarize the concept of strategic cost management, strategic cost analysis – target costing, life cycle costing and Kaizen costing and the cost drive concept
- Describe the decision-making; relevant cost, differential cost, incremental cost and opportunity cost, objectives of a costing system
- Summarize the meaning and different types of project management and project execution, detailed engineering activities
- Understand the project contracts
- Describe the cost behavior and profit planning types and contents, Bar charts and Network diagram
- Analyze by using quantitative techniques for cost management like PERT/CPM

### **(19ME3022) COMPOSITE MATERIALS**

#### **Course Outcomes:**

Upon completion of this course, the students will have an overview of

- Fundamental concept of composite materials.

- Different types of composite materials.
- Fabrication and processing of composite materials.
- MMC & CMC
- Mechanical behavior of composite materials.
- Application of composite materials.

**(19EE2128) WASTE TO ENERGY**

**Course Outcomes:**

On successful completion of the course students will be able to

- Identify the new methodologies / technologies for effective utilization of renewable energy sources.
- Analyse over different types of waste for energy conception.
- Understand different types of Bio mass utilizations.

**(19CS5008) PHASE-I DISSERTATION-I /INDUSTRIAL PROJECT**

**II M. Tech – II Sem.(CSE)**

**(19CS5009) PROJECT PHASE –II /DISSERTATION-II**

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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Bachelor of Technology**

**Department of Civil Engineering (R18)**

**I Year – I Semester**

**(18HS0848) PHYSICS**

**Course Outcomes:**

Studies will be familiar with

- Various basic terms related to Vectors & Scalars and Newton's laws of motion.
- Some of the basic concepts related to forces.
- Simple terms related to Mechanical Vibrations.
- Recognize importance of various mechanical properties of materials.
- Understand the importance of Nanotechnology.

**(18HS0830) MATHEMATICS – I**

**COURSE OUTCOMES (COs)**

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their discipline

**(18CS0501) PROGRAMMING FOR PROBLEM SOLVING**

**COURSE OUTCOMES (COs)**

- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs
- Able to write C programs for real world problems using simple and compound data types

**(18CE0101) ENGINEERING MECHANICS**

**COURSE OUTCOMES (COs)**

On completion of this course, the student will be able to

- Construct free body diagrams and develop appropriate equilibrium equations.
- Understand the concepts of friction and to apply in real life problems.
- Determine the centroid for composite sections.
- Determine the Moment of Inertia for composite sections.

**(18CS0503) PROGRAMMING FOR PROBLEM SOLVING LAB**

### **COURSE OUTCOMES (COs)**

At the end of the course, students will be able to

- Apply problem solving techniques of C to find solution.
- Use C language features effectively to implement solutions.
- Use C++ language features effectively to solve problems.
- Identify and develop apt searching and sorting technique for a given problem.
- Identity, design and develop the appropriate data structure for a given problem or application.

### **(18ME0301) WORKSHOP PRACTICE LAB**

### **COURSE OUTCOMES (COs)**

After completion of this course, a successful student will be able to:

1. Utilize workshop tools for engineering practice.
2. Employ skills for the production a component for real time applications.
3. Appreciate the hard work and intuitive knowledge of the manual workers

### **I YEAR – IISEMESTER**

### **(18HS0801) CHEMISTRY**

### **COURSE OUTCOMES (COs)**

1. Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
2. Able to design the flowchart and algorithm for real world problems
3. Able to learn and understand new programming languages
4. Able to construct modular and readable programs Rationalise bulk properties and processes using thermodynamic considerations.
5. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.

### **(18HS0831) MATHEMATICS – II**

### **COURSE OUTCOMES (COs)**

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariable calculus and complex analysis. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of Mathematics and applications that they would find useful in their disciplines.

### **(18EE0240) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

### **COURSE OUTCOMES (COs)**

Upon completion of the course, students will:

1. Determine the equivalent impedance of given network by using network reduction techniques.
2. Determine the current through any element and voltage across any element

3. Apply the network theorems suitably.
4. Analyze the operating principles of motor and transformer.
5. Analyze the operating principles of major electronic devices, its characteristics and applications.
6. Design and analyze the DC bias circuitry of BJT and FET.

### **(18HS0810) ENGLISH**

#### **COURSE OUTCOMES (COs)**

Students will be able:

1. To understand the rules of English grammar and their usage in writing English.
2. To use LSRW skills through the prescribed text and develop their ability to communicate effectively.
3. To get the mastery of language to express ideas, views, feelings and experience.
4. To communicate well among themselves.
5. To inculcate values and ideal characteristic qualities in themselves.

### **(18ME0302) ENGINEERING GRAPHICS & DESIGN**

#### **COURSE OUTCOMES (COs)**

Students undergoing this course are able to

1. Frame ideas based on the conceptual modeling and design
2. Provide good understanding of the methods involved in preparing various views in Engineering drawings
3. Can prepare 2D and 3D diagrams of various objects

### **(18HS0811) ENGLISH LAB**

#### **COURSE OUTCOMES**

Students will be able:

1. To recognize sounds of English language with different classifications.
2. To know phonetic transcription and phonemic symbols of English language.
3. To understand international accent and utilize the same in their daily conversation.
4. To crease confidence for public speaking, for facing interviews, for making effective oral presentations, for having discussions, and for delivering impromptu speeches.

### **(18HS0816) INDIAN CONSTITUTION**

#### **COURSE OUTCOMES (COs)**

Students will be able to:

1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
4. Discuss the passage of the Hindu Code Bill of 1956.

## **II YEAR I SEMESTER**

### **(18HS0803) BIOLOGY FOR ENGINEERS**

#### **COURSE OUTCOMES (COs)**

- Classify enzymes and distinguish between different mechanisms of enzyme action.
- Identify DNA as a genetic material in the molecular basis of information transfer.
- Analyse biological processes at the reduction istic level
- Apply thermodynamic principles to biological systems.
- Identify and classify microorganisms

### **(18HS0832) TRANSFORM & DISCRETE MATHEMATICS**

#### **COURSE OUTCOMES (COs)**

The objective of this course is to familiarize the prospective engineers with techniques in Transform Calculus and Discrete Mathematics. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

### **(18CE0102) INTRODUCTION TO CIVIL ENGINEERING**

#### **COURSE OUTCOMES (COs)**

- Introduction to what constitutes Civil Engineering
- Identifying the various areas available to pursue and specialize within the overall field of Civil Engineering
- Highlighting the depth of engagement possible within each of these areas
- Supervise the construction activities
- Able to understand the Building Bye laws
- Able to plan a residential & public building

### **(18CE0103) INTRODUCTION TO SOLID MECHANICS**

#### **COURSE OUTCOMES (COs)**

Students undergoing this course are able to:

- The students would be able to understand the behavior of materials under different stress and strain conditions.
- The students would be able to draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading.
- The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams under various loading conditions
- Determine shear stress in the shaft subjected to torsional moments

### **(18CE0104) INTRODUCTION TO FLUID MECHANICS**

### **COURSE OUTCOMES (COs)**

On completion of the course, the students will be able to:

1. Determine the properties of fluid like pressure and their measurement.
2. Apply continuity equation and energy equation in solving problems on flow through conduits.
3. Compute the frictional loss in laminar and turbulent flows.

### **(18CE0105) SOLID MECHANICS LAB**

### **COURSE OUTCOMES (COs)**

After completion of the course the student will be able to:

1. Estimate Young's modulus, tensional rigidity of mild steel rods
2. Know the hardness of mild steel and HYSO specimens
3. Analyze the strength of wood, concrete, stone and bricks
4. Assess the quality of wood, concrete, stone and bricks

### **(18CE0106) FLUID MECHANICS LAB**

### **COURSE OUTCOMES (COs)**

Students undergoing this course are able to

1. Calibrate Venturimeter & Orifice meter
2. Calculate losses in flows
3. Estimate the efficiency of different pumps.
4. Study the performance of different turbines.

### **(18CE0107) COMPUTER AIDED BUILDING DRAWING**

### **COURSE OUTCOMES (COs)**

1. The students will be able to draft the plan, elevation and sectional views of the buildings, industrial structures, and framed buildings using computer software's.
2. Draw the symbols and plan of a residential building using Auto CAD Software.

### **(18HS0804) ENVIRONMENTAL SCIENCES**

### **COURSE OUTCOMES (COs)**

1. Based on this course, the Engineering Student will be able to understand/evaluate/develop technologies on the basis of Ecological principles and environmental regulations along with Legislation, Laws and Policies which in turn help in sustainable development.
2. Take preventive measures to reduce air, water, soil pollutions and contaminants in food.
3. Effectively carry out waste disposal at individual level.
4. Involve in preservation of natural resources.

## **II YEAR II SEMESTER**

### **(18ME0346) MECHANICAL ENGINEERING**

### **COURSE OUTCOMES (COs)**

1. After completion of the course the student will be able to understand the fundamentals of mechanical

engineering.

2. Acquire the concept of laws of thermodynamics, Energy conversion devices, R&AC.
3. Knows the principles of welding, manufacturing processes, Power transmission devices.
4. Knows about Engineering Materials.

### **(18CE0108) ENGINEERING GEOLOGY**

#### **COURSE OUTCOMES (COs)**

1. This course helps to know the identification of rocks, minerals, engineering geology problems and also basics of earth science.
2. Site characterization and how to collect, analyze, and report geologic data using standards in engineering practice

### **(18CE0109) SURVEYING & GEOMATICS**

#### **COURSE OUTCOMES (COs)**

The course will enable the students to:

1. Apply the knowledge, techniques, skills and applicable tools of the discipline to engineering and surveying activities
2. Translate the knowledge gained for the implementation of civil infra-structure facilities.
3. To be in a position to apply the basic principle of surveying and usage of surveying instruments in all civil engineering activities, including the construction of buildings, bridges, roads and high ways, pipe lines, dams, ports and harbours
4. To be an expert of demarcation of ownership and / or delimitation of land, property, etc., through surveying process
5. Surveying techniques to collect data for planning, designing and execution, able to employ green field
6. Use total station and able to assess the electromagnetic distances

### **(18CE0110) MATERIALS, TESTING & EVALUATION**

#### **COURSE OUTCOMES (COs)**

On completion of the course, the students will be able to:

1. Understand properties of various construction materials and their manufacturing process.
2. Access the quality of construction materials.
3. Supervise the construction activities.
4. Introduction to Engineering Materials covering

### **(18CE0111) MECHANICS OF SOLIDS**

#### **COURSE OUTCOMES (COs)**

The course will enable the students to:

1. Determine different stresses developed in thin and thick cylinders
2. Determine the behaviour of direct and bending stress in beams
3. Have knowledge in structural engineering
4. Understand the application of Castiglione's theorem.
5. Analyse continuous beams and portal frames by slope deflection method and moment distribution method.

### **(18CE0112) ENGINEERING GEOLOGY LAB**



## **COURSE OUTCOMES (COs)**

After completion of this lab the student:

1. Can conduct macroscopic tests on rock forming minerals to identify
2. Can conduct macroscopic tests on rocks to identify
3. Can be in position to interpret geological models
4. Can perform strike and dip problems

### **(18CE0113) SURVEYING LAB – I**

## **COURSE OUTCOMES (COs)**

After completion of the course the student will be able to:

1. Gain knowledge and expertise in operation of various survey instruments for computation of area of a land.
2. Successfully carry out survey work in all civil Engineering projects, including the construction of buildings, roads and highways, rail track laying with curves, pipe lines, dams, ports and harbor as well as delimitation of land and property, etc.

### **(18HS0817) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**

## **COURSE CONTENTS**

1. Basic structure of Indian Knowledge System: Astadash Vidya- 4ved
2. 4 Upaved (Ayurved, Dhanurved, Gandharva Ved & Sthapthya Adi.,)
3. 6 Vedanga (Shisha, Kalpa, Nirukha, VYkaran, Jyothish & Chand)
4. 4 Upanga (Dharma Shastra, Meemamsa, Purana & Tharka Shastra)
5. Modern Science and Indian Knowledge System
6. Yoga and Holistic Healthcare
7. Case studies
8. Philosophical Tradition (Sarvadarshan) Nyaya, Vyshepec, Sankhya, Yog, Meemamsa, Vedantha, Chavanka, Jain & Boudh
9. Indian Linguistic Tradition – (Phonology, morphology, syntax and semantics)
10. Indian Artistic Tradition - Chitrakala, Moorthikala, Vasthukala, Sthapthya, Sangeetha, Nruthya Yevam Sahithya
11. Case studies

## **III B.Tech – I Sem**

### **(18CE0114) HYDRAULIC ENGINEERING**

## **COURSE OUTCOMES (COs)**

On completion of the course, the students will be able to

1. Discuss uniform and non-uniform open channel flows and Design economic channel section
2. Explain gradually varied flow and rapid varied flow
3. Analyze impact of jets on vanes and develop velocity triangle
4. Classify turbines and study the principal of various turbines
5. Study the principals of different pumps
6. Classify methods of dimensional analysis and Apply Buckingham Pi theorem

### **(18CE0115) STRUCTURAL DESIGN**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Explain the Limit State of Collage and Serviceability and describe various design parameters
2. Design and Analysis of RCC singly, doubly and flanged beams
3. Design of RCC flexural members such as beams and slabs for various considerations
4. Design RCC columns and isolated footings
5. Describe and design various connections used in steel design
6. Design of steel compression, tension and flexural members

### **(18CE0116) GEOTECHNICAL ENGINEERING**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Describe volumetric ratios, weight/mass relationships, index properties of soils, establish interrelationships and classify soils
2. Discuss Soil permeability, effective stress principal and seepage through soils
3. Classify compaction and consolidation and predict consolidation settlements
4. Determine vertical stress due to various loads and comprehend shear strength of soil
5. Can use various methods to analyze stability of finite and infinite earth slopes
6. Describe various means to conduct soil exploration and can interpret soil exploration report

### **(18CE0117) HYDROLOGY & WATER RESOURCES ENGINEERING**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Explain importance of hydrology, hydrological cycle and estimate precipitation, runoff, evaporation, evapotranspiration and infiltration. Classify different type of geological formation of ground water and estimate yield
2. Classify various types of irrigation and describe principals of irrigation
3. Explain the principals of crop water requirements and determine the irrigation crop water requirements
4. Describe canal regulation works and design various elements in canal regulation works
5. Classify different types of cross drainage works and explain the concepts of reservoir planning
6. Classify various types of dams and estimate the stability of gravity of dam

### **(18CE0118) ESTIMATION, COSTING AND VALUATION**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Apply different methods of estimates for calculating the quantities of building works
2. Calculate the quantity of earthwork in roads and canals
3. Estimate the quantities of the reinforcement in the beams, slabs, columns with foundation and staircase
4. Work out the rate analysis of various items of building works
5. Explain specifications of various items of building works
6. Assess valuation of assets

### **(18CE0119) GEOTECHNICAL ENGINEERING LAB**

### **COURSE OUTCOMES (COs)**

On successful the completion of this course, the student will be able to

1. Conduct tests on fine grained soils to determine Atterberg's limits
2. Conduct fields test to find out field density of cohesive and cohesion less soils
3. Perform sieve analysis and sedimentation analysis to classify the soil
4. Conduct field tests on soil to estimate soil permeability
5. Conduct compaction test and draw compaction curve to find out optimum moisture content and maximum dry density
6. Conduct shear tests to predict shear strength of the soil

### **(18CE0120) CONSTRUCTION MATERIALS LAB**

### **COURSE OUTCOMES (COs)**

After the completion of this course, students will be able to

1. Outline the importance of testing of cement and conduct various tests on cement
2. Assessthe different properties of aggregate
3. Summarize the concept of workability and testing of concrete
4. Determine the specific gravity and water absorption on fine aggregate.
5. Conduct tests on hardened concrete and describe the its properties
6. Perform non-destructive test on concrete

### **(18CE0121) SURVEYING LAB-II**

### **COURSE OUTCOMES (COs)**

Students undergoing this course are able to

1. Measure horizontal and vertical angles using transit theodolite and determine the tachometric constant
2. Determine horizontal distances between accessible and inaccessible point using the principals of trigonometry with the help of theodolite and tachometry
3. Find the heights of objects using the theodolite and tachometry
4. Set simple curves by different methods using theodolite
5. Carry out setting of works for building and pipe lines
6. Use total stations to carryout various surveying jobs

### **(18HS0842) APTITUDE PRACTICES**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Develop the subtle way of approaching in the candidate
2. Acquired the decision making with in no time
3. Implement logical thinking during professional tenure
4. Improve knowledge on problem solving
5. Understand problems on coding and decoding
6. Apply the knowledge on the concept of reasoning in real life

### **III B.Tech – II Sem**

### **(18CE0122) CONSTRUCTION PROJECT MANAGEMENT**

### **COURSE OUTCOMES(COs)**

At the end of the course, the student should be able to

1. Describe importance, types, phases, participants of construction projects and summarize functions of construction management
2. Develop bar chart, mile stone charts and can explain the basic principles of network techniques
3. Analyze PERT & CPM networks to find various time estimates and identify critical activities and path
4. Optimize the cost and can update CPM network
5. Discuss significance of material management and quality management of construction projects
6. Recognize various issues related to construction safety and can describe fundamentals of construction contracts

### **(18CE0123) ENVIRONMENTAL ENGINEERING**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Forecast population, Estimate the water demand for a town or city during design period
2. Describe water quality criteria and standards, and their relation to public health
3. An ability to Design the various functional units in water treatment and distribution system
4. Estimate sewage generation and Design of sewer system
5. Recognize characteristics and composition of wastewater
6. Design of the unit operations and processes that are used in sewage treatment and sludge disposal

### **(18CE0124) TRANSPORTATION ENGINEERING**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Recognize significance of highway alignment and can carry out engineering surveys for highway location
2. Design various geometric elements of highway
3. Implement traffic studies, traffic regulations and can design intersection and traffic signals
4. Design flexible and rigid pavements as per IRC
5. Describe different components of permanent way in Railway Track
6. Design various components of Railway Track

### **(18CE0125) TRANSPORTATION ENGINEERING LAB**

#### **COURSE OUTCOMES (COs)**

After completion of this course, the students will be able to

1. Conduct test on road aggregates to estimate their mechanical properties
2. Perform shape tests on aggregates and decide their suitability as road aggregates
3. Conduct tests on bitumen to find its properties and purity
4. Conduct tests on bitumen to identify its grade
5. Perform traffic volume studies
6. Perform vehicle speed studies

### **(18CE0126) ENVIRONMENTAL ENGINEERING LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Describe and use the water and wastewater sampling procedures and sample preservations

2. Conduct the physical tests on drinking water and compare the result with standards
3. Perform the test on drinking water to estimate various chemical constituents
4. Conduct test on drinking water to access biological contamination
5. Perform the Total solids test to estimate the level of contamination of water
6. Decide the optimal coagulant dose required to treat water

### **(18HS0859) ENGLISH FOR CORPORATE COMMUNICATION SKILLS LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Flair in Writing by using cohesion and coherence.
2. Prepare effective job application.
3. Present Effective Speaking Abilities.
4. Apply various communicative techniques in their professional lives.
5. Cope with the employability skills.
6. Use effective communicative approaches by preparing job application, report and other kinds of spoken and written correspondences.

### **(18CE0133) FOUNDATION ENGINEERING**

#### **COURSE OUTCOMES (COs)**

At the end of the course the student will able to

1. Describe different earth pressures and calculate active and passive earth pressures using Rankine's theory, Coulomb's theory and graphical techniques
2. Establish the stability of retaining walls
3. Discuss various theories on bearing capacity and field tests and apply them to estimate the bearing capacity of soils and conduct settlement analysis
4. Classify various types of pile foundation, analyze the load carrying capacity of pile and pile groups
5. Describe the concept of well foundation and explain the design and construction aspects of caisson foundation
6. Describe types and principals of machine foundations

### **(18CE0134) WATER TECHNOLOGY**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Underline the importance of water and Describe the mechanism of hydrological cycle
2. Describe various elements associate with public water supply
3. Describe water quality criteria and standards, and their relation to public health
4. Recognize the cause of water pollution and Influence of climatic changes on water resources
5. Summarize various water conservation techniques in practice
6. Explain need for watershed management and Implement various plans for watershed management

### **(18CE0135) MAINTENANCE & REHABILITATION OF STRUCTURES**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Describe the fundamentals of maintenance and repair strategies

2. Identify the probable reasons for the deterioration of various structural members
3. Explain the causes of corrosion and its prevention
4. Know the materials and techniques used for repair of structures
5. Assessing damage to structures and various repair techniques
6. Carry out inspection and evaluation of damaged structure

### **(18EE0234) INDUSTRIAL INSTRUMENTATION**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Identify and explain the types of errors occurring in measurement system
2. Differentiate among the types of data transmission and modulation techniques
3. Apply digital techniques to measure voltage, frequency and speed
4. Analyse the working principles of different Signal Analyzers and Digitalmeter
5. Understand the operation of several types of transducers
6. Choose suitable Transducers for the measurement of non-electrical quantities

### **(18ME0307) NON-CONVENTIONAL ENERGY RESOURCES**

#### **COURSE OUTCOMES (COs)**

On successful completion of the course, the student will be able to

1. State various sources of Energies, its availability and explain the importance of them by observing the global energy scenario.
2. Distinguish the types of solar energy tapping devices and describe the method of harnessing the solar energy.
3. Summarize the Wind energy systems and elucidate the impact of it in environmental aspects.
4. Describe the Biomass conversion process and list out various bioenergy applications.
5. Interpret the knowledge of renewable energies such as tidal energy, OTEC, Fuel cell, etc. for effective construction of Hybrid systems.
6. Identify numerous applications renewable energy resources and illustrate its harnessing technologies

### **(18EC0449) INTRODUCTION TO IOT**

#### **COURSE OUTCOMES**

On successful completion of this course, student will be able to

1. Understand the technology and standards relating to IoTs
2. Understand where the IoT concept fits within the broader ICT industry and possible future trends
3. Understand the key components that make up an IoT system
4. Differentiate between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack
5. Configure Raspberry Pi, Understand Sensors, and Actuators & get started with python on Raspberry Pi
6. Apply the knowledge and skills acquired during the course to design, build and test a complete, working IoT system involving prototyping, programming and data analysis

### **(18CS0517) PYTHON PROGRAMMING**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Solve the problems using control structures, input and output statements
2. Summarize the features of lists, tuples, dictionaries, strings and files
3. Experience the usage of standard libraries, objects, and modules
4. Solve the problems using Object Oriented Programming Concepts
5. Build the software for real time applications using python
6. Install various Python packages

### **(18HS0814) INTELLECTUAL PROPERTY RIGHTS**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights
2. Identify different types of intellectual properties, ownership rights and the scope of the protection
3. Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work
4. Able to identify, apply, and assess ownership rights, registration processes for IP rights
5. To discern the approaches for intellectual property management and intellectual property audits
6. Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**Department of Electrical & Electronics Engineering**

**B.Tech, I Year 1<sup>st</sup> semester**

**(18HS0830) MATHEMATICS-I**

**Course Outcomes:**

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

**(18HS0849) PHYSICS**

**Course outcomes:**

Studies will be familiar with

- Various basic terms related to waves and Oscillations.
- Some of the basic concepts related properties of Lasers.
- Able to explain Dual nature of matter.
- Recognize importance of free electrons theory and semiconductors.
- Understand the importance of Nanotechnology.

**(18CS0501) PROGRAMMING FOR PROBLEM SOLVING**

**Course Outcomes:**

- Able to design the flowchart and algorithm for real world problems.
- Able to learn and understand new programming languages.
- Able to construct modular and readable programs.
- Able to write C programs for real world problems using simple and compound data types.

**(18ME0348) THERMAL & FLUID ENGINEERING**

**Course Outcomes:**

- Understands the applied thermodynamic concepts, the construction and the working principles of various engineering devices such as steam generators, steam nozzles, steam turbine.
- Knows the different types of pipe flow and the conditions governing them. Equations related to different flows are derived and the student gets to understand the working of the different devices used for measurement of fluid flow under different conditions.

**(18ME0301) WORKSHOP PRACTICE LAB**

**Course Outcomes:**

- After completion of this course, a successful student will be able to: Utilize workshop tools for engineering practice.
- Employ skills for the production a component for real time applications. Appreciate the hard work and intuitive knowledge of the manual workers.



## **(18CS0503) PROGRAMMING FOR PROBLEM SOLVING LAB**

### **Course Outcomes:**

At the end of the course, students will be able to

- Apply problem solving techniques for C to find solution
- Use C language features effectively to implement solutions.
- Use C++ Language features effectively to implement solutions.
- Identify and develop apt searching and sorting technique for a given problem.
- Identify 'Design & develop the appropriate data structure for a given problem or application

## **B.Tech, I Year 2<sup>nd</sup> semester**

### **(18HS0810) ENGLISH**

#### **Course Outcomes**

Students will be able:

- To understand the rules of English grammar and their usage in writing English.
- To use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- To get the mastery of language to express ideas, views, feelings and experience.
- To communicate well among themselves.
- To inculcate values and ideal characteristic qualities in themselves.

### **(18HS0831) MATHEMATICS-II**

#### **Course Outcomes:**

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariable calculus and complex analysis. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of Mathematics and applications that they would find useful in their disciplines.

### **(18HS0801) CHEMISTRY**

#### **Course Outcomes:**

- Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs Rationalise bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
- Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.

### **(18EE0201) ELECTRICAL CIRCUITS-I**

**Course Outcomes:**

- After completing the course, the student should be able to do the following:
- Determine the equivalent impedance of given network by using network reduction techniques.
- Determine the real power, reactive power, power factor etc., for the given network. Determine the current through any element and voltage across any element.
- Apply the network theorems suitably.

**(18ME0302) ENGINEERING GRAPHICS & DESIGN****Course Outcomes:**

- Students undergoing this course are able to
- Frame ideas based on the conceptual modeling and design
- Provide good understanding of the methods involved in preparing various views in Engineering drawings
- Can prepare 2D and 3D diagrams of various objects.

**(18HS0811) ENGLISH LAB****Course Outcomes:**

- Students will be able:
- To recognize sounds of English language with different classifications.
- To know phonetic transcription and phonemic symbols of English language
- .To understand international accent and utilize the same in their daily conversation.
- To create confidence for public speaking, for facing interviews, for making effective oral presentations, for having discussions, and for delivering impromptu speeches.

**(18HS0802) CHEMISTRY LABORATORY****Laboratory Outcomes**

- The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:
- Estimate rate constants of reactions from concentration of reactants/products as a function of time.
- Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
- Synthesize a small drug molecule and analyse a salt sample.

**(18HS0816) INDIAN CONSTITUTION****COURSE OUTCOMES**

Students will be able to:

- Explain the key concepts of political economy
- Analyse the significant developments in the political ideologies
- Describe the salient features of the constitution of India interpret, integrate and critically
- Analyse the political economy of Indian international relations and gain knowledge in Judiciary

system

- Apply their knowledge and skills acquired to write civil service examinations

## **B.Tech, II Year 1<sup>st</sup> semester**

### **(18HS0803) BIOLOGY FOR ENGINEERS**

#### **Course Outcomes**

- Classify enzymes and distinguish between different mechanisms of enzyme action.
- Identify DNA as a genetic material in the molecular basis of information transfer.
- Analyse biological processes at the reductionistic level
- Apply thermodynamic principles to biological systems.
- Identify and classify microorganisms.

### **(18EE0202) ELECTRICAL CIRCUITS-II**

#### **Course Outcomes:**

At the end of this course, students will demonstrate the ability to

- Analyze the transient behavior of electrical networks for various excitations.
- Analyze the Electrical Circuits with the concept of Network topology.
- Analyze the three phase circuits with Star & Delta connected balanced and unbalanced loads.
- Obtain the various network parameters for the given two port networks.
- Represent the transfer function for the given network.

### **(18EC0443) ANALOG ELECTRONIC CIRCUITS**

#### **Course Outcomes:**

- Upon completion of this course, student will be able to: Understand Diode Circuits, BJT and FET amplifiers.
- Become familiar with the basic building blocks of linear integrated circuits.

### **(18EE0203) ELECTRO MAGNETIC FIELDS**

#### **Course Outcomes:**

After going through this course the student acquires:

- Knowledge on basic principles, concepts and fundamental laws of electromagnetic fields.
- The knowledge to understand 3, dimensional coordinate systems, electrostatics, magneto statics, time, varying fields and interaction between electricity and magnetism

### **(18EE0204) ELECTRICAL MACHINES-I**

#### **Course Outcomes:**

- After completing the course, the student should be able to do the following: Calculate the e.m.f. generated on open circuit and find terminal voltage on load.
- Diagnose the failure of DC generator to build up voltage.
- Compute the load shared by each generator when several generators operate in parallel.
- Draw the equivalent circuit of transformer
- Conduct O.C, S.C tests and predetermine the regulation and efficiency of transformer

## **(18EC0445) ANALOG ELECTRONIC CIRCUITS LAB**

### **Course Outcomes:**

Upon completion of this course, student will be able to:

- Understand about various semiconductor devices and its characteristics.
- Find the Frequency response characteristics of BJT and FET amplifiers and to
- Determine bandwidth.

## **(18ME0349) THERMAL & FLUID ENGINEERING LAB**

### **Course Outcomes:**

After completing the course, the student should be able to do the following:

- Correctly measure and successfully troubleshoot circuits by taking accurate data and interpret results
- .Apply suitable theorems for circuit analysis and verify the results theoretically.

**B.Tech, II Year 2<sup>nd</sup>  
semester**

## **(18EC0444) DIGITAL ELECTRONICS**

### **Course Outcomes:**

At the end of the Course, the students will demonstrate the ability to

- Define different Number system and perform Number base conversions.
- Design and analyze Combinational Logic Circuits
- Design and analyze modular Combinational Circuits with MUX / DEMUX, Decoder /Encoder
- Design and analyze synchronous sequential logic circuits

### **(18HS0833) PROBABILITY & STATISTICS, NUMERICAL METHODS**

#### **Course Outcomes:**

The objective of this course is to familiarize the prospective engineers with techniques in Probability & Statistics and Numerical Methods. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

### **(18EE0206) POWER ELECTRONICS**

#### **Course Outcomes:**

- Design of power electronic converters in power control applications.
- Ability to express characteristics of SCR, BJT, MOSFET and IGBT.
- Ability design AC voltage controller and Cyclo Converter.
- Ability to design Chopper circuits.

### **(18EE0207) ELECTRICAL MACHINES-II**

#### **Course Outcomes:**

After completing the course, the student should be able to do the following:

- Compute the load shared by each transformer when several transformers operate in parallel.
- Draw the circle diagram of a three phase Induction motor and predetermine the performance characteristics.
- Determine the starting torque, maximum torque, slip at maximum torque using given data.

### **(18EC0403) SIGNALS & SYSTEMS**

#### **Course Outcomes:**

At the end of this course students will demonstrate the ability to

- Analyze different types of signals.
- Represent continuous and discrete systems in time and frequency domain using different transforms.
- Investigate the system stability.
- Sampling and reconstruction of a signal.

### **(18EE0208) ELECTRICAL CIRCUITS SIMULATION LAB**

#### **Course Outcomes:**

- Analyze networks by various techniques.
- Analyze circuit responses.

### **(18EE0209) ELECTRICAL MACHINES-I LAB**

#### **Course Outcomes:**

The student should be able to do the following:

- Conduct experiments to obtain the no, load and load characteristics of D.C.
- Generators. Conduct tests on D.C. motors for predetermination of efficiency.
- Conduct tests on D.C. motors for determination of efficiency.
- Control the speed of D.C. motor in a given range using appropriate method .
- Identify the reason as to why D.C. Generator is not building up voltage.

#### **B.Tech., III Year 1<sup>st</sup> semester**

### **(18HS0812) MANAGERIAL ECONOMICS AND FINANCIAL**

#### **ANALYSIS COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Understand the nature of managerial economics and the role of it in business firms
- Identify the determinants of demand and apply cost analysis under different market conditions
- Integrate the concepts of price and output decisions of business firms
- Appreciate the importance of market structures and implement appropriate price and output decisions
- Assess the financial statements of a firm and the financial performance of the firm through the financial statements
- Measure operating, investing and financial performance of a firm

### **(18EC0414) DIGITAL SIGNAL**

#### **PROCESSING COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Apply DFT & FFT for the analysis of digital signals and systems and Compare its efficiency.
- Design IIR and FIR filters for the given specifications.
- Construct different forms of IIR and FIR filter realizations.
- Distinguish the effects of finite precision representation on digital filters.
- Evaluate the errors due to Truncation and Rounding in Quantization process.
- Realize DSP architecture and programming.

## **(18EE0210) POWER SYSTEMS-I**

### **COURSE OUTCOMES**

After completion of the course the student should be able to:

- Understand the principles of power generation. Investigate the line diagram and components in thermal power station, Hydro and Nuclear power stations
- understand the process involved in solar, wind, biogas, geothermal and ocean energy generation
- Investigate different tariff methods
- Compute the transmission line parameters and Estimate the performance of a given transmission line
- Understand the types of insulators, sag and corona
- Understand the construction, types and grading of underground cables

## **(18EE0211) CONTROL SYSTEMS**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Identify open and closed loop control system.
- Formulate mathematical model for physical systems and simplify representation of complex systems using reduction techniques.
- Use standard test signals to identify performance characteristics of first and second-order systems.
- Apply root locus technique for stability analysis.
- Analyze performance characteristics of system using Frequency response methods.
- Develop and analyze state space models.

## **(18EE0212) ELECTRICAL MEASUREMENTS**

### **COURSE OUTCOMES:**

After successful completion of the course, student will be

- Able to develop an understanding of construction and working of different measuring instruments
- Able to develop an understanding of construction and working of different AC and DC bridges and its applications
- Familiar with C.T and P.T and its applications
- Familiar with various measuring instruments used to detect electrical quantities such as power and energy.
- Able to measure magnetic measurements.
- Able to measure Phase, Frequency, Current and Voltage by using CRO.

### **(18EE0213) ELECTRICAL MACHINES-II LAB**

#### **COURSE OUTCOMES:**

After going through this laboratory course

- The student acquires sufficiently good practical knowledge about the operation, testing, and characteristics of Transformers
- The student acquires sufficiently good practical knowledge about the operation, testing, and characteristics of Induction motors
- The student acquires sufficiently good practical knowledge about the operation, testing, and characteristics of Alternators
- The student should also have acquired the knowledge about the fixation of the rating of transformers, induction motors and synchronous machines.
- The Student will be able to calculate the  $X_d$  and  $X_q$  of Salient Pole Synchronous Machine
- The Student will be able to calculate Regulation of Three-Phase Alternator by Z.P.F. and A.S.A Methods

### **(18EE0214) CONTROL SYSTEMS LAB**

#### **COURSE OUTCOMES (COs)**

At the end of the course the student should be able to

- Design the controllers/compensators to achieve desired specifications.
- Understand the effect of location of poles and zeros on transient and steady state behavior of systems.
- Assess the performance, in terms of time domain specifications, of first and second order systems.
- Understand the effect of P, PD, PI, PID controllers on second order systems.
- Use MATLAB/SIMULINK software for control system analysis and design.
- Use MATLAB/SIMULINK software for state space model.

### **(18EE0215) ELECTRICAL**

#### **MEASUREMENTS LAB COURSE OUTCOMES:**

On successful completion of this course, the student will be able to:

- Calibrate various electrical measuring/recording instruments.
- Accurately determine the values of inductance and capacitance using a.c bridges.
- Accurately determine the values of very low resistances.
- Measure reactive power in 3-phase circuit using single wattmeter.
- Determine ratio error and phase angle error of CT.
- Measure the power by using 3 Voltmeter Method and 3 Ammeter Method.



## **(18HS0842) APTITUDE PRACTICES**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

- Develop the subtle way of approaching in the candidate.
- Acquired the decision making with in no time.
- Implement logical thinking during professional tenure.
- Improve knowledge on problem solving.
- Understand problems on coding and decoding.
- Apply the knowledge on the concept of reasoning in real life.

### **B.Tech, III Year II<sup>nd</sup> semester**

#### **(18HS0813)**

### **MANAGEMENT SCIENCE COURSE OUTCOMES**

#### **(COs)**

On successful completion of this course, the student will be able to

- Utilize appropriate theoretical frameworks to real life business and managerial problems
- Identify appropriate operational risks and develop appropriate responses to them
- Apply human resource principles to recruit, select and manage employees to achieve organizational goals
- Enact strategy, including contingent plans for the effective management of the organization
- Identify, plan, and implement the projects and evaluate the performance of the projects
- Analyze effective application of latest developments to diagnose and solve organizational problems

#### **(18EC0420) MICROPROCESSORS AND**

### **MICROCONTROLLERS COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Understand the evolution of computers, processors, and its applications
- Explain the various software and hardware parts of a microprocessors and computer
- Understand the architectures of 8085 microprocessor and 8051 microcontroller system
- Analyze the programming model of 8085 Microprocessor & 8051 microcontroller development environment.
- Implement the techniques of interfacing memories, various I/O devices, sensors and actuators with microprocessor and microcontrollers
- Design and develop various microprocessor/microcontroller-based systems for the real-life problems

#### **(18EE0216) POWER SYSTEMS - II**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Form the Z Bus and Y Bus of a given power system network.
- Make fault calculations for various types of faults
- Conduct load flow studies on a given system.
- Compare different methods used for obtaining load flow solution
- Understand the Concepts of Steady State, Dynamic and Transient Stabilities.
- Understand the Equal area criterion and its application

### **(18EE0221) ELECTRICAL MACHINE DESIGN COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- The students will be able to Understand the principle of electrical machine design. .
- The students will be able to design transformers.
- The students will be able to design DC Generator
- The students will be able to design DC Motor
- The students will be able to design synchronous machines.
- The students will be able to design three phase induction motors.
- (18EE0222) POWER SEMICONDUCTOR DRIVES

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Control DC and AC drives.
- Analyze the operation of the converter, chopper fed dc drive.
- Analyze the operation of both Induction & Synchronous machine drives.
- Design the current and speed controllers for a closed loop solid-state dc motordrive
- Select the drives for any particular application

### **(18EE0223) MODERN CONTROL THEORY COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Model a given dynamic system in state space and obtain the solution for the State equation.
- Test whether a given system is controllable and/or observable
- Design a state feedback controller for pole placement
- Design an observer for state estimation
- Apply Lyapunov criterion and determine stability of a given system
- Analyze non linear systems.

## **(18CE0127) ELEMENTS OF ROAD TRAFFIC SAFETY**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Identify the causes for road accidents and can implement measures to prevent road accidents
- Describe traffic regulations and implement parking methods
- Classify different traffic signal and can design traffic signal system
- List and illustrate various traffic signs
- List and discuss various road markings
- Discuss importance of street lighting and classify various street lighting system

## **(18ME0307) NON-CONVENTIONAL ENERGY**

### **RESOURCE COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- State various sources of Energies, its availability and explain the importance of them by observing the global energy scenario.
- Distinguish the types of solar energy tapping devices and describe the method of harnessing the solar energy.
- Summarize the Wind energy systems and elucidate the impact of it in environmental aspects.
- Describe the Biomass conversion process and list out various bioenergy applications.
- Interpret the knowledge of renewable energies such as tidal energy, OTEC, Fuel cell, etc. for effective construction of Hybrid systems.
- Identify numerous applications renewable energy resources and illustrate its harnessing technologies.

## **(18EC0449) INTRODUCTION TO IOT**

### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Understand the technology and standards relating to IoTs.
- Understand where the IoT concept fits within the broader ICT industry and possible future trends.
- Understand the key components that make up an IoT system.
- Differentiate between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack.
- Configure Raspberry Pi, Understand Sensors, Actuators & get started with python on Raspberry Pi.
- Apply the knowledge and skills acquired during the course to design, build and

test a complete, working IoT system involving prototyping, programming and data analysis.

### **(18CS0517) PYTHON**

#### **PROGRAMMING COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

- Solve the problems using control structures, input and output statements.
- Summarize the features of lists, tuples, dictionaries, strings and files
- Experience the usage of standard libraries, objects, and modules
- Solve the problems using Object Oriented Programming Concepts
- Build the software for real time applications using python
- Install various Python packages

### **(18HS0814) INTELLECTUAL PROPERTY RIGHTS**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

- Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights
- Identify different types of intellectual properties, ownership rights and the scope of the protection
- Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work
- Able to identify, apply, and assess ownership rights, registration processes for IP rights
- To discern the approaches for intellectual property management and intellectual property audits
- Demonstrate knowledge and understanding on unfair competition and latest developments

### **(18EE0217) POWER ELECTRONICS AND**

#### **DRIVES LAB COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Analyze various power electronic devices and their commutation circuits
- Understand voltage and current characteristics of various converters and inverters at different firing angles
- Analyze different types converters and inverters with different types of loads
- Design current and speed controllers to control dc motor
- Design DC-DC converter and regulated power supply

### **(18EE0218) POWER SYSTEMS LAB COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

- Experimental determination (in machines lab) of sequence impedance and Sub transient reactances of synchronous machine.
- Conducting experiments to analyze LG, LL, LLG, LLLG faults.
- The equivalent circuit of three winding transformer by conducting a suitable experiment.
- Develop MATLAB program for formation of Y and Z buses.
- Develop MATLAB programs for gauss-seidel and fast decoupled load flow studies.
- Develop the SIMULINK model for single area load frequency control problem.

**(18HS0859) ENGLISH FOR CORPORATE COMMUNICATION  
SKILLS LAB**

**Course Outcomes**

- Flair in Writing by using cohesion and coherence.
- prepare effective job application.
- Presenting Effective Speaking Abilities.
- Apply various communicative techniques in their professional lives.
- cope with the employability skills.
- Use effective communicative approaches by preparing job application, report and other kinds of spoken and written correspondences.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**Department of Mechanical Engineering**

**I B. Tech. – I Semester (M.E)**

**(18HS0830) MATHEMATICS-I**

**Course Outcomes:**

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

**(18HS0850) PHYSICS**

**Course outcomes:**

**Studies will be familiar with**

1. Able to explain properties of electromagnetic waves.
2. Some of the basic concepts related Maxwell equations and properties of magnetic materials.
3. Various basic terms related to Waves, Optics and Acoustics.
4. Some of the basic concepts related properties of Laser.
5. Understand the importance of Nanotechnology.

**(18CE0101) ENGINEERING MECHANICS**

**Course Outcomes:**

On completion of this course, the student will be able to

1. Construct free body diagrams and develop appropriate equilibrium equations.
2. Understand the concepts of friction and to apply in real life problems.
3. Determine the centroid for composite sections.
4. Determine the Moment of Inertia for composite sections.

**(18CS0501) PROGRAMMING FOR PROBLEM SOLVING**

**Course Outcomes:**

1. Able to design the flowchart and algorithm for real world problems
2. Able to learn and understand new programming languages
3. Able to construct modular and readable programs
4. Able to write C programs for real world problems using simple and compound data types

### **(18CS0503) PROGRAMMING FOR PROBLEM SOLVING LAB**

#### **Course Outcomes:**

At the end of the course, students will be able to

1. Apply problem solving techniques of C to find solution.
2. Use C language features effectively to implement solutions.
3. Use C++ language features effectively to solve problems.
4. Identify and develop apt searching and sorting technique for a given problem.
5. Identity, design and develop the appropriate data structure for a given problem or application.

### **(18ME0301) WORKSHOP PRACTICE LAB**

#### **Course Outcomes:**

After completion of this course, a successful student will be able to :

1. Utilize workshop tools for engineering practice.
2. Employ skills for the production a component for real time applications.
3. Appreciate the hard work and intuitive knowledge of the manual workers.

### **(18HS0810) ENGLISH**

#### **Course Outcomes**

Students will be able:

1. To understand the rules of English grammar and their usage in writing English.
2. To use LSRW skills through the prescribed text and develop their ability to communicate effectively.
3. To get the mastery of language to express ideas, views, feelings and experience.
4. To communicate well among themselves.
5. To inculcate values and ideal characteristic qualities in themselves.

### **(18HS0831) MATHEMATICS II**

#### **Course Outcomes:**

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariable calculus and complex analysis. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of Mathematics and applications that they would find useful in their disciplines.

### **(18HS0801) CHEMISTRY**

#### **Course Outcomes:**

1. Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
2. Able to design the flowchart and algorithm for real world problems
3. Able to learn and understand new programming languages

### **(18ME0302) ENGINEERING GRAPHICS & DESIGN**

#### **Course Outcomes:**

Students undergoing this course are able to

1. Frame ideas based on the conceptual modeling and design
2. Provide good understanding of the methods involved in preparing various views in Engineering drawings
3. Can prepare 2D and 3D diagrams of various objects

### **(18ME0303) MATERIALS ENGINEERING**

#### **Course Outcomes:**

Students undergoing this course are able to

1. Describe fundamental scientific (chemistry, physics) and engineering principles (material science) in materials processes and material systems.
2. Students will get knowledge on bonds of solids and knowing the crystallization of metals
3. Students should be able to understand the equilibrium diagrams and their usage in the production processes.

### **(18HS0811) ENGLISH LAB**

#### **Course Outcomes:**

Students will be able:

1. To recognize sounds of English language with different classifications.
2. To know phonetic transcription and phonemic symbols of English language.
3. To understand international accent and utilize the same in their daily conversation.
4. To crease confidence for public speaking, for facing interviews, for making effective oral presentations, for having discussions, and for delivering impromptu speeches.

### **(18HS0816) INDIAN CONSTITUTION**

#### **Course Outcomes:**

Students will be able to:

1. Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
2. Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
3. Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
4. Discuss the passage of the Hindu Code Bill of 1956.

### **(18HS0835) PROBABILITY & STATISTICS**

#### **Course Outcomes:**



At the end of the course, students would be expected to:

1. Have acquired ability to participate effectively in group discussions
2. Have developed ability in writing in various contexts

### **(18HS0803) BIOLOGY FOR ENGINEERS**

#### **Course Outcomes**

1. Classify enzymes and distinguish between different mechanisms of enzyme action.
2. Identify DNA as a genetic material in the molecular basis of information transfer.
3. Analyze biological processes at the reductionistic level
4. Apply thermodynamic principles to biological systems.
5. Identify and classify microorganisms.

### **(18CE0151) STRENGTH OF MATERIALS**

#### **Course Outcomes:**

Students undergoing this course are able to:

1. The students would be able to understand the behaviour of materials under different stress and strain conditions.
2. The students would be able to draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading.
3. The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams under various loading conditions.
4. Determine shear stress in the shaft subjected to torsional moments.

### **(18ME0304) KINEMATICS OF MACHINERY**

#### **Course Outcomes:**

Students undergoing this course are able to

1. Familiarity with common mechanisms used in machines and everyday life.
2. Identify different mechanisms, Inversions of kinematic chains
3. Ability to perform analysis of different types of links, position, velocity, acceleration analyses.

### **(18CE0152) FLUID MECHANICS & FLUID MACHINES**

#### **Course Outcomes:**

After completion of this course the student will be able to,

1. How to find frictional losses in a pipe when there is a flow between two places.
2. Know types of flow and its measurements and applications.
3. Identify the suitable pump required for different purposes.
4. Classify the turbines and design criteria based on water availability.

### **(18ME0305) MATERIAL TESTING LAB**

#### **Course Outcomes:**

After completion of this course, a successful student will be able to:

1. Prepare metallographic samples for microscopic examinations.
2. Analyze the microstructure and estimate the amount of porosity and grain size of the casted specimen.
3. Analyze the mechanical Properties of Various Engineering materials

### **(18ME306) MACHINE DRAWING LAB**

#### **Course Outcomes:**

1. Students can understand the working principles of an assembly or subassembly so that he/she will be able to produce the final product by procuring the units from various sources/suppliers and still produce any useful product serving effectively.
2. The drawings can be easily prepared and understood by the people in a manufacturing industry.

### **(18CE0153) FLUID MECHANICS & FLUID MACHINES LAB**

#### **Course Outcomes:**

Students undergoing this course are able to

1. Calibrate Venturimeter & Orifice meter
2. Calculate losses in flows
3. Estimate the efficiency of different pumps.
4. Study the performance of different turbines.

### **(18HS0804) ENVIRONMENTAL SCIENCES**

#### **Course Outcomes:**

1. Based on this course, the Engineering Student will be able to understand/evaluate/develop technologies on the basis of Ecological principles and environmental regulations along with Legislation, Laws and Policies which in turn help in sustainable development.
2. Take preventive measures to reduce air, water, soil pollutions and contaminants in food.
3. Effectively carry out waste disposal at individual level.
4. Involve in preservation of natural resources.

### **(18ME0307) NON- CONVENTIONAL ENERGY RESOURCES**

#### **COURSE OUTCOMES**

On successful completion of the course, the student will be able to

1. State various sources of Energies, its availability and explain the importance of them by observing the global energy scenario.
2. Distinguish the types of solar energy tapping devices and describe the method of harnessing the solar energy.
3. Summarize the Wind energy systems and elucidate the impact of it in environmental aspects.
4. Describe the Biomass conversion process and list out various bioenergy applications.

5. Interpret the knowledge of renewable energies such as tidal energy, OTEC, Fuel cell, etc. for effective construction of Hybrid systems.
6. Identify numerous applications renewable energy resources and illustrate its harnessing technologies

### **(18EE0240) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

#### **Course Outcomes:**

Upon completion of the course, students will:

1. Determine the equivalent impedance of given network by using network reduction techniques.
2. Determine the current through any element and voltage across any element
3. Apply the network theorems suitably.
4. Analyze the operating principles of motor and transformer.
5. Analyze the operating principles of major electronic devices, its characteristics and applications.
6. Design and analyze the DC bias circuitry of BJT and FET.

### **(18ME0308) MANUFACTURING PROCESSES**

#### **Course Outcomes:**

Students undergoing this course are able to

1. Demonstrate knowledge of engineering principles (metallurgy, mechanics, and/or material science) in manufacturing processes.
2. Use appropriate machine tool equipment, standardized methods and apparatus or manufacturing processes.
3. Use finite element software to simulate physical behaviors of mechanical structures or systems.
4. Apply FEA principles for component and assembly design

### **(18ME0309) THERMODYNAMICS**

#### **Course Outcomes:**

Students undergoing this course are able to

1. Apply the laws of thermodynamics to analyze thermal systems.
2. Can understand the energy transformation from one system to other system.
3. Can understand the working principles of I.C. Engines.

### **(18ME0310) THEORY OF MACHINES**

#### **Course Outcomes:**

Students undergoing this course are able to

1. Understand and apply the basic principles of dynamics.
2. Relate the motion of parts in a machine using the principles of kinematics

### **(18ME0311) MANUFACTURING PROCESSES LAB**

#### **Course Outcomes:**

Students undergoing this course are able to

1. Demonstrate knowledge of engineering principles (metallurgy, mechanics, and/or material science) in manufacturing processes.
2. Use appropriate machine tool equipment, standardized methods and apparatus for manufacturing processes.

### **(18EE0241) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB**

#### **Course Outcomes:**

1. Students will understand all the fundamental concepts involving electrical engineering.
2. Students will understand all the fundamental concepts involving electronics engineering.

### **(18HS0860) SUPPLY CHAIN MANAGEMENT**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Appreciate the evolution and identify the role of supply chain management in the economy.
2. Identify and evaluate the drivers of supply chain management.
3. Analyze the importance of make or buy decisions and identify appropriate suppliers.
4. Appraise the importance of supply chain networks.
5. Assess the risk associated with supply chain practices and take better decisions.
6. Familiarize with and apply various computer based supply chain optimization tools.

### **(18ME0312) CAD/CAM**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Apply geometric transformation techniques in CAD.
2. Formulate the mathematical models to represent curves and surfaces.
3. Design engineering components using solid modeling techniques.
4. Understands about NC and CNC systems, Group Technology and FMS
5. Create programs for CNC to manufacture industrial components.
6. Summarize the different types of techniques used in MRP-I & MRP-II.

### **(18ME0313) DESIGN OF MACHINE ELEMENTS-I**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Apply design procedures using theories of failure for different elements.
2. Design simple components under cyclic loading using Goodman's and Soderberg's criterions.
3. Intend Bolted joints with pre stress and joints under eccentric loading.

4. Design and analyze riveted joints with different configuration, boiler shell joint and eccentric loading of riveted joints and bolted joints.
5. Implement the concepts to design cotter joint, knuckle joint and shafts.
6. Explain the design procedure of various key, rigid and flexible shaft couplings.

#### **(18ME0314) MACHINE TOOLS**

##### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Describe elements of metal machining.
2. Draw Merchant's cycle diagrams.
3. Explain the working principle of lathe and different operations performed on it.
4. Understands about the drilling, boring, shaping and milling machines.
5. Express the basic principles of jigs & fixtures, grinding machines.
6. Illustrate numerous surface finishing operations.

#### **(18ME0315) THERMAL ENGINEERING**

##### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Interpret the knowledge of I C engines in Engine performance calculations
2. Compute various performance parameters of an I C engine.
3. Summarize the working of Air compressors and its classification.
4. Analyze Vapour power cycles and can find methods to improve cycle performance.
5. Recognize the importance of Steam nozzles and Condensers in steam power plants.
6. Describe the phenomenon of Governing in Steam turbines, Classification & its Governing and can compute efficiency of steam turbine.

#### **(18ME0316) COMPUTER AIDED MODELING LAB**

##### **COURSE OUTCOMES**

Students undergoing this course can

1. Describe the interface of Solid edge software.
2. Explain various commands used to sketch a part.
3. Understand the use of different commands in Assembly interface.
4. Draw various part drawings using solid edge software.
5. Summarize various assembly commands used to assemble the component.
6. Produce a component by assembling various part drawings of the component.

#### **(18ME0317) MACHINE TOOLS LAB**

##### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Describe various taper turning methods.

2. Demonstrate different machine tools used in machine shop.
3. Illustrate knurling, threading and shaping operations on a job.
4. Evaluate various fundamental parameters of tool and surface roughness by using different instruments.
5. Understands about machine tool structures and machining economics.
6. Explain the use of keyway in milling and slotting operations.

### **(18ME0318) THERMAL ENGINEERING LAB**

#### **COURSE OUTCOMES**

Students undergoing this course can

1. Describe the Maintenance of Air filter, Spark plug and carburetor of a two wheeler.
2. Understands about suspension systems, Chain Overhauling and dismantling brakes of a two wheeler.
3. Explains about tire changing, injector testing, Wheel alignment & Balancing, Disc Braking of a four wheeler.
4. Construct valve timing & Port timing diagram of an engine.
5. Estimate the performance of 4 -Stroke Diesel Engine & VCR Petrol Engine.
6. Execute Heat Balance test on a 4 -Stroke Diesel Engine.

### **(18HS0842) APTITUDE PRACTICES**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Develop the subtle way of approaching in the candidate.
2. Acquired the decision making with in no time.
3. Implement logical thinking during professional tenure.
4. Improve knowledge on problem solving.
5. Understand problems on coding and decoding.
6. Apply the knowledge on the concept of reasoning in real life.

### **(18ME0319) DESIGN OF MACHINE ELEMENTS-II**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Summarize the knowledge to design crane hooks, C-clamps and various belt, rope and chain drives.
2. Design and analyze journal bearings, ball bearings and roller bearings and Explain the advantages of rolling contact bearings against sliding contact bearings.
3. Apply the concepts to know various forces acting on I C engine parts and failure criteria to be adopted for various parts.
4. Create helical springs for two wheel vehicle and laminated springs for trucks.
5. Explain Gears and its classification.

6. Design spur and helical gears for different input conditions.

### **(18ME0320) HEAT & MASS TRANSFER**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Explain the fundamental principles associated with heat transfer.
2. Evaluate multi-dimensional and transient thermal conduction problems.
3. Analyze forced convection, internal flows and free convection problems.
4. Understands about Boiling and Condensation.
5. Design heat exchangers for various applications.
6. Illustrate the principles of radiation and mass transfer.

### **(18ME0321) METROLOGY & MEASUREMENTS**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Explain the basic standards of measurements and also application of Slip gauges.
2. Describe the concept of different types of dimensional tolerances and fits.
3. Evaluate engineering parts with various precision instruments.
4. Check the surface roughness of parts.
5. List out various measuring techniques for Pressure, Strain and Temperature.
6. Estimate the Instruments accuracy and Perform calibration of measuring instruments.

### **(18ME0330) INDUSTRIAL ENGINEERING & MANAGEMENT**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Interpret the roles and responsibilities of Management-Administration and Organization.
2. Explain about organizational structures with its merits and demerits
3. Assess the type of plant layout for increasing productivity
4. Describe the importance of work and time study at work place
5. Recognize the importance of inventory and ERP systems.
6. Describe the human resource department effectiveness and ability to lead an organization.

### **(18ME0331) PRODUCTION & OPERATIONS MANAGEMENT**

#### **COURSE OUTCOMES**

On successful Completion of this course the student will be able to

1. Explain the Functions of production planning & control operation and productivity measurement.
2. Develop new products and its design issues.
3. Describe the Importance of forecasting, uses, principles and its methods.
4. Analyze and evaluate various facility alternatives and their capacity decision.

5. List out Aggregate planning strategies and Inventory management and control.
6. Summarize Scheduling policies, lot sizing techniques and implementation of suitable quality control measures in operation environments.

### **(18ME0332) TOTAL QUALITY MANAGEMENT**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Understand the importance of the quality, costs of quality, and Basics concepts of quality.
2. Describe the TQM principles, employee involvement, and team spirit and PDCA cycle.
3. Explain the management tools like Six Sigma, Bench Marking.
4. Recognize various stages of FMEA and its classification.
5. Summarize TQM tools like control charts, QFD, Taguchi loss function and TPM.
6. Apply the tools and techniques of quality management to manufacturing and services processes.

### **(18CE0127) ELEMENTS OF ROAD TRAFFIC SAFETY**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Identify the causes for road accidents and can implement measures to prevent road accidents.
2. Describe traffic regulations and implement parking methods.
3. Classify different traffic signal and can design traffic signal system.
4. List out and illustrate various traffic signs.
5. List out and discuss various road markings.
6. Discuss importance of street lighting and classify various street lighting system.

### **(18EE0234) INDUSTRIAL INSTRUMENTATION**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Identify and explain the types of errors occurring in measurement systems.
2. Differentiate among the types of data transmission and modulation techniques.
3. Apply digital techniques to measure voltage, frequency and speed.
4. Analyze the working principles of different Signal Analyzers and Digital meters.
5. Understand the operation of several types of transducers.
6. Choose suitable Transducers for the measurement of non-electrical quantities.

### **(18EC0449) INTRODUCTION TO IOT**

#### **COURSE OUTCOMES**

On successful completion of this course, student will be able to

1. Understand the technology and standards relating to IoTs.



2. Understand where the IoT concept fits within the broader ICT industry and possible future trends.
3. Understand the key components that make up an IoT system.
4. Differentiate between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack.
5. Configure Raspberry Pi, Understand Sensors, Actuators & get started with python on Raspberry Pi.
6. Apply the knowledge and skills acquired during the course to design, build and test a complete, working IoT system involving prototyping, programming and data analysis.

### **(18CS0517) PYTHON PROGRAMMING**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to

1. Solve the problems using control structures, input and output statements.
2. Summarize the features of lists, tuples, dictionaries, strings and files.
3. Experience the usage of standard libraries, objects, and modules.
4. Solve the problems using Object Oriented Programming Concepts.
5. Build the software for real time applications using python.
6. Install various Python packages.

### **(18HS0814) INTELLECTUAL PROPERTY RIGHTS**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights.
2. Identify different types of intellectual properties, ownership rights and the scope of the protection.
3. Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work.
4. Identify, apply, and assess ownership rights, registration processes for IP rights.
5. Discern the approaches for intellectual property management and intellectual property audits.
6. Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level.

### **(18ME0322) HEAT TRANSFER LAB**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Evaluate thermal conductivity of a given metal Rod and overall heat transfer coefficient for a composite slab.
2. Check the increased rate of heat transfer with extended surface (Pin Fin).

3. Compare differences in rate of heat transfer between Forced & Natural Convection and also explain the transient heat conduction process.
4. Compute rate of heat transfer in Parallel and counter flow heat exchanger.
5. Understands emissivity effect of black body & gray body and Stefan Boltzmann Constant.
6. Carryout experiment on Heat transfer in Drop wise and Film wise Condensation.

### **(18ME0323) METROLOGY AND MEASUREMENTS LAB**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Understand about Calibration of Linear measuring and Angular measuring instruments.
2. Measure Straightness, Flatness and Taper angle.
3. Estimate Gear tooth dimensions and thread parameters.
4. Compute the various parameters like pressure, displacement, speed, temperature etc., by using various instruments like pressure gauge, LVDT, stroboscope ,thermocouple etc.,
5. Check parameters like length, height, angle, displacement, flatness etc., by using various instruments like Vernier calipers, micrometer, dial indicator, etc.
6. Find surface roughness using appropriate instruments and analyze the data.

### **(18HS0859) ENGLISH FOR CORPORATE COMMUNICATION SKILLS LAB**

#### **COURSE OUTCOMES**

On successful completion of this course the student will be able to

1. Flair in Writing by using cohesion and coherence.
2. Prepare effective job application.
3. Presenting Effective Speaking Abilities.
4. Apply various communicative techniques in their professional lives.
5. Cope with the employability skills.
6. Use effective communicative approaches by preparing job application, report and other kinds of spoken and written correspondences.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**Department of Electronics and Communication Engineering**

**I B. Tech. – I Semester (E.C.E)**

**(18HS0830) MATHEMATICS-I**

**Course Outcomes:**

On successful completion of this course, the student will be able to

- Familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra.
- Equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

**(18HS0801) CHEMISTRY**

**Course Outcomes:**

On successful completion of this course, the student will be able to

- Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs Rationalise bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity

**(18ME0302) ENGINEERING GRAPHICS & DESIGN**

**Course Outcomes:**

On successful completion of this course, the student will be able to

- Frame ideas based on the conceptual modeling and design
- Provide good understanding of the methods involved in preparing various views in Engineering drawings
- Can prepare 2D and 3D diagrams of various objects.

### **(18HS0810) ENGLISH**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- To understand the rules of English grammar and their usage in writing English.
- To use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- To get the mastery of language to express ideas, views, feelings and experience.
- To communicate well among themselves.
- To inculcate values and ideal characteristic qualities in themselves.

### **(18HS0811) ENGLISH LAB**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- To recognize sounds of English language with different classifications.
- To know phonetic transcription and phonemic symbols of English language.
- To understand international accent and utilize the same in their daily conversation.
- To create confidence for public speaking, for facing interviews, for making effective oral presentations, for having discussions, and for delivering impromptu speeches.

### **(18ME0301) WORKSHOP PRACTICE LAB**

#### **Course outcomes:**

On successful completion of this course, the student will be able to

- Utilize workshop tools for engineering practice.
- Employ skills for the production a component for real time applications.
  - Appreciate the hard work and intuitive knowledge of the manual workers

### **I B. Tech. – II Sem. (E.C.E)**

### **(18HS0831) MATHEMATICS-II**

#### **Course Outcomes:**

- On successful completion of this course, the student will be able to
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- The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariable calculus and complex analysis. It aims to equip the students with standard concepts and tools at an intermediate to advanced

level that will serve them well towards tackling more advanced level of Mathematics and applications that they would find useful in their disciplines.

### **(18HS0851) SEMICONDUCTOR PHYSICS**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Would understand the basic concepts of free electron theory and energy bands in solids.
- Able to deliver importance of semiconductors.
- Would understand working principles and applications of optoelectronic devices.
- Able to explain concepts related to Lasers and Optical fibers..
- Understand the importance of Nanotechnology.

### **(18EE0239) BASIC ELECTRICAL ENGINEERING**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Determine the equivalent impedance of given network by using network reduction techniques.
- Determine the current through any element and voltage across any element Apply the network theorem suitably.
- Analyze the operating principles of electrical machines and transformer.

### **(18CS0501) PROGRAMMING FOR PROBLEM SOLVING**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs
- Able to write C programs for real world problems using simple and compound data types

### **(18CE0101) ENGINEERING MECHANICS**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Construct free body diagrams and develop appropriate equilibrium equations.
- Understand the concepts of friction and to apply in real life problems.

- Determine the centroid for composite sections.
- Determine the Moment of Inertia for composite sections.

### **(18HS052) PHYSICS LAB**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- To explore the application of Interference and Diffraction by doing concerned experiments.
- Elucidate the concepts of Physics through involvement in the experiment by applying theoretical knowledge.
- To understand the concept of energy gap, B-H curve and resonance phenomena in LCR circuits.
- Develop an ability to apply the knowledge of physics experiments in the later studies

### **(18CS0503) PROGRAMMING FOR PROBLEM SOLVING LAB**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Apply problem solving techniques of C to find solution.
- Use C language features effectively to implement solutions.
- Use C++ language features effectively to solve problems.
- Identify and develop apt searching and sorting technique for a given problem.
- Identify, design and develop the appropriate data structure for a given problem or application.

### **(18HS0817) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Impart basic principles of thought process, reasoning and inference. Sustainability is at the core of Indian Traditional knowledge Systems connecting society and nature.
- Holistic life style of yogic science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions.
- The course focuses on introduction to Indian Knowledge Systems, Indian perspective of modern scientific world-view, and basic principles of Yoga and holistic health care system.

## **II B. Tech -ISem.(E.C.E)**

### **(18HS0834) MATHEMATICS-III**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

familiarize the prospective engineers with techniques in Numerical Methods, Transform Calculus & Partial Differential Equations. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines

### **(18EC0401) ELECTRONIC DEVICES**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Demonstrate the knowledge in Electronic Devices, their Characteristics and Applications.
- Analyze the Diode circuits, Transistor & FET biasing circuits of BJT and FET.
- Design of Diode circuits and Transistor Amplifier circuits using BJT and FET.

### **(18EC0402) DIGITAL SYSTEM DESIGN**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Define different Number system and perform Number base conversions.
- Design and analyze Combinational Logic Circuits.
- Design and analyze modular Combinational Circuits with MUX / DEMUX, Decoder / Encoder.
- Design and analyze synchronous sequential logic circuits.
- Use HDL & EDA tools for digital logic design and simulation.

### **(18EC0403) SIGNALS & SYSTEMS**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Analyze different types of signals.
- Represent continuous and discrete systems in time and frequency domain using different transforms.
- Investigate the system stability.
- Sampling and reconstruction of a signal

### **(18EE0242) NETWORK THEORY**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Understand basics electrical circuits with nodal and mesh analysis.
- Determine the transient response of R-L, R-C, R-L-C circuits for dc and ac excitations.
- Apply Fourier transforms to electrical circuits excited by non-sinusoidal sources.
- Design different types of filters.

### **(18EC0404) ELECTRONIC DEVICES LAB**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

1. Know various semiconductor devices and their use in Real time applications.
2. Find the Frequency response characteristics of BJT and FET amplifiers and determine Bandwidth.

### **(18EC0405) DIGITAL SYSTEM DESIGN LAB**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Design and analyze Combinational Logic Circuits
- Design and analyze modular Combinational Circuits with MUX / DEMUX, Decoder/ Encoder
- Design and analyze synchronous sequential logic circuits
- Use HDL & EDA tools for digital logic design and simulation

### **(18EC0407) ANALOG CIRCUITS**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Analyze and design BJT single stage and multi stage amplifiers, feedback amplifiers, oscillators, power amplifiers and tuned amplifiers.
- Understand the basic building blocks of linear integrated circuits.

### **(18EC0408) ANALOG COMMUNICATIONS**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Acquire knowledge on the basic concepts of Analog Communication Systems.
- Analyze the analog modulated and demodulated systems.
- Verify the effect of noise on the performance of communication systems.
- Know the fundamental concepts of information and capacity.



### **(18EC0409) PROBABILITY THEORY AND STOCHASTIC PROCESSES**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- A student will be able to determine the temporal and spectral characteristics of random signal response of a given linear system.

### **(18HS0812) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

Thorough understanding of Managerial Economics and Analysis of Financial statements facilitates the technocrats –cum- entrepreneurs to take up decisions effectively and efficiently in the challenging Business Environment.

### **(18HS0803) BIOLOGY FOR ENGINEERS**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Classify enzymes and distinguish between different mechanisms of enzyme action.
- Identify DNA as a genetic material in the molecular basis of information transfer.
- Analyse biological processes at the reductionistic level
- Apply thermodynamic principles to biological systems.
- Identify and classify microorganisms.

### **(18EC0410) ANALOG CIRCUITS LAB**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Construct and simulate various single stage, multi stage amplifiers, feedback amplifiers, oscillators, power amplifiers and tuned amplifiers.
- Design various electronic circuits using opAmp.

### **(18EC0411) ANALOG COMMUNICATIONS LAB**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Technically visualize spectra of different analog modulation schemes
- Analyze practical behavior of different elements available in analog

- communication system such as filters, amplifiers etc.
- Measure characteristics of radio receiver measurements.

### **(18HS0804) ENVIRONMENTAL SCIENCES**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Based on this course, the Engineering Student will be able to understand/evaluate/develop technologies on the basis of Ecological principles and environmental regulations along with Legislation, Laws and Policies which in turn help in sustainable development.
- Take preventive measures to reduce air, water, soil pollutions and contaminants in food.
- Effectively carry out waste disposal at individual level.
- Involve in preservation of natural resources

#### **III B.Tech. – I Sem.**

### **(18EE0211) CONTROL SYSTEMS**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Identify open and closed loop control system.
- Formulate mathematical model for physical systems and simplify representation of complex systems using reduction techniques.
- Use standard test signals to identify performance characteristics of first and second-order systems.
- Apply root locus technique for stability analysis.
- Analyze performance characteristics of system using Frequency response methods.
- Develop and analyze state space models.

### **(18EC0412) ELECTROMAGNETIC THEORY AND TRANSMISSION LINES**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Analyse the relation between electric and magnetic fields using vector analysis.
- Evaluate the Maxwell's Equation in Static Electric and Magnetic Field.
- Apply Maxwell's equations in Electromagnetic fields.
- Characterize Maxwell's equation in both static and Time varying fields.
- Understand the propagation of electromagnetic waves in different media.
- Understand the concepts of Transmission lines and Their Applications

### **(18EC0413) ELECTRONIC MEASUREMENTS AND INSTRUMENTATION**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Recognize the evolution and history of units and standards in Measurements.
- Identify the various parameters that are measurable in electronic instrumentation.
- Employ appropriate instruments to measure given sets of parameters.
- Practice the construction of testing and measuring set up for electronic systems.
- Apply the complete knowledge of various electronics instruments/transducers to measure the physical quantities in the field of science, engineering and technology.
- Relate the usage of various instrumentation standards

### **(18EC0414) DIGITAL SIGNAL PROCESSING**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Apply DFT & FFT for the analysis of digital signals and systems and Compare its efficiency.
- Design IIR and FIR filters for the given specifications.
- Construct different forms of IIR and FIR filter realizations.
- Distinguish the effects of finite precision representation on digital filters.
- Evaluate the errors due to Truncation and Rounding in Quantization process.
- Realize DSP architecture and programming.

### **(18EC0415) DIGITAL COMMUNICATIONS**

#### **Course Outcomes:**

On Successful Completion of this Course the Student will be able to

- Understand the Elements of Digital Communication System & Fundamental concepts of sampling Theorem along with different Modulation Techniques.
- Describe and determine the performance of line codes and methods to mitigate inter symbol interference.
- Learn the generation and detection of pass band system.
- Understand the generation, detection signal space diagram, spectrum, bandwidth efficiency, and probability of error analysis of different band pass modulation techniques.
- Describe and determine the performance of different error control coding schemes for the reliable transmission of digital representation of signals and information over the channel.
- Apply the knowledge of digital electronics and describe the error control codes like Linear block codes, convolutional codes

### **(18EC0416) ELECTRONIC MEASUREMENTS LAB**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Assess values of R,L,C ,Voltage, Current, Power, Energy.

- Determine unknown values in balancing Bridges.
- Evaluate frequency, phase in Oscilloscope.
- Explain the use of Digital voltmeters.
- Determine strain, displacement, Velocity, temperature and Pressure.
- Estimate water level using capacitive transducer.

### **(18EC0417) DIGITAL SIGNAL PROCESSING LAB**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Analyze basic signal processing operations.
- Perform linear and circular convolution and implement in DSP Processor.
- Compute Auto and Cross Correlation.
- Design the FIR and IIR Filters.
- Analyze the Multirate Signal Processing.
- Implement different elementary Discrete-Time sequences.

### **(18EC0418) DIGITAL COMMUNICATIONS LAB**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

Demonstrate a good background in analyzing the block diagram of communication system

- Able to understand basic theories of Digital communication system in practical.
- The skill to analyze and implement analogue to digital converters like PCM, DM.
- Measures the Amplitude and Frequency of various Base band modulation techniques and observes the output waveforms.
- Measures the Amplitude and Frequency of various Pass band modulation techniques and observes the output waveforms.
- Able to understand channel coding like Linear Block Codes and Convolutional Codes.

### **(18HS0859) ENGLISH FOR CORPORATE COMMUNICATION SKILLS LAB**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Flair in Writing by using cohesion and coherence.
- To prepare effective job application.
- Presenting Effective Speaking Abilities.
- To apply various communicative techniques in their professional lives.
- To cope with the employability skills.
- Use effective communicative approaches by preparing job application, report and other kinds of spoken and written correspondences.

### **III B.Tech.– II Sem.**

#### **(18EC0451) DATA COMMUNICATION AND NETWORKING**

##### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Understand the basics of data communication, networking, internet and their importance.
- Analyze the services and features of various protocol layers in data networks.
- Differentiate wired and wireless computer networks
- Analyze TCP/IP and their protocols.
- Recognize the different internet devices and their functions
- Identify the basic security threats of a network

#### **(18EC0419) ANTENNAS AND WAVE PROPAGATION**

##### **Course Outcomes:**

On successful completion of the course, students will be able to:

- Understand the basic principles of all types of antennas calculate the far field region.
- Analyze different types of antennas their parametric integral expressions for a given current source for various frequency ranges.
- Calculate electromagnetic fields for a given vector potential can understand practical antennas.
- Implement pattern multiplication principle for some practical array antennas such as dipole, Yagi - uda, and horn antenna.
- Apply the radiation patterns of antennas through measurement setups.
- Learn various modes of wave propagation and their parameters

#### **(18EC0420) MICROPROCESSORS AND MICROCONTROLLERS**

##### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Understand the evolution of computers, processors, and its applications
- Explain the various software and hardware parts of a microprocessors and computer
- Understand the architectures of 8085 microprocessor and 8051 microcontroller system
- Analyze the programming model of 8085 Microprocessor & 8051 microcontroller development environment.
- Implement the techniques of interfacing memories, various I/O devices, sensors and actuators with microprocessor and microcontrollers
- Design and develop various microprocessor/microcontroller-based systems for the real-life problems

## **(18EC0428) MICROWAVE THEORY AND TECHNIQUES**

### **Course Outcomes:**

On successful completion of this course, the student will be able to

1. Design and simulate waveguide components for various applications
2. Compare between the conventional waveguides & microwave tubes
3. Able to analyze micro-wave circuits incorporating hollow, dielectric and planar waveguides, transmission lines, filters and other passive components, active devices
4. Utilize knowledge about the measurements to be done at microwaves
5. Able to illustrate the various parameters and explain about the characteristics of the various waveguide components
6. Able to define the basic concepts of microwave tubes & Scattering Matrix

## **(18EC0429) INFORMATION THEORY AND CODING**

### **Course Outcomes:**

After the completion of the course, student will be able to

- Explain the concept of information.
- Analyse the concept of entropy and error control coding .
- Determine channel capacity.
- Apply coding techniques to define channel capacities and properties using Shannon's Theorems.
- Construct efficient codes for data on imperfect communication channels.
- Analyse error correction and detection in receiver section.

## **(18EC0430) SCIENTIFIC COMPUTING**

### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Illustrate the significance of computing methods, their strengths and application areas.
- Solve the scientific computing of system of linear equations and Eigen values and singular values in real life situations.
- Apply the scientific computing of system of Non - linear equations and Interpolation for engineering problems.
- Demonstrate the knowledge of scientific methods for solving Numerical Integration and Differentiation for engineering problems.
- Solve the ordinary differential equations with initial conditions by using scientific techniques with engineering applications.
- Evaluate the partial differential equations by using scientific techniques with engineering applications.

### **(18CE0127) ELEMENTS OF ROAD TRAFFIC SAFETY**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Identify the causes for road accidents and can implement measures to prevent road accidents
- Describe traffic regulations and implement parking methods
- Classify different traffic signal and can design traffic signal system
- List and illustrate various traffic signs
- List and discuss various road markings
- Discuss importance of street lighting and classify various street lighting system

### **(18EE0234) INDUSTRIAL INSTRUMENTATION**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Identify and explain the types of errors occurring in measurement systems.
- Differentiate among the types of data transmission and modulation techniques.
- Apply digital techniques to measure voltage, frequency and speed.
- Analyse the working principles of different Signal Analyzers and Digital meters.
- Understand the operation of several types of transducers.
- Choose suitable Transducers for the measurement of non-electrical quantities.

### **(18ME0307) NON-CONVENTIONAL ENERGY RESOURCES**

#### **Course Outcomes:**

At the end of this course, the student will be able to

- State various sources of Energies, its availability and explain the importance of them by observing the global energy scenario.
- Distinguish the types of solar energy tapping devices and describe the method of harnessing the solar energy.
- Summarize the Wind energy systems and elucidate the impact of it in environmental aspects.
- Describe the Biomass conversion process and list out various bioenergy applications.
- Interpret the knowledge of renewable energies such as tidal energy, OTEC, Fuel cell, etc. for effective construction of Hybrid systems.
- Identify numerous applications renewable energy resources and illustrate its harnessing technologies.

### **(18CS0517) PYTHON PROGRAMMING**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Solve the problems using control structures, input and output statements.
- Summarize the features of lists, tuples, dictionaries, strings and files
- Experience the usage of standard libraries, objects, and modules
- Solve the problems using Object Oriented Programming Concepts
- Build the software for real time applications using python
- Install various Python packages

### **(18HS0814) INTELLECTUAL PROPERTY RIGHTS**

#### **Course Outcomes:**

On successful completion of the course, students will be able to:

- Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights
- Identify different types of intellectual properties, ownership rights and the scope of the protection
- Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work
- Able to identify, apply, and assess ownership rights, registration processes for IP rights
- To discern the approaches for intellectual property management and intellectual property audits
- Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level

### **(18EC0421) ANTENNAS AND WAVE PROPAGATION LAB (Virtual Lab)**

#### **Course Outcomes:**

On successful completion of the course, students will be able to:

- Understand parametric equations for the calculation in the far field region.
- Analyze Antenna model for various VHF, UHF.
- Learn pattern multiplication principle for array antennas.
- Understand the relation between various antennas and their parameters .
- Calculate Microwave Antennas parameters.
- Applications of the various practical antenna.

### **(18EC0422) MICROCONTROLLER AND APPLICATIONS LAB**

#### **Course Outcomes:**

On successful completion of this course, students will be able to

- Familiar with keil programming environment



- Demonstrate arithmetic, logical and string operations using assembly language programming.
- Develop embedded C language programs for various applications using 8051 microcontroller.
- Explore the provided example code and online resources for extending knowledge about the capabilities of the 8051 microcontrollers
- Test, debug, and deploy the 8051 microcontroller-based systems
- Design and develop own microprocessor/microcontroller-based solutions for the real-world problems

### **(18HS0842) APTITUDE PRACTICES**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Develop the subtle way of approaching in the candidate.
- Acquired the decision making with in no time.
- Implement logical thinking during professional tenure.
- Improve knowledge on problem solving.
- Understand problems on coding and decoding.
- Apply the knowledge on the concept of reasoning in real life.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)  
Bachelor of Technology**

**Department of Computer Science and Engineering**

**I B. Tech. – I Semester (CSE)**

**(18HS0830) MATHEMATICS-I**

**Course Outcomes:**

- To introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals. Apart from some applications it gives a basic introduction on Beta and Gamma functions.
- To introduce the fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
- To develop the tool of power series and Fourier series for learning advanced Engineering Mathematics.
- To familiarize the student with functions of several variables that is essential in most branches of engineering.
- To develop the essential tool of matrices and linear algebra in a comprehensive manner.

**(18HS0801) CHEMISTRY**

**Course Outcomes:**

- Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs Rationalise bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.

**(18ME0302) ENGINEERING GRAPHICS & DESIGN**

**Course Outcomes:**

Students undergoing this course are able to

- Frame ideas based on the conceptual modeling and design
- Provide good understanding of the methods involved in preparing various views in Engineering drawings.
- Can prepare 2D and 3D diagrams of various objects

### **(18HS0810) ENGLISH**

#### **Course Outcomes:**

Students will be able:

- To understand the rules of English grammar and their usage in writing English.
- To use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- To get the mastery of language to express ideas, views, feelings and experience.
- To communicate well among themselves.
- To inculcate values and ideal characteristic qualities in themselves.

### **(18HS0802) CHEMISTRY LAB**

#### **Course Outcomes:**

The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:

- Estimate rate constants of reactions from concentration of reactants/products as a function of time.
- Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
- Synthesize a small drug molecule and analyse a salt sample.

### **(16HS607) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

#### **Course outcomes:**

- To become active participants in the learning process and acquire proficiency in spoken English.
- To speak with clarity and confidence thereby enhances employability skills.
- To prepare effective job application

### **(18HS0802) CHEMISTRY LAB**

#### **Course Outcomes:**

On completion of this course, students will have the knowledge in.

- Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.
- Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results.

### **(18HS0811) ENGLISH LAB**

#### **Course Outcomes:**

Students will be able:

1. To recognize sounds of English language with different classifications.
2. To know phonetic transcription and phonemic symbols of English language.

3. To understand international accent and utilize the same in their daily conversation.
4. To crease confidence for public speaking, for facing interviews, for making effective oral presentations, for having discussions, and for delivering impromptu speeches.

### **(18ME0301) WORKSHOP PRACTICES LAB**

#### **Engineering Workshop**

##### **Course Outcomes:**

After completion of this course, a successful student will be able to:

- Utilize workshop tools for engineering practice.
- Employ skills for the production a component for real time applications.
- Appreciate the hard work and intuitive knowledge of the manual workers.

#### **IT Workshop**

##### **Course Outcomes:**

After Completion of this Course the Student would be able to

- Identify the basic computer peripherals.
- Gain sufficient knowledge on assembling and disassembling a PC.
- Learn the installation procedure of Windows and Linux OS.
- Acquire knowledge on basic networking infrastructure.
- Learn productivity tools like Word, Excel and Power point.
- Acquire knowledge on basics of internet and worldwide web.

#### **I B. Tech – II Sem.(CSE)**

### **(18HS0831) MATHEMATICS-II**

##### **Course Outcomes:**

- The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariable calculus and complex analysis.
- It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of Mathematics and applications that they would find useful in their disciplines.

### **(18HS0851) SEMI-CONDUCTOR PHYSICS**

##### **Course outcomes:**

- Would understand the basic concepts of free electron theory and energy bands in solids.
- Able to deliver importance of semiconductors.
- Would understand working principles and applications of optoelectronic devices.
- Able to explain concepts related toLasers and Optical fibers. .
- Understand the importance of Nanotechnology.

### **(18CS0501) PROGRAMMING FOR PROBLEM SOLVING**

#### **Course Outcomes:**

- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs
- Able to write C programs for real world problems using simple and compound data types

### **(18CS0502) DIGITAL LOGIC DESIGN**

#### **Course Outcomes:**

At the end of this course, students will demonstrate the ability to

- Understand working of logic families and logic gates.
- Design and implement Combinational and Sequential logic circuits.
- Understand the process of Analog to Digital conversion and Digital to Analog conversion.
- Be able to use PLDs to implement the given logical problem.

### **(18EE0239) BASIC ELECTRICAL ENGINEERING**

#### **Course Outcomes:**

Upon completion of the course, students will:

- Determine the equivalent impedance of given network by using network reduction techniques.
- Determine the current through any element and voltage across any element
- Apply the network theorems suitably.
- Analyze the operating principles of electrical machines and transformer.

### **(18CS0503) PROGRAMMING FOR PROBLEM SOLVING LAB**

#### **Course Outcomes:**

At the end of the course, students will be able to

- Apply problem solving techniques of C to find solution.
- Use C language features effectively to implement solutions.
- Use C++ language features effectively to solve problems.
- Identify and develop apt searching and sorting technique for a given problem.
- Identity, design and develop the appropriate data structure for a given problem or application.

### **(18HS0852) PHYSICS LAB**

#### **Course Outcomes:**

- To explore the application of Interference and Diffraction by doing concerned experiments.

- Elucidate the concepts of Physics through involvement in the experiment by applying theoretical knowledge.
- To understand the concept of energy gap, B-H curve and resonance phenomena in LCR circuits.
- Develop an ability to apply the knowledge of physics experiments in the later studies.

**(18HS0817) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**

**Course Outcome:**

- Ability to understand, connect up and explain basics of Indian traditional Knowledge in modern scientific perspective.

**II B. Tech – I Sem.(CSE)**

**(18HS0835) PROBABILITY & STATISTICS**

**Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability

**(18EC0443) ANALOG ELECTRONICS CIRCUITS**

**Course Outcomes:**

Upon completion of this course, student will be able to:

- Understand Diode Circuits, BJT and FET amplifiers.
- Become familiar with the basic building blocks of linear integrated circuits.

**(18CS0504) DATA STRUCTURES & ALGORITHMS**

**Course Outcome:**

At the end of the course, students will be able to:

- Design algorithms to implement various data structures.
- Understand and program stacks and list data structures.
- Write programs to implement different types of queues.
- Understand and make use of hash tables in applications like dictionary, spell checker etc.,
- Understand why height balanced trees are advantageous over other data structures.

**(18CS0505) COMPUTER ORGANIZATION & ARCHITECTURE**

**Course outcomes:**

- Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.

- Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
- Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
- Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU.
- Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology

### **(18CS0506) DATABASE MANAGEMENT SYSTEMS**

#### **Course Outcomes:**

- For a given query write relational algebra expressions for that query and optimize the developed expressions
- For a given specification of the requirement design the databases using E\_R method and normalization.
- For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.
- Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.

### **(18CS0508) DATABASE MANAGEMENT SYSTEMS LAB**

#### **Course Outcome:**

Apply ER concepts to design databases.

- Design simple database using a tool and implement it using SQL.
- Access normalization relations of relational model using normal forms
- Apply all constrains to develop a business application using cursors, triggers and stored

### **(18EE0241) BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB**

#### **Course Outcomes:**

- Students will understand all the fundamental concepts involving electrical engineering.
- Students will understand all the fundamental concepts involving electronics engineering.

### **(18HS0816) INDIAN CONSTITUTION**

#### **Course Outcomes:**

Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.

- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- Discuss the passage of the Hindu Code Bill of 1956.

## **II B. Tech – II Sem.(CSE)**

### **(18HS0836) DISCRETE MATHEMATICS**

#### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability

### **(18CS0509) FORMAL LANGUAGES AND AUTOMATA THEORY**

#### **Course Outcomes:**

At the end of the course, students will be able to

- Construct finite Automats for various problems.
- Design automata, regular expressions and context-free grammar accepting and generating a certain language, design of new grammar and languages
- Define Push Down Automata performing simple tasks and equivalence of PDA and CFGs.
- Find solutions to the problems using Turing machines.
- Distinguish between computability , Decidability and un decidability problems

### **(18CS0510) OPERATING SYSTEMS**

#### **Course Outcomes:**

- Able to use operating systems effectively.
- Create processes and threads.
- Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time.
- For a given specification of memory organization develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time.
- Design and implement file management system.

### **(18HS0803) BIOLOGY FOR ENGINEERS**

#### **Course Outcomes**

- Classify enzymes and distinguish between different mechanisms of enzyme action.
- Identify DNA as a genetic material in the molecular basis of information transfer.



- Analyse biological processes at the reductionistic level
- Apply thermodynamic principles to biological systems.
- Identify and classify microorganisms.

### **(18CS0511) OBJECT ORIENTED PROGRAMMING**

#### **Course Outcomes:**

After taking the course, students will be able to:

- Specify simple abstract data types and design implementations, using abstraction functions to document them.
- Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
- Name and apply some common object-oriented design patterns and give examples of their use.
- Design applications with an event-driven graphical user interface.
- Develop applications to connect with database

### **(18HS0804) ENVIRONMENTAL SCIENCES**

#### **Course Outcomes:**

- Based on this course, the Engineering Student will be able to understand/evaluate/develop technologies on the basis of Ecological principles and environmental regulations along with Legislation, Laws and Policies which in turn help in sustainable development.
- Take preventive measures to reduce air, water, soil pollutions and contaminants in food.
- Effectively carry out waste disposal at individual level.
- Involve in preservation of natural resources.

### **III B. Tech – I Sem.(CSE)**

#### **(18HS0812) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

#### **Course Outcomes:**

On successful completion of the course students will be able to

- Understand the nature of managerial economics and the role of it in business firms
- Identify the determinants of demand and apply cost analysis under different market conditions
- Integrate the concepts of price and output decisions of business firms
- Appreciate the importance of market structures and implement appropriate price and output decisions
- To assess the financial statements of a firm and the financial performance of the firm through the financial statements
- To measure operating, investing and financial performance of a firm

## **(18CS0514) COMPILER DESIGN**

### **Course Outcomes:**

On successful completion of the course students will be able to

- Specify and analyze the lexical, syntactic and semantic structures of advanced language features
- Separate the lexical, syntactic and semantic analysis into meaningful phases for a compiler to undertake language translation
- Write a scanner, parser, and semantic analyzer without the aid of automatic generators
- Turn fully processed source code for a novel language into machine code for a novel computer
- Implement techniques for intermediate code and machine code optimization
- Design the structures and support required for compiling advanced language features.

## **(18CS0515) COMPUTER NETWORKS**

### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Explain the terminology and concepts of OSI and TCP/IP Reference models and identify different physical media used for datatransmission
- Illustrate and implement the services of Data linklayer
- Describe the principles of network layer and categorize routing algorithms used for data transmission
- Identify the essential services of transport layer
- Interpret the functioning of various protocols of Application layer
- Understand the principles of networking

## **(18CS0516) DESIGN AND ANALYSIS OF ALGORITHMS**

### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Determine the time complexity of an algorithm by solving the corresponding Recurrence equation
- Apply the Divide and Conquer strategy to solve searching, sorting and matrix multiplication problems.
- Analyze the efficiency of Greedy and Dynamic Programming design techniques to solve the optimization problems.
- Apply Backtracking technique for solving constraint satisfaction problems.
- Analyze the LC and FIFO branch and bound solutions for optimization problems, and compare the time complexities with Dynamic Programming techniques.
- Define and Classify deterministic and Non-deterministic algorithms; P, NP, NP –hard and NP-complete classes of problems.

## **(18CS0517) PYTHON PROGRAMMING**

### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Solve the problems using control structures, input and output statements.
- Summarize the features of lists, tuples, dictionaries, strings and files
- Experience the usage of standard libraries, objects, and modules
- Solve the problems using Object Oriented Programming Concepts
- Build the software for real time applications using python
- Install various Python packages

## **(18CS0518) ANALYSIS OF ALGORITHMS LAB**

### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Able to understand the techniques of proof by contradiction, mathematical induction and recurrence relation, and apply them to prove the correctness and to analyze the running time of algorithms.
- Design new algorithms, prove them correct, and analyze their asymptotic and absolute runtime and memory demands.
- Analyse an algorithm to solve the problem (create) and prove that the algorithm solves the problem correctly (validate).
- Understand the mathematical criterion for deciding whether an algorithm is efficient, and know many practically important problems that do not admit any efficient algorithms.
- Understand basic techniques for designing algorithms, including the techniques of recursion, divide-and-conquer, and greedy.
- Analyse NP-Completeness , NP-complete problems and synthesize efficient algorithms in common engineering design situations.

## **(18CS0519) PYTHON PROGRAMMING LAB**

### **Course Outcomes:**

On successful completion of the course students will be able to

- Write, Test and Debug Python Programs
- Implement Conditionals and Loops for Python Programs
- Use functions and represent Compound data using Lists, Tuples and Dictionaries
- Read and write data from & to files in Python and develop Application using Pygame
- Build software for real needs.
- Ability to work on a real life Project, implementing R Analytics to create Business insights.

## **(18CS0520) OBJECT ORIENTED ANALYSIS AND DESIGN LAB**

### **Course Outcomes:**

On successful completion of the course students will be able to

- Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation
- Describe the importance of systems analysis and design in solving complex problems
- Explain how the object-oriented approach differs from the traditional approach to systems analysis and design
- Understand the role and function of each UML model in developing object oriented software
- Exhibit software development process
- Recognize the difference between various object relationships: inheritance, association, whole-part, and dependency relationships

## **(18HS0842) APTITUDE PRACTICES**

### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Develop the subtle way of approaching in the candidate.
- Acquired the decision making with in no time.
- Implement logical thinking during professional tenure.
- Improve knowledge on problem solving.
- Understand problems on coding and decoding.
- Apply the knowledge on the concept of reasoning in real life.

## **III B. Tech – II Sem. (CSE)**

### **(18CS0521) DATA WAREHOUSING AND DATA MINING**

#### **Course Outcomes:**

On successful completion of this course, student will be able to

- Understand the basic concepts of data warehouse and data mining
- Apply pre-processing techniques for data cleansing
- Analyze and evaluate performance of algorithms for Association Rules
- Analyze Classification and Clustering algorithms
- Developing practical work of Data Mining techniques and design hypotheses based on the analysis to conceptualize a Data Mining Solution to practical problem
- Utilizing Data mining algorithms to build analytical applications.

## **(18CS0522) SOFTWARE ENGINEERING**

### **Course Outcomes:**

On successful completion of this course, student will be able to

- Define and develop a software project from requirement gathering to implementation
- Ability to code and test the software
- Ability to plan, estimate and maintain software systems
- Understand the basic testing procedures
- Able to generate test cases and test suites.
- Test the applications manually by applying different testing methods and automation tools.

## **(18CS0523) WEB TECHNOLOGIES**

### **Course Outcomes:**

On successful completion of this course, student will be able to

- Create dynamic and interactive web sites using HTML
- Gain knowledge of client side scripting using java sript and DHTML
- Design and develop CSS
- Demonstrate understanding of what is XML and how to parse and use XML data
- Able to do server side programming with Java Servelets, JSP and PHP
- Design client presentation using AJAX

## **(18CS0531) ADVANCED OPERATING SYSTEMS**

### **Course Outcomes:**

On successful completion of this course, student will be able to

- Recognize the Process Scheduling Deadlocks
- Describe Centralized and Distributed Deadlock Detection Algorithms
- Analyze the fundamental skills required to Two-Phase Commit Protocol
- Explain Mobile Operating Systems
- Demonstrate the Linux System and Design Principles
- Assess with Inter process Communication. iOS and Android

## **(18CS0532) LINUX PROGRAMMING**

### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Understand the basic set of commands and editors in Linux operating system.
- Implement and execute various shell scripts.
- Work with filters, pipes and user communication, Vi-Editor commands.
- Execute various commands related to regular expressions
- Implement korn shell programming

- Execute commands related to C shell.

### **(18CS0533) QUANTUM COMPUTING**

#### **Course Outcomes:**

On successful completion of this course, student will be able to

- The basic principles of quantum computing.
- The fundamental differences between conventional computing and quantum computing.
- Several basic quantum computing algorithms
- The classes of problems that can be expected to be solved well by quantum computers
- The implications of quantum computing on fields such as computer security and machine Learning

### **(18CE0127) ELEMENTS OF ROAD TRAFFIC SAFETY**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Identify the causes for road accidents and can implement measures to prevent road accidents
- Describe traffic regulations and implement parking methods
- Classify different traffic signal and can design traffic signal system
- List and illustrate various traffic signs
- List and discuss various road markings
- Discuss importance of street lighting and classify various street lighting system

### **(18EE0234) INDUSTRIAL INSTRUMENTATION**

#### **Course Outcomes:**

On successful completion of this course, student will be able to

- Identify and explain the types of errors occurring in measurement systems.
- Differentiate among the types of data transmission and modulation techniques.
- Apply digital techniques to measure voltage, frequency and speed.
- Analyse the working principles of different Signal Analyzers and Digitalmeters.
- Understand the operation of several types of transducers.
- Choose suitable Transducers for the measurement of non-electrical quantities.

### **(18ME0307) NON-CONVENTIONAL ENERGY RESOURCES**

#### **Course Outcomes:**

At the end of this course, the student will be able to

- State various sources of Energies, its availability and explain the importance of them by observing the global energy scenario.

- Distinguish the types of solar energy tapping devices and describe the method of harnessing the solar energy.
- Summarize the Wind energy systems and elucidate the impact of it in environmental aspects.
- Describe the Biomass conversion process and list out various bioenergy applications.
- Interpret the knowledge of renewable energies such as tidal energy, OTEC, Fuel cell, etc. for effective construction of Hybrid systems.
- Identify numerous applications renewable energy resources and illustrate its harnessing technologies.

### **(18EC0449) INTRODUCTION TO IOT**

#### **Course Outcomes:**

On successful completion of this course, student will be able to

- Understand the technology and standards relating to IoTs.
- Understand where the IoT concept fits within the broader ICT industry and possible future trends.
- Understand the key components that make up an IoT system.
- Differentiate between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack.
- Configure Raspberry Pi, Understand Sensors, Actuators & get started with python on Raspberry Pi.
- Apply the knowledge and skills acquired during the course to design, build and test a complete, working IoT system involving prototyping, programming and data analysis.

### **(18HS0814) INTELLECTUAL PROPERTY RIGHTS**

#### **Course Outcomes:**

On successful completion of this course, student will be able to

- Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights
- Identify different types of intellectual properties, ownership rights and the scope of the protection
- Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work
- Able to identify, apply, and assess ownership rights, registration processes for IP rights
- To discern the approaches for intellectual property management and intellectual property audits
- Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level

### **(18CS0524) DATA MINING LAB**

#### **Course Outcomes:**

On successful completion of this course, student will be able to

- Explore WEKA tool
- Perform data preprocessing tasks
- Demonstrate association rule mining on datasets
- Implement classification techniques on datasets
- Implement clustering and regression techniques on datasets
- Design and implement data mining algorithms

### **(18CS0525) WEB TECHNOLOGIES LAB**

#### **Course Outcomes:**

On successful completion of this course, student will be able to

- Create dynamic and interactive web sites using HTML
- Design client side scripting using java script and DHTML.
- Develop servlet program using java servlets
- Develop simple online application using servlets
- Implement JDBC concepts
- Develop client program using AJAX

### **(18HS0859) ENGLISH FOR CORPORATE COMMUNICATION SKILLS LAB**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Flair in Writing by using cohesion and coherence.
- Prepare effective job application.
- Presents Effective Speaking Abilities.
- Apply various communicative techniques in their professional lives.
- Cope with the employability skills.
- Use effective communicative approaches by preparing job application, report and other kinds of spoken and written correspondences.



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**DEPARTMENT OF CSIT**

**I B. Tech – I Sem.**

**(18HS0830) MATHEMATICS-I**

**COURSE OUTCOMES:**

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

**(18HS0801) CHEMISTRY**

**COURSE OUTCOMES:**

- Analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs Rationalize bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques Rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.

**(18ME0302) ENGINEERING GRAPHICS & DESIGN**

**COURSE OUTCOMES:**

Students undergoing this course are able to

- Frame ideas based on the conceptual modeling and design
- Provide good understanding of the methods involved in preparing various views in Engineering drawings.
- Can prepare 2D and 3D diagrams of various objects

**(18HS0810) ENGLISH**

**COURSE OUTCOMES:**

Students will be able:

- To understand the rules of English grammar and their usage in writing English.
- To use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- To get the mastery of language to express ideas, views, feelings and experience.

- To communicate well among themselves.
- To inculcate values and ideal characteristic qualities in themselves.

### **(18HS0802) CHEMISTRY LABORATORY**

#### **COURSE OUTCOMES:**

The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:

- Estimate rate constants of reactions from concentration of reactants/products as a function of time.
- Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
- Synthesize a small drug molecule and analyse a salt sample.

### **(18HS0811) ENGLISH LAB**

#### **COURSE OUTCOMES:**

Students will be able:

- To recognize sounds of English language with different classifications.
- To know phonetic transcription and phonemic symbols of English language.
- To understand international accent and utilize the same in their daily conversation.
- To create confidence for public speaking, for facing interviews, for making effective oral presentations, for having discussions, and for delivering impromptu speeches.

### **(18ME0301) WORKSHOP PRACTICES LAB**

#### **COURSE OUTCOMES:**

After completion of this course, a successful student will be able to:

- Utilize workshop tools for engineering practice.
- Employ skills for the production a component for real time applications.
- Appreciate the hard work and intuitive knowledge of the manual workers.

#### **PART-B – IT Workshop**

##### **Course Outcomes:**

After Completion of this Course the Student would be able to

- Identify the basic computer peripherals.
- Gain sufficient knowledge on assembling and disassembling a PC.
- Learn the installation procedure of Windows and Linux OS.
- Acquire knowledge on basic networking infrastructure.
- Learn productivity tools like Word, Excel and Power point.
- Acquire knowledge on basics of internet and worldwide web.

## **I B. Tech – II Sem.**

### **(18HS0831) MATHEMATICS-II**

#### **COURSE OUTCOMES:**

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariable calculus and complex analysis. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of Mathematics and applications that they would find useful in their disciplines.

### **(18HS0851) SEMI-CONDUCTOR PHYSICS**

#### **COURSE OUTCOMES:**

- Would understand the basic concepts of free electron theory and energy bands in solids.
- Able to deliver importance of semiconductors.
- Would understand working principles and applications of optoelectronic devices.
- Able to explain concepts related to Lasers and Optical fibers. .
- Understand the importance of Nanotechnology.

### **(18CS0501) PROGRAMMING FOR PROBLEM SOLVING**

#### **COURSE OUTCOMES:**

- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs
- Able to write C programs for real world problems using simple and compound data types

### **(18CS0502) DIGITAL LOGIC DESIGN**

**COURSE OUTCOMES:** At the end of this course, students will demonstrate the ability to

- Understand working of logic families and logic gates.
- Design and implement Combinational and Sequential logic circuits.
- Understand the process of Analog to Digital conversion and Digital to Analog conversion.
- Be able to use PLDs to implement the given logical problem.

### **(18EE0239) BASIC ELECTRICAL ENGINEERING**

#### **COURSE OUTCOMES:**

Upon completion of the course, students will:

- Determine the equivalent impedance of given network by using network reduction techniques.
- Determine the current through any element and voltage across any element
- Apply the network theorems suitably.
- Analyze the operating principles of electrical machines and transformer.

### **(18CS0503) PROGRAMMING FOR PROBLEM SOLVING LAB**

#### **COURSE OUTCOMES:**

At the end of the course, students will be able to

- Apply problem solving techniques of C to find solution.
- Use C language features effectively to implement solutions.
- Use C++ language features effectively to solve problems.
- Identify and develop apt searching and sorting technique for a given problem.
- Identity, design and develop the appropriate data structure for a given problem or application.

### **(18HS0852) PHYSICS LAB**

#### **COURSE OUTCOMES:**

- To explore the application of Interference and Diffraction by doing concerned experiments.
- Elucidate the concepts of Physics through involvement in the experiment by applying theoretical knowledge.
- To understand the concept of energy gap, B-H curve and resonance phenomena in LCR circuits.
- Develop an ability to apply the knowledge of physics experiments in the later studies.

### **(18HS0817) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**

#### **COURSE OUTCOME:**

- Ability to understand, connect up and explain basics of Indian traditional Knowledge in modern scientific perspective.

## **II B. Tech – I Sem.**

### **(18HS0835) PROBABILITY & STATISTICS**

#### **COURSE OUTCOMES:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability

### **(18EC0443) ANALOG ELECTRONICS CIRCUITS**

#### **COURSE OUTCOMES:**

Upon completion of this course, student will be able to:

- Understand Diode Circuits, BJT and FET amplifiers.
- Become familiar with the basic building blocks of linear integrated circuits.

### **(18CS0504) DATA STRUCTURES & ALGORITHMS**

#### **COURSE OUTCOME:**

At the end of the course, students will be able to:

- Design algorithms to implement various data structures.

Understand and program stacks and list data structures.

- Write programs to implement different types of queues.
- Understand and make use of hash tables in applications like dictionary, spell checker etc.,
- Understand why height balanced trees are advantageous over other data structures.

### **(18CS0505) COMPUTER ORGANIZATION & ARCHITECTURE**

#### **COURSE OUTCOMES:**

- Draw the functional block diagram of a single bus architecture of a computer and describe the function of the instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set.
- Write assembly language program for specified microprocessor for computing 16 bit multiplication, division and I/O device interface (ADC, Control circuit, serial port communication).
- Write a flowchart for Concurrent access to memory and cache coherency in Parallel Processors and describe the process.
- Given a CPU organization and instruction, design a memory module and analyze its operation by interfacing with the CPU.
- Given a CPU organization, assess its performance, and apply design techniques to enhance performance using pipelining, parallelism and RISC methodology

### **(18CS0506) DATABASE MANAGEMENT SYSTEMS**

#### **COURSE OUTCOMES:**

- For a given query write relational algebra expressions for that query and optimize the developed expressions
- For a given specification of the requirement design the databases using E\_R method and normalization.
- For a given transaction-processing system, determine the transaction atomicity, consistency, isolation, and durability.
- Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.

### **(18CS0508) DATABASE MANAGEMENT SYSTEMS LAB**

#### **COURSE OUTCOME:**

Apply ER concepts to design databases.

- ♣ Design simple database using a tool and implement it using SQL.
- ♣ Access normalization relations of relational model using normal forms
- ♣ Apply all constraints to develop a business application using cursors, triggers and stored

**(18EE0241) BASIC ELECTRICAL & ELECTRONICS ENGINEERING LAB**

**COURSE OUTCOMES:**

- Students will understand all the fundamental concepts involving electrical engineering.
- Students will understand all the fundamental concepts involving electronics engineering

**(18HS0816) INDIAN CONSTITUTION**

**COURSE OUTCOMES:**

Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- Discuss the passage of the Hindu Code Bill of 1956.

**II B. Tech – II Sem.**

**(18HS0836) DISCRETE MATHEMATICS**

**COURSE OUTCOMES:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability

**(18CS0509) FORMAL LANGUAGES AND AUTOMATA THEORY**

**COURSE OUTCOMES:**

At the end of the course, students will be able to

- Construct finite Automats for various problems.
- Design automata, regular expressions and context-free grammar accepting and generating a certain language, design of new grammar and languages
- Define Push Down Automata performing simple tasks and equivalence of PDA and CFGs.
- Find solutions to the problems using Turing machines.
- Distinguish between computability , Decidability and un decidability problems

**(18CI0601) FUNDAMENTALS OF OPERATING SYSTEMS**

**COURSE OUTCOME:**

- Able to use operating systems effectively.

- Write System and application programs to exploit operating system functionality. • Add functionality to the existing operating systems
- Design new operating systems

### **(18HS0803) BIOLOGY FOR ENGINEERS**

#### **COURSE OUTCOMES:**

- Classify enzymes and distinguish between different mechanisms of enzyme action.
- Identify DNA as a genetic material in the molecular basis of information transfer.
- Analyze biological processes at the reductionistic level
- Apply thermodynamic principles to biological systems.
- Identify and classify microorganisms.

### **(18CS0511) OBJECT ORIENTED PROGRAMMING**

#### **COURSE OUTCOMES:**

After taking the course, students will be able to:

- Specify simple abstract data types and design implementations, using abstraction functions to document them.
- Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
- Name and apply some common object-oriented design patterns and give examples of their use.
- Design applications with an event-driven graphical user interface.
- Develop applications to connect with database.

### **(18CI0602) FUNDAMENTALS OF OPERATING SYSTEMS LAB**

#### **COURSE OUTCOMES:**

- Ensure the development of applied skills in operating systems related areas.
- Able to write software routines modules or implementing various concepts of operating system

### **(18HS0804) ENVIRONMENTAL SCIENCES**

#### **COURSE OUTCOMES:**

- Based on this course, the Engineering Student will be able to understand/evaluate/develop technologies on the basis of Ecological principles and environmental regulations along with Legislation, Laws and Policies which in turn help in sustainable development.
- Take preventive measures to reduce air, water, soil pollutions and contaminants in food.
- Effectively carry out waste disposal at individual level.
- Involve in preservation of natural resources.

### **III B. Tech – I Sem.**

#### **(18HS0812) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS**

##### **COURSE OUTCOMES (COs)**

On successful completion of the course students will be able to

1. Understand the nature of managerial economics and the role of it in business firms
2. Identify the determinants of demand and apply cost analysis under different market conditions
3. Integrate the concepts of price and output decisions of business firms
4. Appreciate the importance of market structures and implement appropriate price and output decisions
5. To assess the financial statements of a firm and the financial performance of the firm through the financial statements
6. To measure operating, investing and financial performance of a firm

#### **(18CS0515) COMPUTER NETWORKS**

##### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Explain the terminology and concepts of OSI and TCP/IP Reference models and identify different physical media used for data transmission
2. Illustrate and implement the services of Data link layer
3. Describe the principles of network layer and categorize routing algorithms used for data transmission
4. Identify the essential services of transport layer
5. Interpret the functioning of various protocols of Application layer
6. Understand the principles of networking

#### **(18CS0516) DESIGN AND ANALYSIS OF ALGORITHMS**

##### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Determine the time complexity of an algorithm by solving the corresponding Recurrence equation
2. Apply the Divide and Conquer strategy to solve searching, sorting and matrix multiplication problems.
3. Analyze the efficiency of Greedy and Dynamic Programming design techniques to solve the optimization problems.
4. Apply Backtracking technique for solving constraint satisfaction problems.
5. Analyze the LC and FIFO branch and bound solutions for optimization problems, and compare the time complexities with Dynamic Programming techniques.
6. Define and Classify deterministic and Non-deterministic algorithms; P, NP, NP –hard and NP-complete classes of problems.



### **(18CS0517) PYTHON PROGRAMMING**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Solve the problems using control structures, input and output statements.
2. Summarize the features of lists, tuples, dictionaries, strings and files
3. Experience the usage of standard libraries, objects, and modules
4. Solve the problems using Object Oriented Programming Concepts
5. Build the software for real time applications using python 6. Install various Python packages

### **(18CI0603) SOFTWARE ENGINEERING & TESTING**

#### **COURSE OUTCOMES**

On successful completion of this course, the student will be able to:

1. Design the software process models
2. Analyze software metrics.
3. Develop software project plan.
4. Design the software and estimate the software reliability.
5. Apply software testing methods.
6. Maintain the software.

### **(18CS0518) ANALYSIS OF ALGORITHMS LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Able to understand the techniques of proof by contradiction, mathematical induction and recurrence relation, and apply them to prove the correctness and to analyze the running time of algorithms.
2. Design new algorithms, prove them correct, and analyze their asymptotic and absolute runtime and memory demands.
3. Analyse an algorithm to solve the problem (create) and prove that the algorithm solves the problem correctly (validate) .
4. Understand the mathematical criterion for deciding whether an algorithm is efficient, and know many practically important problems that do not admit any efficient algorithms.
5. Understand basic techniques for designing algorithms, including the techniques of recursion, divide-and-conquer, and greedy.
6. Analyse NP-Completeness , NP-complete problems and synthesize efficient algorithms in common engineering design situations.

### **(18CS0519) PYTHON PROGRAMMING LAB**

#### **COURSE OUTCOMES (CO's)**

On successful completion of the course students will be able to

1. Write, Test and Debug Python Programs

2. Implement Conditionals and Loops for Python Programs
3. Use functions and represent Compound data using Lists, Tuples and Dictionaries
4. Read and write data from & to files in Python and develop Application using Pygame
5. Build software for real needs.
6. Ability to work on a real life Project, implementing R Analytics to create Business insights.

### **(18CI0604) SOFTWARE ENGINEERING & TESTING LAB**

#### **COURSE OUTCOMES**

On successful completion of the course students will be able to:

1. Write problem statement of suggested system.
2. Do requirement analysis.
3. Perform view analysis.
4. Draw the structural view diagram.
5. Apply behavioral view diagram for the suggested system.
6. Implement component diagram and deployment diagram.

### **(18HS0842) APTITUDE PRACTICES**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Develop the subtle way of approaching in the candidate.
2. Acquired the decision making with in no time.
3. Implement logical thinking during professional tenure.
4. Improve knowledge on problem solving.
5. Understand problems on coding and decoding.
6. Apply the knowledge on the concept of reasoning in real life.

### **III B.Tech. – II Sem.**

#### **(18CS0514) COMPILER DESIGN**

#### **COURSE OUTCOMES (COs)**

On successful completion of the course students will be able to:

1. Specify and analyze the lexical, syntactic and semantic structures of advanced language features
2. Separate the lexical, syntactic and semantic analysis into meaningful phases for a compiler to undertake language translation
3. Write a scanner, parser, and semantic analyzer without the aid of automatic Generators
4. Turn fully processed source code for a novel language into machine code for a novel computer
5. Implement techniques for intermediate code and machine code optimization
6. Design the structures and support required for compiling advanced language features.

## **(18CS0521) DATA WAREHOUSING AND DATA MINING**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, student will be able to

1. Understand the basic concepts of data warehouse and data mining
2. Apply pre-processing techniques for data cleansing
3. Analyze and evaluate performance of algorithms for Association Rules
4. Analyze Classification and Clustering algorithms
5. Developing practical work of Data Mining techniques and design hypotheses based on the analysis to conceptualize a Data Mining Solution to practical problem
6. Utilizing Data mining algorithms to build analytical applications.

## **(18CS0523) WEB TECHNOLOGIES**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, student will be able to

1. Create dynamic and interactive web sites using HTML
2. Gain knowledge of client side scripting using java script and DHTML
3. Design and develop CSS
4. Demonstrate understanding of what is XML and how to parse and use XML data
5. Able to do server side programming with Java Servlets, JSP and PHP
6. Design client presentation using AJAX

## **(18CS0531) ADVANCED OPERATING SYSTEMS**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, student will be able to

1. Recognize the Process Scheduling Deadlocks
2. Describe Centralized and Distributed Deadlock Detection Algorithms
3. Analyze the fundamental skills required to Two-Phase Commit Protocol
4. Explain Mobile Operating Systems
5. Demonstrate the Linux System and Design Principles
6. Assess with Inter process Communication. iOS and Android

## **(18CS0532) LINUX PROGRAMMING**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Understand the basic set of commands and editors in Linux operating system.
2. Implement and execute various shell scripts.
3. Work with filters, pipes and user communication, Vi-Editor commands.
4. Execute various commands related to regular expressions
5. Implement korn shell programming
6. Execute commands related to C shell.

### **(18CI0610) INTERNETWORKING WITH TCP/IP**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, student will be able to

1. Students able to configure TCP/IP protocol suite
2. Students able to analyze the IPV4 Protocol
3. Ability to analyze the ARP Protocol and ICMP.
4. Able to design the Routing protocols
5. Ability to configure the Transport layer Protocols
6. Able to configure the Windows in TCP,IPV6 Protocol and ICMPv6 Protocol

### **(18CE0127) ELEMENTS OF ROAD TRAFFIC SAFETY**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Identify the causes for road accidents and can implement measures to prevent road accidents
2. Describe traffic regulations and implement parking methods
3. Classify different traffic signal and can design traffic signal system
4. List and illustrate various traffic signs
5. List and discuss various road markings
6. Discuss importance of street lighting and classify various street lighting system

### **(18EE0234) INDUSTRIAL INSTRUMENTATION**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, student will be able to

1. Identify and explain the types of errors occurring in measurement systems.
2. Differentiate among the types of data transmission and modulation techniques.
3. Apply digital techniques to measure voltage, frequency and speed.
4. Analyze the working principles of different Signal Analyzers and Digital meters.
5. Understand the operation of several types of transducers.
6. Choose suitable Transducers for the measurement of non-electrical quantities.

### **(18ME0307) NON-CONVENTIONAL ENERGY RESOURCES**

#### **COURSE OUTCOMES(COs)**

At the end of this course, the student will be able to

1. State various sources of Energies, its availability and explain the importance of them by observing the global energy scenario.
2. Distinguish the types of solar energy tapping devices and describe the method of harnessing the solar energy.
3. Summarize the Wind energy systems and elucidate the impact of it in environmental aspects.
4. Describe the Biomass conversion process and list out various bioenergy applications.

5. Interpret the knowledge of renewable energies such as tidal energy, OTEC, Fuel cell, etc. for effective construction of Hybrid systems.
6. Identify numerous applications renewable energy resources and illustrate its harnessing technologies.

### **(18EC0449) INTRODUCTION TO IOT**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, student will be able to

1. Understand the technology and standards relating to IOTs.
2. Understand where the IoT concept fits within the broader ICT industry and possible future trends.
3. Understand the key components that make up an IoT system.
4. Differentiate between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack.
5. Configure Raspberry Pi, Understand Sensors, Actuators & get started with python on Raspberry Pi.
6. Apply the knowledge and skills acquired during the course to design, build and test a complete, working IoT system involving prototyping, programming and data analysis.

### **(18HS0814) INTELLECTUAL PROPERTY RIGHTS**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, student will be able to

1. Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights
2. Identify different types of intellectual properties, ownership rights and the scope of the protection
3. Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work
4. Able to identify, apply, and assess ownership rights, registration processes for IP rights
5. To discern the approaches for intellectual property management and intellectual property audits
6. Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level

### **(18CS0524) DATA MINING LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, student will be able to

1. Explore WEKA tool
2. Perform data preprocessing tasks
3. Demonstrate association rule mining on datasets
4. Implement classification techniques on datasets
5. Implement clustering and regression techniques on datasets
6. Design and implement data mining algorithms

### **(18CS0525) WEB TECHNOLOGIES LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, student will be able to

1. Create dynamic and interactive web sites using HTML
2. Design client side scripting using java script and DHTML.
3. Develop servlet program using java servlets
4. Develop simple online application using servlets
5. Implement JDBC concepts
6. Develop client program using AJAX

### **(18HS0859) ENGLISH FOR CORPORATE COMMUNICATION SKILLS LAB**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

1. Flair in Writing by using cohesion and coherence.
2. Prepare effective job application.
3. Present Effective Speaking Abilities.
4. Apply various communicative techniques in their professional lives.
5. Cope with the employability skills.
6. Use effective communicative approaches by preparing job application, report and
7. Use other kinds of spoken and written correspondences.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY: PUTTUR  
(AUTONOMOUS)**

**Bachelor of Technology**

**AGRICULTURE ENGINEERING**

**I B. TECH – II SEM.(AG)**

**(18HS0848) PHYSICS**

**Course outcomes:**

Students will be familiar with

- Various basic terms related to Vectors & Scalars and Newton's laws of motion.
- Some of the basic concepts related to forces.
- Simple terms related to Mechanical Vibrations.
- Recognize importance of various mechanical properties of materials.
- Understand the importance of Nanotechnology.

**(18HS0830) MATHEMATICS – I**

**Course Outcomes:**

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

**(18CS0501) PROGRAMMING FOR PROBLEM SOLVING**

**Course Outcomes:**

- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs
- Able to write C programs for real world problems using simple and compound data types

**(18CE0101) ENGINEERING MECHANICS**

**Course Outcomes:**

On completion of this course, the student will be able to

- Construct free body diagrams and develop appropriate equilibrium equations.
- Understand the concepts of friction and to apply in real life problems.
- Determine the centroid for composite sections.
- Determine the Moment of Inertia for composite sections.

**(18HS0852) PHYSICS LAB**

**Course Description:**

Physics practical course is meant for making the students to gain practical knowledge to correlate with the theoretical studies. It covers experiments on principle of Mechanics and Optics, measurement of magnetic field and studying resonance using LCR circuit.

**(18CS0503) PROGRAMMING FOR PROBLEM SOLVING LAB****Course Outcomes:**

At the end of the course, students will be able to

- Apply problem solving techniques of C to find solution.
- Use C language features effectively to implement solutions.
- Use C++ language features effectively to solve problems.
- Identify and develop apt searching and sorting technique for a given problem.
- Identify, design and develop the appropriate data structure for a given problem or application.

**(18ME0301) WORKSHOP PRACTICE LAB****Course Outcomes:**

After completion of this course, a successful student will be able to:

- Utilize workshop tools for engineering practice.
- Employ skills for the production a component for real time applications.
- Appreciate the hard work and intuitive knowledge of the manual workers.

**(18HS0801) CHEMISTRY****Course Outcomes:**

- Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs Rationalise bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.

**(18HS0831) MATHEMATICS – II**



**Course Outcomes:**

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariable calculus and complex analysis. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of Mathematics and applications that they would find useful in their disciplines.

**(18EE0240) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING****Course Outcomes:**

Upon completion of the course, students will:

- Determine the equivalent impedance of given network by using network reduction techniques.
- Determine the current through any element and voltage across any element
- Apply the network theorems suitably.
- Analyze the operating principles of motor and transformer.
- Analyze the operating principles of major electronic devices, its characteristics and applications.
- Design and analyze the DC bias circuitry of BJT and FET.

**(18HS0810) ENGLISH**

**Course Outcomes:** Students will be able:

- To understand the rules of English grammar and their usage in writing English.
- To use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- To get the mastery of language to express ideas, views, feelings and experience.
- To communicate well among themselves.
- To inculcate values and ideal characteristic qualities in themselves.

**(18ME0302) ENGINEERING GRAPHICS & DESIGN****Course Outcomes:**

Students undergoing this course are able to

- Frame ideas based on the conceptual modeling and design
- Provide good understanding of the methods involved in preparing various views in Engineering drawings
- Can prepare 2D and 3D diagrams of various objects

**(18HS0802) CHEMISTRY LAB**

## **Laboratory Outcomes**

The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:

- Estimate rate constants of reactions from concentration of reactants/products as a function of time.
- Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
- Synthesize a small drug molecule and analyse a salt sample.

## **(18HS0811) ENGLISH LAB**

### **Course Outcomes:**

Students will be able:

- To recognize sounds of English language with different classifications.
- To know phonetic transcription and phonemic symbols of English language.
- To understand international accent and utilize the same in their daily conversation.
- To create confidence for public speaking, for facing interviews, for making effective oral presentations, for having discussions, and for delivering impromptu speeches.

## **(18HS0816) INDIAN CONSTITUTION**

### **Course Outcomes:**

Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.
- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- Discuss the passage of the Hindu Code Bill of 1956.

## **II B. Tech - II Sem.(AG)**

### **(18HS0803) BIOLOGY FOR ENGINEERS**

#### **Course Outcomes**

- Classify enzymes and distinguish between different mechanisms of enzyme action.
- Identify DNA as a genetic material in the molecular basis of information transfer.
- Analyse biological processes at the reductionist level

- Apply thermodynamic principles to biological systems.
- Identify and classify microorganisms.

### **(18HS0832) TRANSFORM & DISCRETE MATHEMATICS**

#### **Course Outcomes:**

The objective of this course is to familiarize the prospective engineers with techniques in Transform Calculus and Discrete Mathematics. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

### **(18AG0701) PRINCIPLES OF AGRICULTURAL ENGINEERING**

#### **Course Outcomes:**

At the end of the course, students would be expected to:

- The knowledge gained on soil water conservation, irrigation engineering and farm structures and agricultural processing to provide a strong platform to understand the concepts on these subjects for further learning.

### **(18CE0151) STRENGTH OF MATERIALS**

#### **Course Outcomes:**

Students undergoing this course are able to:

- The students would be able to understand the behavior of materials under different stress and strain conditions.
- The students would be able to draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading.
- The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams under various loading conditions.
- Determine shear stress in the shaft subjected to torsional moments.

### **(18CE0104) INTRODUCTION TO FLUID MECHANICS**

#### **Course Outcomes:**

- On completion of the course, the students will be able to:
- Determine the properties of fluid like pressure and their measurement.
- Apply continuity equation and energy equation in solving problems on flow through conduits.
- Compute the frictional loss in laminar and turbulent flows.

### **(18CE0105) SOLID MECHANICS LAB**

**Course Outcomes:**

After completion of the course the student will be able to:

- estimate Young's modulus, tensional rigidity of mild steel rods
- know the hardness of mild steel and HYS specimens
- analyze the strength of wood, concrete, stone and bricks
- assess the quality of wood, concrete, stone and bricks

**(18CE0106) FLUID MECHANICS LAB****Course Outcomes:**

Students undergoing this course are able to

- Calibrate Venturimeter & Orificemeter
- Calculate losses in flows
- Estimate the efficiency of different pumps.
- Study the performance of different turbines.

**(18CE0107) COMPUTER AIDED BUILDING DRAWING****Course Outcomes:**

- The students will be able to draft the plan, elevation and sectional views of the buildings, industrial structures, and framed buildings using computer software's.
- Draw the symbols and plan of a residential building using Auto CAD Software.

**(18HS0804) ENVIRONMENTAL SCIENCE****Course Outcomes:**

- Based on this course, the Engineering Student will be able to understand/evaluate/develop technologies on the basis of Ecological principles and environmental regulations along with Legislation, Laws and Policies which in turn help in sustainable development.
- Take preventive measures to reduce air, water, soil pollution and contaminants in food.
- Effectively carry out waste disposal at individual level.
- Involve in preservation of natural resources.

**(18AG0702) PRINCIPLES OF SOIL SCIENCE****Course Outcomes:**

At the end of the course, students would be expected to:

- Get Fundamental knowledge of soil physical parameters.

- Know the procedures involved in soil survey, soil classification.
- Learn soil fertility and nutrients.
- Understand Concepts of Ion exchange in soils.

### **(18AG703) HYDROLOGY, GROUND WATER & WELL ENGINEERING**

#### **Course Outcomes:**

At the end of the course, students must be in a position to

- To understand the interaction among various processes in the hydrologic cycle
- To understand the basic aquifer parameters and estimate groundwater resources for different hydro-geological boundary conditions
- To understand of the physical and mathematical concepts of groundwater hydrology. Some real-world example problems are also being incorporated to give an idea about the complexities and challenges encountered during the modeling and management of groundwater processes.

### **(18CE0109) SURVEYING & GEO MATICS**

#### **Course Outcomes:**

The course will enable the students to:

- Apply the knowledge, techniques, skills, and applicable tools of the discipline to engineering and surveying activities
- Translate the knowledge gained for the implementation of civil infrastructure facilities.
- To be in a position to apply the basic principle of surveying and usage of surveying instruments in all civil engineering activities, including the construction of buildings, bridges, roads and high ways, pipe lines, dams, ports and harbors
- To be an expert of demarcation of ownership and/or delimitation of land, property, etc., through surveying process
- Surveying techniques to collect data for planning, designing and execution, able to employ greenfield
  - Use total station and able to assess the electromagnetic distances

### **(18ME0346) MECHANICAL ENGINEERING**

#### **Course Outcomes:**

After completion of the course the student will be able to Understand the

- fundamentals of mechanical engineering.
- Acquire the concept of laws of thermodynamics, Energy conversion devices, R&AC.
- Knows the principles of welding, Manufacturing processes, Power transmission devices.
- Knows about Engineering Materials.

### **(18ME0350) THERMODYNAMICS & HEAT ENGINES**

#### **Course Outcomes:**

- Students are advised to be acquainted with the terms related to steam, steam tables and Mollier chart.
- To apply the thermodynamic concepts into various thermal application like IC engines,

### **(18AG704) PRINCIPLES OF SOIL SCIENCE LAB**

#### **Course Outcomes:**

After completion of the course the student will be able to:

- Determine the different types chemicals and minerals in soils
- Know the fertilizers and classifications and their reactions in soils.
- Determine the water quality parameters

### **(18CE0113) SURVEYING LAB – I**

#### **Course Outcomes:**

After completion of the course the student will be able to:

- Gain knowledge and expertise in operation of various survey instruments for computation of area of land.
- Successfully carry out survey work in all civil Engineering projects, including the construction of buildings, roads and highways, rail track laying with curves, pipelines, dams, ports and harbor as well as delimitation of land and property, etc.

### **(18HS0817) ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**

**Course Outcome:** Ability to understand, connect up and explain basics of Indian traditional Knowledge in modern scientific perspective.

### **(18ME0310) THEORY OF MACHINES**

**(Common to MECH & AGE)**

#### **Course Outcomes**

Students undergoing this course can

1. Explain the Effect of gyroscopic couple, its reactions and also design flywheel for machinery.
2. Find the uses of clutch and modify its application.
3. Design Brakes according to applications and need.
4. Design a gyroscope in an optimized size with maximum effort.
5. Interpret how to balance an engine to reduce vibration and noise.
6. Identify the cause of vibration and calculate its magnitude to reduce it.

### **III B. TECH - II SEM. (AG)**

### **(18CE0154) SOIL MECHANICS**

#### **Course Outcomes**

On successful completion of this course, the student will be able to

1. **Describe** volumetric ratios, weight/mass relationships, index properties of soils, **establish** interrelationships and **classify** soils.
2. **State** Darcy's Law, **define** permeability, effective and **determine** the effective stress for different soil profiles
3. **Derive** equation for vertical stress for different load based Boussinesq's equation, calculate the vertical stress using Newmark's charts and Boussinesq's equation
4. **Explain** the phenomenon of compaction, factor affecting compaction, laboratory test to determine the compaction and field methods of compaction
5. **Derive** Terzaghi's equation for one dimensional consolidation and **estimate** consolidation settlements for various soils under various drainage conditions
6. **Learn** Mohr-Coulomb's theory of shear strength of soil and **conduct** various shear strength tests under different drainage conditions

### **(18ME0335) REFRIGERATION & AIR CONDITIONING (Common to MECH & AGE)**

#### **Course Outcomes**

Upon completion of the course the student will

1. Summarize the basic concepts of refrigeration and air conditioning systems
2. Explain Various refrigeration cycles, their analysis and applications. Different refrigerants properties, applications and their environmental issues.
3. Describe air conditioning processes on psychometric charts
4. Evaluate heating and cooling load requirements for various applications.
5. Apply scientific and engineering principles to analyze and design engineering systems that relate to refrigeration and air conditioning

### **(18AG0705) AGRICULTURAL PROCESS ENGINEERING**

#### **Course Outcomes**

Studies will be familiar with

1. Be proficient in the scope of the process engineering and the use of processing machinery
2. Understand the physical properties, rheological properties and frictional properties of agricultural materials
3. Summarising the thermal properties, electrical properties and the terms related to the machine design aspects
4. Some of the basic concepts related to cleaning and size reduction equipments
5. To acquaint the students with the milling of rice, parboiling technologies and milling of pulses and oilseeds
6. Understand the filtration equipments

### **(18AG0706) FARM MACHINERY & EQUIPMENT-I**

### **Course Outcomes**

Studies will be familiar with

1. What is the importance of the Farm Mechanization in agriculture?
2. Classify the types of tillage and tillage tools.
3. Determine the various forces acting on tillage tools
4. Distinguish the various methods involved in sowing, inter cultivation and plant protection operation.
5. Categorize the various types of sowing, inter cultivation and plant protection equipment.
6. Utilize the transplanting concepts in agriculture field.

### **(18CE0155) SOIL MECHANICS LAB**

#### **COURSE OUTCOMES (COs)**

On successful the completion of this course, the student will be able to

1. Conduct tests on fine grained soils to determine Atterberg's limits
2. Conduct fields test to find out field density of cohesive and cohesion less soils
3. Perform sieve analysis and sedimentation analysis to classify the soil
4. Conduct field tests on soil to estimate soil permeability
5. Conduct compaction test and draw compaction curve to find out optimum moisture content and maximum dry density
6. Conduct shear tests to predict shear strength of the soil

### **(18AG0707) AGRICULTURAL PROCESS ENGINEERING LAB**

#### **Course Outcomes**

1. Be proficient in the scope of the process engineering and the use of processing machinery
2. Understand the types of mixers
3. Summarizing the psychrometric properties
4. Some of the basic concepts related to size reduction equipments
5. To acquaint the students with the problems on distillation
6. Understand the cleaning equipments

### **(18AG0708) FARM MACHINERY & EQUIPMENT-I LAB**

#### **Course Outcomes:**

Studies will be familiar with

1. List out the various types of sowing, inter cultivation and plant protection equipment.
2. Classify the types of sprayer and duster.
3. Determine the performance of MB plough, disc plough, disc harrow and cultivator
4. Compare the different types of seed drills.
5. Categorize the various types of sowing, inter cultivation and plant protection equipment.
6. Measure the nozzle discharge and field capacity of sprayer and duster.



## **(18HS0842) APTITUDE PRACTICES**

### **Course Outcomes**

On successful completion of this course, the student will be able to:

1. Develop the subtle way of approaching in the candidate.
2. Acquired the decision making with in notime.
3. Implement logical thinking during professional tenure.
4. Improve knowledge on problemsolving.
5. Understand problems on coding and decoding.
6. Apply the knowledge on the concept of reasoning in real life.

## **(18ME0320) HEAT & MASS TRANSFER**

**(Common to MECH & AGE)**

### **Course Outcomes**

Students undergoing this course are able to

1. Explain the fundamental principles associated with heat transfer
2. Evaluate multi-dimensional and transient thermal conduction problems
3. Analyze forced convection, internal flows and free convection problems
4. Design heat exchangers for various applications
5. Explain the principles of radiation and mass transfer.

## **(18AG0709) IRRIGATION & DRAINAGE ENGINEERING**

### **Course Outcomes**

Studies will be familiar with

- Basic terms related to the development of irrigation in India and AP and classification of different irrigation works
- Basic terms related to soil and water conservation
- Various terms related to soil loss estimation models
- Understand the different types of micro irrigation and its design
- Understand the maintenance of micro irrigation system
- Understand the different types of land drainage and its importance

## **(18AG0710) FARM MACHINERY AND EQUIPMENT-II**

### **Course outcomes:**

Studies will be familiar with

1. Classify the crop harvesting machineries.
2. Explain about different types of mower.
3. Distinguish between reaper and combine harvester.
4. Demonstrate the performance of harvesting machineries and thresher.
5. Create an idea towards development of fruit harvesting machineries based on the problem faced during harvesting of fruits.

6. Carry out the testing of farm machines by using farm machines testing procedure

### **(18AG0718) AGRICULTURAL ENGINEERING STRUCTURES (PEC-I)**

#### **Course Outcomes**

Studies will be familiar with

1. To acquaint the students with various aspects of agricultural structures such as farm stead and dairy barn
2. To acquaint the students with various aspects of farm roads and storage structures
3. Design and construction of farm fences and farm roads
4. Summarizing the grain storage structures, types of silos and the loads acting on it
5. Classifying the poultry houses, planning and requirements
6. Rural living and development, sewage system and design

### **(18AG0719) DAIRY AND FOOD ENGINEERING (PEC-I)**

#### **Course Outcomes**

1. Enable the students to understand the methods of food preservation and the dairy development
2. Developed the understanding of physic – chemical properties of milk
3. Summarizing the methods of pasteurization and its importance
4. To acquaint the students with various dairy engineering operations such as homogenization, pasteurization, thermal processing, evaporation, freezing and drying of milk
5. Understanding the design and layout of a dairy plant
6. Control spoilage of food through process operations such as evaporation, freezing, membrane processing etc.

### **(18AG0720) SOLID WASTE & BY-PRODUCT UTILIZATION (PEC-I)**

#### **Course Outcomes:**

Studies will be familiar with

- Decide more efficient waste management methodologies / technologies
- Be proficient in execute the effective utilization and conversion of solid waste material into useful fuels
- Distinguish the different biomass conversion technologies used for converting biomass into biofuel
- Design of gasifier technology more effectively
- Illustrate about working principle and constructional details of different types of biogas plant.
- Develop an ability to recognize the different types of briquetting making machines

### **(18CE0127) ELEMENTS OF ROAD TRAFFIC SAFETY (OE-I)**

### **Course Outcomes**

On successful completion of this course, the student will be able to

- Identify the causes for road accidents and can implement measures to prevent road accidents
- Describe traffic regulations and implement parking methods
- Classify different traffic signal and can design traffic signal system
- List and illustrate various traffic signs
- List and discuss various road markings
- Discuss importance of street lighting and classify various street lighting system

### **(18EE0234) INDUSTRIAL INSTRUMENTATION (OE-I)**

#### **Course Outcomes**

On successful completion of this course, the student will be able to

1. Identify and explain the types of errors occurring in measurement systems.
2. Differentiate among the types of data transmission and modulation techniques.
3. Apply digital techniques to measure voltage, frequency and speed.
4. Analyse the working principles of different Signal Analyzers and Digital meters.
5. Understand the operation of several types of transducers.
6. Choose suitable Transducers for the measurement of non-electrical quantities.

### **(18ME0307) NON-CONVENTIONAL ENERGY RESOURCES (OE-I)**

#### **Course Outcomes**

At the end of this course, the student will be able to

1. State various sources of Energies, its availability and explain the importance of them by observing the global energy scenario.
2. Distinguish the types of solar energy tapping devices and describe the method of harnessing the solar energy.
3. Summarize the Wind energy systems and elucidate the impact of it in environmental aspects.
4. Describe the Biomass conversion process and list out various bioenergy applications.
5. Interpret the knowledge of renewable energies such as tidal energy, OTEC, Fuel cell, etc. for effective construction of Hybrid systems.
6. Identify numerous applications renewable energy resources and illustrate its harnessing technologies

### **(18EC0449) INTRODUCTION TO IoT (OE-I)**

#### **Course Outcomes**

On successful completion of this course, student will be able to

1. Understand the technology and standards relating to IoTs.
2. Understand where the IoT concept fits within the broader ICT industry and possible future trends.

3. Understand the key components that make up an IoT system.
4. Differentiate between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack.
5. Configure Raspberry Pi, Understand Sensors, Actuators & get started with python on Raspberry Pi.
6. Apply the knowledge and skills acquired during the course to design, build and test a complete, working IoT system involving prototyping, programming and data analysis.

### **(18CS0517) PYTHON PROGRAMMING (OE-I)**

#### **Course Outcomes**

On Successful Completion of this course, the student will be able to

1. Solve the problems using control structures, input and output statements.
2. Summarize the features of lists, tuples, dictionaries, strings and files
3. Experience the usage of standard libraries, objects, and modules
4. Solve the problems using Object Oriented Programming Concepts
5. Build the software for real time applications using python
6. Install various Python packages

### **(18HS0814) INTELLECTUAL PROPERTY RIGHTS (OE-I)**

#### **Course Outcomes**

1. Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights
2. Identify different types of intellectual properties, ownership rights and the scope of the protection
3. Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work
4. Able to identify, apply, and assess ownership rights, registration processes for IP rights
5. To discern the approaches for intellectual property management and intellectual property audits
6. Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at international level

### **(18AG0711) IRRIGATION & DRAINAGE ENGINEERING LAB**

#### **Course Outcomes**

Students will be familiar with

1. Basic terms related to the development of irrigation in India and AP and classification of different irrigation works
2. Basic terms related to soil and water conservation
3. Various terms related to soil loss estimation models
4. Understand the different types of micro irrigation and its design

5. Understand the maintenance of micro irrigation system  
Understand the different types of land drainage and its importance

### **(18AG0712) FARM MACHINERY & EQUIPMENT-II LAB**

#### **Course outcomes:**

Studies will be familiar with

1. Classify the crop harvesting machineries.
2. Explain about different types of mower.
3. Distinguish between reaper and combine harvester.
4. Demonstrate the performance of harvesting machineries and thresher.
5. Create an idea towards development of fruit harvesting machineries based on the problem faced during harvesting of fruits.
6. Carry out the operation, repair, maintenance and safety precautions of chaff cutters, post hole digger and self-propelled sugar cane harvester

### **(18HS0859) ENGLISH FOR CORPORATE COMMUNICATION SKILLS LAB (Common to CE, EEE, ME, CSE, CSIT & AGE)**

#### **Course Outcomes**

1. Flair in Writing and felicity in written expression
2. To enhance job prospects
3. Improving Effective Speaking Abilities
4. To prepare effective Interview techniques
5. To apply various communicative techniques in their inter and intra-personal communications.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Master of Business Administration**

**I MBA – I Semester**

**(18MB9001) ORGANIZATIONAL BEHAVIOUR**

**Course Outcomes:**

After the completion of course Students will be able to:

- Able to describe the basic principles, levels, skills of management and management theories and apply the concepts in real world.
- Analyze the various managerial functions to be performed and decision making in different contexts.
- Recognize, differentiate and assess for an individual, the concept of perception, values, attitudes and personality.
- Comprehend the various theories of motivation, leadership, and explore group dynamics for the benefit of the organizations.
- Apply leadership skills in different organizational contexts and lead the people.

**(18MB9002) FINANCIAL ACCOUNTING & ANALYSIS**

**Course Outcomes:**

After the completion of course Students will be able to:

- Develop and understand the nature and purpose of financial statements in relationship to decision making.
- Determine the useful life and value of the depreciable assets.
- Recognize the relationship between the financing, investing and dividend decisions of the firm during the given point of time.
- Explain how cost volume profit analysis is to be applied by managers to answer various operating decisions, such as what level sales required to break even, how many units of Products are to be sold in order to earn a target level of profit.
- Gain an insight to a broad range of cost accounting concepts and their terminology
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**(18MB9003) BUSINESS LAW & REGULATIONS**

**Course Outcomes:**

After the completion of course Students will be able to:

- Gain an insight into various laws in the country to regulate business aspects
- Identify the legal principles in making contractual agreements.
- Recognize the importance of business law in economic, political and on social context.
- Analyze the legal issues involved in the formation and winding up of a company.
- Explain to compute Income Tax and various forms of Taxes.

**(18MB9004) BUSINESS STATISTICS AND ANALYTICS FOR DECISION MAKING**

**Course Outcomes:**

After the completion of course Students will be able to:

- Implement managerial applications of statistical methods in business problems
- Measure a central value of an observation and variation of an observation with its central value
- Gain better numerical understanding and its key applications to make valid findings and conclusions of data that has collected through different sources.
- Relate all possible kinds of relationships of dependent variables with independent variables
- Formulate hypothesis and test the same with tools of hypothesis testing to draw a proper conclusions about population.

- 

**(18MB9005) MANAGERIAL ECONOMICS****Course Outcomes:**

After the completion of course Students will be able to:

- Assess the importance of micro economics in business management
- Assess the roles of managers as economists in firms
- Analyze the internal and external decisions to be made by managers
- Analyze the demand and supply conditions and assess the position of a company
- Design competitive strategies, including costing, pricing, product differentiation, according to the natures of products and the structures of the markets.

**(18MB9006) ENTREPRENEURSHIP IN PRACTICE.****Course Outcomes:**

After the completion of course Students will be able to:

- Discern distinct entrepreneurial traits and identify the successful elements of successful entrepreneurial ventures
- Consider the legal and financial conditions for starting a venture and to assess the opportunities and constraints for new ventures
- Design strategies for the successful implementation of ideas
- Comprehend the evaluation of business opportunity from the prospective of an investor
- Identify the most suitable sources of finance for start-ups
- Write and execute their own business plan

**(18MB9007) BUSINESS COMMUNICATION LAB****Course Outcomes:**

After the completion of course Students will be able to:

- Apply business communication strategies and principles to prepare effective communication for domestic and international business situations.
- Utilize the skill of writing business letters, memos, general warning, and caution and danger letters in an organization.
- Analyze the verbal and nonverbal communications and lead the people effectively.

- Deliver an effective oral business presentation. Communicate via electronic mail, Internet, and other technologies.
- Select appropriate organizational formats and channels used in developing and presenting business messages.

### **(18MC9150) FUNDAMENTALS OF COMPUTER AND INFORMATION SYSTEM LAB**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate ability to create documents and Excel sheets for information storage
- Develop the documentation of using MS-Word.
- Sort the data and apply the mathematical calculation using MS-Excel.
- Develop the business presentation using MS-PowerPoint
- Gain an understanding of techniques of Google search engine.

### **I MBA – II Semester**

#### **(18MB9008) HUMAN RESOURCE MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding of the concept of human resource management and its relevance in organizations.
- Explain the current theory and practice of recruitment and selection. This includes but is not limited to the supply of human resource and the advantages and disadvantages of external and internal recruiting.
- Assess the relevant recruitment and selection, and performance appraisal methods to be used in different contexts.
- Develop, implement, and evaluate compensation, employee orientation, training, and development programs.
- Demonstrate the significance of contemporary issues such as diversity management, talent management and so on to both employers and employees

#### **(18MB9009) FINANCIAL MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate the applicability of the concept of Financial Management; understand its objectives and role of a Financial Manager.
- Analyze and evaluate the investment decisions.
- Manage the working capital requirements of a firm
- Apply the Leverage and EBIT EPS Analysis associated with financial data of the firm



- Demonstrate an understanding of the Cost of capital.

### **(18MB9010) MARKETING MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate strong conceptual knowledge in the functional area of marketing management.
- Develop an understanding of various facets of Marketing management
- Demonstrate the ability to take decisions and plan, develop, execute and control marketing strategies
- Ensure various marketing programs for the attainment of organizational marketing goals.
- Demonstrate analytical skills in identification and resolution of problems pertaining to marketing management.

### **(18MB9011) BUSINESS RESEARCH METHODS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop understanding on various kinds of business research concepts.
- Gain knowledge on Research process and hypothesis development with different research design.
- Demonstrate adequate knowledge on sampling procedure and data collection methods.
- Apply knowledge of measurement & scaling techniques as well as the quantitative data analysis for research problems.
- Assess the importance of Research Report writing in systematic way.

### **(18MB9012) OPERATIONS MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Identify the elements of operations management and various transformation processes to enhance productivity and competitiveness.
- Analyze and evaluate various facility alternatives and their capacity decisions.
- Develop a balanced line of production & scheduling and sequencing techniques in operation environments
- Develop aggregate capacity plans and MPS in operation environments.
- Plan and implement suitable materials handling principles and practices in the operations.

### **(18MB9013) MANAGEMENT INFORMATION SYSTEMS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the importance of information system in decision making.
- Determine information system requirements for all management levels by describing the differences between various types of information systems.

- Apply probability theory in decision making situations.
- Apply an ERP system to manage a company.
- Implement and evaluate all aspects management information systems

### **(18HS0805) COMMUNICATIVE ENGLISH LAB**

#### **Course Outcomes:**

- Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
- Apply communication skills through various language learning activities.
- Analyse the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
- Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
- Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

### **(18HS0815) HUMAN VALUES AND PROFESSIONAL ETHICS FOR MANAGER (AUDIT COURSE)**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the moral issues in a society to live in harmony in the society
- Maintain professional, personal ethics and avoid discriminatory practices.
- Handle ethical dilemmas in various functional disciplines and live in balance with environment
- Realize the significance of mutual trust and abiding by the code of conduct in the organizations and as well in the society.
- Gain an insight into ethics, responsibilities, code of conduct in organizations.

#### **II MBA – I Semester**

### **(18MB9015) BUSINESS ETHICS AND CORPORATE GOVERNANCE**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Apply various ethical principles in business and corporate social responsibility practices
- Recognize how personal ethics can influence behavior and apply in decision making
- Explain the ethical challenges facing the various functional departments
- Identify the organizational and cultural variables that impact ethical judgment
- Analyze various ethical codes in corporate governance
- Identify organizational policies and systems that employ ethical conduct

### **(18MB9016) INDIAN ECONOMY & POLICY**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Analyze the characteristics of Indian economy and sectorial contribution towards economy in the historic period and also in the current scenario.
- Familiarize with the various components of business environment and able to assess the dynamics of the environment.
- Recognize the industrial policies that have made significant contribution to the growth of the Indian economy
- Appreciate and assess the impact government policies towards the business.
- Analyze the policies towards international trade, role of export-import bank, and the components balance of payments that cause disequilibrium.

### **(18MB9017) SPIRITUAL MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the values and the importance of value education in a society.
- Gain an understanding towards spirituality, and discern to the challenges of value adoption.
- Appreciate the major religions and the sources of values and understand the divine concept.
- Handle the principles of integrity, character development and live in balance with environment
- Realize the significance of meditation and emotional maturity for the code of conduct in the organizations and as well in the society
- Develop environmental awareness and maintain and assess personal progress to create harmony in professional as well as personal life

### **(18MB9018) BASICS OF BUSINESS PROCESS OUTSOURCING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the basics of business process outsourcing and the challenges of Off shoring.
- Analyze the opportunities, issues and problems, components that control the business process outsourcing industry.
- Demonstrate the ability to handle the aspects of health care BPOs and financial services BPOs.
- Realize the significance of outsourcing and assessing the new trends in the BPO organizations
- Develop appropriate technologies and management patterns to create careers in BPOs.
- Realize the new opportunities in various other sectors that can offer BPOs.

## **(18MB9019) AGRI-BUSINESS MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Understand the fundamentals of management with reference to agribusiness
- Acquaint with agricultural contribution towards Indian economy
- Realize the significance of environment affecting agribusiness and recognize the various sources of finance towards agri business
- Apply the managerial functions and its applications with reference to agribusiness
- Learn the concepts and process of Agricultural Marketing and Cooperation
- Get knowledge about the recent developments in Agribusiness Management

## **(18MB9020) EXPORT AND IMPORT MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the theories of international trade, balance of trade and adjustment mechanisms.
- Get an insight into various instruments that control the international trade and avoid discriminatory practices
- Realize the significance of export marketing, contracts and the role of promotion councils
- Handle the payment methods, risks and various financing strategies in export and import process
- Recognize the different agencies involved in EXIM process and their role in the international trade
- Observe and explore the international environmental factors, international institutions that control the trade.

## **(18MB9021) INVESTMENT ANALYSIS AND PORTFOLIO MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about investment management and trading securities
- Examine and value the major investment vehicles and strategies to allocate funds
- Make decisions of allocation and selection of assets based on trade-off between risk and return, risk mitigating tools and investment avenues.
- Define the objectives in constructing and managing a portfolio and learn to create an investment policy statement.
- Develop knowledge of modern portfolio theory and effect of diversification on investment portfolios
- Gain knowledge to measure and evaluate portfolio performance and to manage the risk.

## **(18MB9022) SALES AND DISTRIBUTION MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an understanding about the roles and responsibilities of the Sales Managers
- Manage and enhance the sales force productivity and performance.
- Get an insight towards distribution channels, their organization structures and to make value addition to channels.
- Plan and implement an effective sales strategy for their organizations.
- Design and implement distribution channel strategy.
- Manage the Channels efficiency and effectiveness across countries

## **(18MB9023) PERFORMANCE MANAGEMENT SYSTEMS**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an insight towards performance management and performance appraisal.
- Compare and contrast various organizational performance management programs and best practices and define attributes of effective performance management systems.
- Assess how increased employee involvement can contribute to effective performance and coach employees to identify career paths and resources available to support individual development.
- Practically experience a number of tools which are critical to the new performance management systems.
- Realize the value of and drawbacks of modern performance management systems such as 360, MBO conducted in the organizations.
- Develop an understanding towards the issues involved in effective performance management

## **(18MB9024) ENTERPRISE RESOURCE PLANNING**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Make basic use of Enterprise software, and its role in integrating business functions
- Analyze the strategic options for ERP identification and adoption.
- Develop and design the modules used in ERP systems
- Create reengineered business processes for successful ERP implementation.
- Customize the existing modules of ERP systems.
- Examine the places where formal development approaches of ERP systems can be fruitful and where they may not be so helpful.

## **(18MB9025) RISK MANAGEMENT AND INSURANCE**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the Principles, essential features and objectives of risk management.
- Gain knowledge of the range of financial and financial related risks facing organizations.
- Examine the role of public policy including social insurance in personal financial planning and risk management.
- Determine approach to risk management through risk identification, risk measurement and risk management (or mitigation)
- Identify, understand operational risk and how to manage it.
- Assess significance of insurance policies and calculation of insurance premiums for living and non – living objects.

## **(18MB9026) ADVERTISING AND SALES PROMOTION MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about various types of advertising and its forms.
- Realize the significance of advertising agency and the client agency relationship through selection of media
- Handle advertising budget and measure the effectiveness of advertising.
- Comprehend the values and ethics in advertising and apply in practice
- Identify various suitable sales promotion tools and techniques for various groups
- Organize and measure the effectiveness of sales promotion campaigns

## **(18MB9027) KNOWLEDGE MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the key theories and models that inform knowledge management
- Critically apply theory to organisations in order to identify and justify effective knowledge management strategies and activities
- Access and evaluate essentials relating to knowledge management
- Communicate clearly and implement effectively varying formats and technologies
- Design problem solutions based upon research findings and critical assessment of current theory and practice
- Develop an insight towards the future of knowledge management from industry perspective

## **(18MB9028) DATA WAREHOUSING AND MINING**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an understanding towards Data Warehouse fundamentals, Data Mining Principles
- Design data warehouse with dimensional modeling and apply OLAP operations.
- Identify appropriate data mining algorithms to solve real world problems
- Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining
- Describe complex data types with respect to spatial and web mining.
- Apply and select suitable methods for data analysis.

## **(18MB9029) FINANCIAL MARKETS AND SERVICES**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate an awareness of the current structure and regulation of the Indian financial services sector.
- Apply concepts relevant to financial markets and financial institutions, such as the flow of funds, levels of interest rates and interest rate differentials
- Identify the functions of financial markets and institutions and examine their impact on the level of interest rates and interest differentials.
- Describe the instruments, participants and operation of the money market and role of intermediaries in the primary market
- Explore the integration of international financial markets and analyze the implications for financial managers.
- Evaluate and create strategies to promote financial products and services

## **(18MB9030) CUSTOMER RELATIONSHIP MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate how knowledge of consumer behaviour can be applied to marketing.
- Identify and explain factors which influence consumer behaviour.
- Relate internal dynamics such as personality, perception, learning motivation and attitude to the choices consumers make.
- Realize the principal factors that influence consumers as individuals and decision makers with an application to the buying decision process.
- Develop marketing strategies that are consumer based and create and enhance customer
- Discern the concept of Consumerism and legislative responses to consumerism, and marketer responses to consumer issues

### **(18MB9031) TRAINING AND DEVELOPMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the role of training and development in human resources management.
- Describe the psychology of the learning process on which training is based.
- Analyze the training needs of an organization.
- Assess, design, access and implement various methods, techniques and sources of training.
- Evaluate the value of the training once completed from the individual employee and the organization's viewpoint.
- Develop an appropriate training strategy for today's organization

### **(18MB9032) SUPPLY CHAIN MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Appreciate the evolution and identify the role of supply chain management in the economy
- Identify and evaluate the drivers of supply chain management
- Analyze the importance of make or buy decisions and identify appropriate suppliers
- Appraise the importance of supply chain networks
- Assess the risk associated with supply chain practices and take better decisions
- Familiarize with and apply various computer based supply chain optimization tools

### **(18MB9033) COST AND MANAGEMENT ACCOUNTING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the role of cost accounting in the business management of manufacturing and non- manufacturing companies.
- Apply accounting methods of cost calculation and interpret cost accounting statements.
- Analyze and evaluate information for cost ascertainment, planning, control and decision making
- To know the various stock valuation methods adopted by various business organisations.
- Gain an understanding between the relationship between cost accounting, financial accounting and management accounting role in decision making.
- Prepare a budget and use budgets for performance evaluation after flexing the budget.

### **(18MB9034) PRODUCT AND BRAND MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:



- Gain an insight into the fundamental concepts of product and brand development
- Use the brand positioning framework to develop a brand, keep it relevant, expand a brand internationally, and reposition a brand
- Use tools and metrics to measure branding and interpret brand performance
- Recognize the importance of using branding strategies in an organization.
- Develop an understanding about the differences in branding to various sectors
- Assess and apply branding strategies to various products across different sectors.

### **(18MB9035) HUMAN RESOURCE METRICS AND ANALYTICS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about how to plan for human resources and implement techniques of man power forecasting and inventorying
- Analyze the role of recruitment and selection in relation to the organization's business
- Competency to recruit, select and appraise the performance of the employees
- Handle employee issues such as employee separation and evaluate new trends in managing the staff in organizations
- Appraise succession plans and critical staffing objectives and evaluate the complexities of downsizing issues and the role of HR planning in the process of downsizing
- Develop appropriate technologies and management patterns to improve business

### **(18MB9036) E – BUSINESS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the E- Markets and E- business infrastructure and trends
- Identify various procurement methods, their benefits and risks and assess different options for integration of organizations' information systems with e-procurement suppliers.
- Analyze different types of portal technologies and deployment methodologies commonly used in the industry for security and reliability of E- business.
- Analyze the effectiveness of network computing and cloud computing policies in a multi-location organization.
- Analyze real business cases regarding their e-business strategies and transformation processes and choices.
- Integrate theoretical frameworks with business strategies.

### **(18MB9037) INDUSTRY ANALYSIS AND REPORT PRESENTATION**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an understanding of the dynamics of a specific industry.
- Compare various issues particular to an industry.

- Develop cross-functional perspective of the functioning of a business enterprise and an industry.
- Develop awareness about the future prospective problems based on secondary source of data.
- Learn and examine the trends of growth or decline in industry.
- Analyze the issues of an industry and an enterprise with respect to set basic parameters

### **(18MB9038) BUSINESS SIMULATION LAB**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the EXCEL lessons
- Get familiarize with basic to intermediate skills for using Excel in the classroom vis-à-vis Business Applications
- Hands on experience on MS Excel Utilities
- Create solutions for Data Management and Reporting
- Gain an understanding about the SPSS and experts in handling data files and carry out basic statistical analysis
- Test basic hypothesis using t tests, Chi Square tests and ANOVA.

#### **II MBA – II Semester**

### **(18MB9039) GREEN BUSINESS MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate an understanding of comprehensive systemic analysis across both physical and behavioural dimensions involving society, the environment, and the economy.
- Analyze the role of environmental sustainability in the promotion of comprehensive justice and equity.
- Gain an insight towards the basic sustainability concepts of evolutionary processes, inter-generational debt, socio-political adaptation, climate change, ecosystem services, and environmental justice
- Articulate a comprehensive world view that integrates diverse approaches to sustainability.
- Realize the significance of environmental reporting and green product management
- Identify how globalized processes impact socio ecological systems. Develop appropriate technologies and management patterns to create harmony with the environment

### **(18MB9040) COMPUTER APPLICATION FOR BUSINESS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the E- Markets and E- business infrastructure and trends
- Identify various procurement methods, their benefits and risks and assess different options for integration of organizations' information systems with e-procurement suppliers.

- Analyze different types of portal technologies and deployment methodologies commonly used in the industry for security and reliability of E- business.
- Analyze the effectiveness of network computing and cloud computing policies in a multi-location organization.
- Analyze real business cases regarding their e-business strategies and transformation processes and choices.
- Integrate theoretical frameworks with business strategies.

## **(18MB9041) WORLD TRADE ORGANIZATION & INTELLECTUAL PROPERTY RIGHTS**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP
- Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development
- Identify activities and constitute IP infringements and the remedies available to the IP owner
- Describe the precautions steps to be taken to prevent infringement of proprietary rights in products and technology development.
- Be familiar with the processes of Intellectual Property Management (IPM) and various approaches for IPM and conducting IP and IPM auditing and explain how IP can be managed as a strategic resource and suggest IPM strategy.
- Be able to anticipate and subject to critical analysis arguments relating to the development and reform of intellectual property right institutions and their likely impact on creativity and innovation.

## **(18MB9042) CROSS CULTURAL MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Appreciate the critical role of culture in international business and the importance of managing cultural differences
- Analyze the interacting spheres of culture including organizational culture, professional culture, national culture, and industry culture.
- Discern the influence of culture on different functions of management including communication, negotiation, marketing, leadership, motivation, human resource management and teams.
- Display an understanding of cultural difference in interactions with different nationalities and an awareness of and sensitivity to cross-cultural issues.
- Understand and explain issues of cultural awareness when conducting international business
- Build mind-set and skill-set of a competent leader who appreciates and leverages diversity in talents and organizations s/he works with

## **(18MB9043) INNOVATION TECHNOLOGY MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Account for the importance of technological development and innovation for economic growth and increased competitiveness on a firm level
- Critically discuss a firm's need to have a strategic and integrated approach to be able to successfully manage innovation and technical development,
- Analyse complex innovation processes in firms both internally and externally.
- Explore and better manage the effects of new technology on people and work systems
- Demonstrate that the effective management of technological innovation requires the integration of people, processes and technology
- Recognize opportunities for the commercialization of innovation

## **(18MB9044) SUSTAINING ORGANIZATIONAL CULTURE & TEAMWORK**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the concepts in the field of management and develop skills to apply the concepts for business problems
- Describe strategies used by managers to create and maintain a consistent organizational culture
- Recognize the role of management in communicating and teaching organizational culture to employees and subordinates across borders
- Understanding and manipulating organisational/corporate culture to engender greater organisational flexibility and productivity
- Demonstrate an understanding of how to uphold international negotiations
- Demonstrate self-awareness, sensitivity, and openness to diverse people and cultures

## **(18MB9045) FINANCIAL DERIVATIVES**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the various financial derivative securities (Futures, Forwards and Options).
- Describe standard derivative contracts, their properties and functionality.
- Analyze the role and relationship between forward and futures prices.
- Apply scientific methods for valuation of options and other derivatives, in continuous and discrete time.
- Interpret and apply risk measures that are commonly used in risk management.
- Describe how swaps can reduce market risks and use a simulation to assess a risk hedging strategy based on interest rate swaps

## **(18MB9046) SERVICES MARKETING**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding understand the characteristics of services, understand consumer behavior in services, align service design and standards, delivering service, managing services promises
- To segment markets for services and create value in the market for new services
- Implement pricing and promotion strategies for services
- Focus on the role of marketing communication and set communication strategies for service marketing
- Plan and execute the delivery of services based on the requirement.
- Develop appropriate strategies for marketing of the services

## **(18MB9047) ORGANIZATIONAL CHANGE AND DEVELOPMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding and appreciation of the various concepts of organizational development
- Learn how to apply some of the key concepts and tools organizational development and change leadership and management.
- Discuss and analyze diagnostic tools used to assess organizational effectiveness.
- Identify major types of organizational development interventions.
- Demonstrate how to evaluate organizational development interventions
- Apply human resource intervention techniques in different management scenarios.

## **(18MB9048) DATA COMMUNICATION AND NETWORK ANALYSIS**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the concept of Data communication and networks, layered architecture and their applications
- Evaluate data communication link considering elementary concepts of data link layer protocols for error detection and correction.
- Analyse and Set up protocol designing issues for Communication networks.
- Apply various network layer techniques for designing subnets and supernets and analyse packet flow on basis of routing protocols.
- Estimate the congestion control mechanism to improve quality of service of networking application
- Understand and design application layer protocols and internet applications such as network security

## **(18MB9049) INTERNATIONAL FINANCIAL MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Analyse, apply and evaluate information within the global financial environment of foreign exchange to solve problems and make informed decisions.
- Review the problems of dealing in foreign currency and the advantages and disadvantages of overseas funding
- Demonstrate the use of foreign exchange derivatives and other methods to manage foreign exchange exposure and risk
- Describe the issues pertaining to cross-border investment decisions and financing MNCs
- Analyse the complexities associated with management of cost of funds in the capital Structure in MNCs
- Analyse, evaluate and synthesize both quantitative and qualitative financial information to influence problem solving and decision making

## **(18MB9050) INTERNATIONAL MARKETING**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the major issues related to international marketing
- To assess an organization's ability to enter and analyse various strategies to enter and compete in international markets
- Identify and analyse opportunities within international marketing environments
- Handle new product development and branding in international markets
- Realize the factors that affect the distribution channels and structures in international markets and take appropriate decisions
- Develop an understanding towards the procedures and documentation in the export and import process in the country and apply in practice

## **(18MB9051) INTERNATIONAL HRM**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about importance of Human resource at international level and also identify the differences between domestic and international human resource management
- To understand and assess the various cultural and human variables that influence in the workplace.
- Understand the nature, sources and different methods for recruiting people at international level and apply them along with compensation of human resources based on their skills.
- Perform the functional roles of HRM in International context especially in recruitment and selection, performance management, training, learning and development and repatriation.
- Apply different appraisal methods and trainings that are available for International staffing.

- Assess about the industrial relations in other nations and also to manage people in different locations.

### **(18MB9052) CORPORATE INFORMATION MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Define an information system from both a technical and business perspective and distinguish between computer literacy and information systems literacy
- Identify the major management challenges to building and using information systems in organizations
- Identify managerial risks related to information system organization processing and utilizing
- Explain how enterprise systems and industrial networks create new efficiencies for businesses
- Apply outsourcing of business activities and manage the risk and relationship with outsourcing agencies
- Highlight the role of projects in modern day business organizations and sensitize the complexities of project management.

### **(18MB9053) SEMINAR ON CONTEMPORARY ISSUES OF MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the issues in the business enterprises across various industrial sectors
- Practice and maintain communication, logical and analytical skills learnt in the MBA program
- Construct new ability to practice new problem solving skills and use these skills in personal life.
- Demonstrate necessary skills to handle day-to-day managerial responsibilities, such as making speeches, giving effective presentations and maintaining one's poise in private and public
- Develop proactive thinking to perform effectively in the dynamic socio economic business systems
- Learn the etiquette essentials to perform in various communication roles as business managers

### **(18MB9054) COMPREHENSIVE VIVVA-VOCE**

#### **Course Outcomes:**

- Plan, and engage in, an independent and sustained critical investigation and evaluation of a chosen research topic relevant to environment and society
- Systematically identify relevant theory and concepts, relate these to appropriate methodologies and evidence, apply appropriate techniques and draw appropriate conclusions
- Engage in systematic discovery and critical review of appropriate and relevant information sources

- Appropriately apply qualitative and/or quantitative evaluation processes to original data
- Understand and apply ethical standards of conduct in the collection and evaluation of data and other resources
- Communicate research concepts and contexts clearly and effectively both in writing and orally

### **(18MB9055) PROJECT WORK**

#### **Course Outcomes:**

- Plan, and engage in, an independent and sustained critical investigation and evaluation of a chosen research topic relevant to environment and society
- Systematically identify relevant theory and concepts, relate these to appropriate methodologies and evidence, apply appropriate techniques and draw appropriate conclusions
- Engage in systematic discovery and critical review of appropriate and relevant information sources
- Appropriately apply qualitative and/or quantitative evaluation processes to original data
- Understand and apply ethical standards of conduct in the collection and evaluation of data and other resources
- Communicate research concepts and contexts clearly and effectively both in writing and orally



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Master of Computer Application**

**MCA I Year-I Semester**

**(18MC9101) COMPUTER PROGRAMMING AND PROBLEM SOLVING**

**Course Outcomes:**

Upon completion of the subject, students will be able to

- Student can effectively apply problem solving techniques in designing the solutions for a wide range of problems.
- Write, compile and debug programs in C language.
- Design programs involving decision structures, loops and functions.
- Explain the difference between call by value and call by reference
- Understand the dynamics of memory by the use of pointers.

**(18HS0810) ENGLISH**

**Course Outcomes:**

Students will be able:

- To understand the rules of English grammar and their usage in writing English.
- To use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- To get the mastery of language to express ideas, views, feelings and experience.
- To communicate well among themselves.
- To inculcate values and ideal characteristic qualities in themselves.

**(18HS0835) PROBABILITY & STATISTICS**

**Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability

**(18HS0836) DISCRETE MATHEMATICS**

**Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts

- Have acquired a proper level of competence for employability

### **(18MB9056) ACCOUNTING & FINANCIAL MANAGEMENT**

#### **Course Outcomes:**

- This course is designed to introduce students to the principles, concepts, and applications of financial accounting and management.

### **(18MC9102) P.C. SOFTWARE LAB**

#### **Course Outcomes:**

- Able to disassemble and assemble the PC back to working condition.
- Able to know installation of software's.
- Able to understand mapping between virtual and physical memory.
- Able to know Software troubleshooting and Hardware Troubleshooting.
- Able to work on MS Office tools.

### **(18MC9103) C PROGRAMMING LAB**

#### **Course Outcomes:**

Upon completion of the subject, students will be able to

- Write, compile and debug programs in C language.
- Apply Problem solving techniques to find solutions to problems.
- Able to use C language features effectively and implement solutions using C language.
- Able to improve logical skills.
- Design programs involving decision structures, loops and functions.
- Explain the difference between call by value and call by reference
- Understand the dynamics of memory by the use of pointers.
- Design programs involving files.

### **(18HS0811) ENGLISH LAB**

#### **Course Outcomes:**

- Students will be able:
- To recognize sounds of English language with different classifications.
- To know phonetic transcription and phonemic symbols of English language.
- To understand international accent and utilize the same in their daily conversation.
- To crease confidence for public speaking, for facing interviews, for making effective oral presentations, for having discussions, and for delivering

impromptu speeches.

## **MCA I Year -II- Semester**

### **(18MC9104) OPERATING SYSTEMS**

#### **Course Outcomes:**

- Able to understand the operating system components and its services
- Implement the algorithms in process management and solving the issues of IPC
- Able to demonstrate the mapping between the physical memory and virtual memory
- Able to understand file handling concepts in OS perspective
- Able to understand the operating system components and services with the recent OS

### **(18MC9105) COMPUTER ORGANIZATION**

#### **Course Outcomes:**

- Able to design digital circuits by simplifying the Boolean functions
- Able to understand the organization and working principle of computer hardware components
- Able to understand mapping between virtual and physical memory
- Acquire knowledge about multiprocessor organization and parallel processing
- Able to trace the execution sequence of an instruction through the processor

### **(18MC9106) OBJECT ORIENTED PROGRAMMING THROUGH C++**

#### **Course Outcomes:**

Students who have completed this course able to:

- Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- Understand fundamentals of object-oriented programming in C++, including defining classes, invoking methods, using class libraries, etc.
- Have the ability to write a computer program to solve specified problems.
- Able to do the C++ Inheritance & Exception Handling concepts.

## **(18MC9107) DATA STRUCTURES**

### **Course Outcomes:**

- Learn how to use data structure concepts for realistic problems.
- Ability to identify appropriate data structure for solving computing problems in C language.
- Ability to solve problems independently and think critically.

## **(18MC9108) DATABASE MANAGEMENT SYSTEMS**

### **Course Outcomes:**

- Understand the basic concepts of the database and data models.
- Design a database using ER diagrams and map ER into Relations and normalize the relations.
- Acquire the knowledge of query evaluation to monitor the performance of the DBMS.
- Develop a simple database applications using normalization.
- Acquire the knowledge about different special purpose databases and to critique how they differ from traditional database systems.

## **(18MC9109) PROGRAMMING IN C++ LAB**

### **Course Outcomes:**

After completion of this course, the students would be able to

- Understand programming language concepts, particularly C++ and object-oriented concepts.
- Write, debug, and document well-structured C++ applications
- Effectively create and use objects from predefined class libraries
- Understand the behavior of primitive data types, object references, and arrays
- Apply decision and iteration control structures to implement algorithms
- Write simple recursive algorithms
- Implement interfaces, inheritance, and polymorphism as programming techniques.

## **(18MC9110) DATA STRUCTURES THROUGH C LAB**

### **Course Outcomes:**

- Learn how to use data structure concepts for realistic problems.
- Ability to identify appropriate data structure for solving computing problems in C language.
- Ability to solve problems independently and think critically.
- Able to search and sort the elements in graphs and trees.

- Ability to solve linked list, queues and hash tables.

### **(18MC9111) DATABASE MANAGEMENT SYSTEMS LAB**

#### **Course Outcomes:**

- Able to master the basic concepts and understand the applications of database systems.
- Able to construct an Entity-Relationship (E-R) model from specifications and to transform to relational model.
- Able to construct unary/binary/set/aggregate queries in Relational Algebra.
- Understand and apply database normalization principles.
- Able to construct SQL queries to perform CRUD operations on database. (Create, Retrieve, Update, Delete)
- Understand principles of database transaction management, database recovery, security.
- Be aware of non-relational databases and applications.

### **(18HS0843) APTITUDE PRACTICE - I**

#### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have developed the subtle way of approaching in the candidate.
- Have acquired the decision making with in no time.
- Have acquired logical thinking during professional tenure.
- Have obtained quick decision making skills.

### **MCA II Year -I- Semester**

#### **(18MC9112) COMPUTER NETWORKS**

#### **Course Outcomes:**

- Able to trace the flow of information from one node to another node in the network
- Able to Identify the components required to build different types of networks
- Able to understand the functionalities needed for data communication into layers
- Able to choose the required functionality at each layer for given application
- Able to understand the working principles of various application protocols
- Acquire knowledge about security issues and services available

## **(18MC9113) JAVA PROGRAMMING**

### **Course Outcomes:**

Students who have completed this course able to:

- Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Have the ability to write a computer program to solve specified problems.
- Able to do the java collection framework programs.
- Work with GUI, Event handling mechanism.

## **(18MC9114) SOFTWARE ENGINEERING**

### **Course Outcomes:**

- Get an insight into the processes of software development
- Able to understand the problem domain for developing SRS and various models of software engineering
- Able to Model software projects into high level design using DFD diagrams
- Able to Measure the product and process performance using various metrics
- Able to Evaluate the system with various testing techniques and strategies

## **(18MC9115) LINUX PROGRAMMING**

### **Course Outcomes:**

- Work confidently in Linux environment.
- Work with shell script to automate different tasks as Linux administration

## **(18MC9116) DATA WAREHOUSING AND DATA MINING**

### **Course Outcomes:**

Upon Completion of the course, the students will be able to

- Store voluminous data for online processing
- Preprocess the data for mining applications
- Apply the association rules for mining the data
- Design and deploy appropriate classification techniques
- Cluster the high dimensional data for better organization of the data
- Discover the knowledge imbibed in the high dimensional system
- Evolve Multidimensional Intelligent model from typical system
- Evaluate various mining techniques on complex data objects

### **(18MC9117) JAVA PROGRAMMING LAB**

#### **Course Outcomes:**

After completion of this course, the students would be able to

- Understand programming language concepts, particularly Java and object-oriented concepts.
- Write, debug, and document well-structured Java applications
- Implement Java classes from specifications
- Effectively create and use objects from predefined class libraries
- Understand the behavior of primitive data types, object references, and arrays
- Apply decision and iteration control structures to implement algorithms
- Write simple recursive algorithms
- Implement interfaces, inheritance, and polymorphism as programming techniques.
- Implement Java collection framework as programming techniques.

### **(18MC9118) LINUX PROGRAMMING LAB**

#### **Course Outcomes:**

- Able to use appropriate Linux commands contextually
- Able to write Shell scripts to automate the jobs and processes.
- Able to use system calls related to file, processes and IPC.

### **(18MC9119) DATA WAREHOUSING AND DATA MINING LAB**

#### **Course Outcomes:**

After undergoing the course students will be able to

- Synthesize the data mining fundamental concepts and techniques from multiple perspectives.
- Develop skills and apply data mining tools for solving practical problems
- Advance relevant programming skills.
- Gain experience and develop research skills by reading the data mining literature.

### **(18HS0820) COMPREHENSIVE SOFT SKILLS**

#### **Course Outcomes:**

- To know the importance of Soft Skills.
- To apply Soft Skills in the different environment.
- To enrich the different levels of Soft Skills to develop their personality.

## **MCA II Year -II- Semester**

### **(18MC9120) BIG DATA ANALYTICS**

#### **Course Outcomes:**

The students will be able to:

- Work with big data platform
- Analyze the big data analytic techniques for useful business applications.
- Design efficient algorithms for mining the data from large volumes.
- Analyze the HADOOP and Map Reduce technologies associated with big data analytics
- Explore on Big Data applications Using Pig and Hive
- Understand the fundamentals of various bigdata analysis techniques

### **(18MC9121) WEB TECHNOLOGIES**

#### **Course Outcomes:**

Student is able to:

- Do the server side programming, maintain sessions.
- Establish the DB connections and access the data.
- Design pages using PHP and AJAX.

### **(18MC9122) DESIGN AND ANALYSIS OF ALGORITHMS**

#### **Course Outcomes:**

- Analyze the complexity of the algorithms
- Use techniques divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems.
- Identify and analyze criteria and specifications appropriate to new problems, and choose the appropriate algorithmic design technique for their solution.
- Able to prove that a certain problem is NP-Complete.

### **(18MC9123) SOFTWARE TESTING**

#### **(DEPARTMENT ELECTIVE – I)**

#### **Course Outcomes:**

- Test the software by applying testing techniques to deliver a product free from bugs
- Evaluate the web applications using bug tracking tools.
- Investigate the scenario and the able to select the proper testing technique
- Explore the test automation concepts and tools
- Deliver quality product to the clients by way of applying standards such as



TQM, Six Sigma

- Evaluate the estimation of cost, schedule based on standard metrics

**(18MC9124) NEURAL NETWORKS & FUZZY LOGIC  
(DEPARTMENT ELECTIVE-I)**

**Course Outcomes:**

- To Expose the students to the concepts of feed forward neural networks
- To provide adequate knowledge about feedback networks.
- To teach about the concept of fuzziness involved in various systems. To provide adequate knowledge about fuzzy set theory.
- To provide comprehensive knowledge of fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm.
- To provide adequate knowledge of application of fuzzy logic control to real time systems.

**(18MC9125) DISTRIBUTED SYSTEMS  
(DEPARTMENT ELECTIVE – I)**

**Course Outcomes:**

- After completion of this course, the student is:
- Able to explain what a distributed system is, why you would design a system as a distributed system, and what the desired properties of such systems are;
- Able to list the principles underlying the functioning of distributed systems, describe the problems and challenges associated with these principles, and evaluate the effectiveness and shortcomings of their solutions;
- Able to recognize how the principles are applied in contemporary distributed systems, explain how they affect the software design, and be able to identify features and design decisions that may cause problems;
- Able to design a distributed system that fulfills requirements with regards to key distributed systems properties (such as scalability, transparency, etc.), be able to recognize when this is not possible, and explain why

**(18MC9126) SERVICE ORIENTED ARCHITECTURE  
(DEPARTMENT ELECTIVE – I)**

**Course Outcomes:**

- Known about the basic principles of service oriented architecture , its components and techniques
- Understand the architecture of web services
- Able to design and develop web services using protocol

- Understand technology underlying the service design
- Acquire the fundamental knowledge of cloud computing

**(18MC9127) HUMAN COMPUTER INTERACTION  
(DEPARTMENT ELECTIVE – II)**

**Course Outcomes:**

- Find innovative ways of interacting with computers
- Help the disabled by designing non-traditional ways of interacting
- Use cognitive psychology in the design of devices for interaction

**(18MC9128) SOCIAL NETWORKS AND SEMANTIC WEB  
(DEPARTMENT ELECTIVE – II)**

**Course Outcomes:**

- Understand semantic web basics, architecture and technologies
- Able to represent data from a chosen problem in XML with appropriate semantic tags obtained or derived from the ontology
- Able to understand the semantic relationships among these data elements using Resource Description Framework (RDF)
- Able to design and implement a web services application that “discovers” the data and/or other web services via the semantic web
- Able to discover the capabilities and limitations of semantic web technology for social networks

**(18MC9129) COMPUTER GRAPHICS  
(DEPARTMENT ELECTIVE – II)**

**Course Outcomes:**

- Gain proficiency in 3D computer graphics API programming
- Enhance the perspective of modern computer system with modeling, analysis and interpretation of 2D and 3D visual information

**(18MC9130) INTERNET OF THINGS  
(DEPARTMENT ELECTIVE – II)**

**Course Outcomes:**

- Ability to combine sensors, servos, robotics, Arduino chips, and more with various or the Internet, to create interactive, cutting-edge devices.
- Better idea of the overview of necessary steps to take the idea of IOT concept through production

**(18MC9131) BIG DATA ANALYTICS LAB**

**Course Outcomes:**

The students will be able to:

- Work with big data platform
- Analyze the big data analytic techniques for useful business applications.
- Design efficient algorithms for mining the data from large volumes.
- Analyze the HADOOP and Map Reduce technologies associated with big data analytics
- Explore on Big Data applications Using Pig and Hive
- Understand the fundamentals of various bigdata analysis techniques

**(18MC9132) WEB TECHNOLOGIES LAB****Course Outcomes:**

Student is able to:

- Design and execute applications in java beam
- Do the server side programming, maintain sessions.
- Establish the DB connections and access the data.
- Ability to work on MVC architecture
- Design pages using PHP and AJAX.

**(18HS0844) APTITUDE PRACTICE - II****Course Outcomes:**

At the end of the course, students would be expected to:

- Have developed the subtle way of approaching in the candidate.
- Have acquired the decision making with in no time.
- Have acquired logical thinking during professional tenure.
- Have obtained quick decision making skills.

**MCA III Year -I- Semester****(18MC9134) .NET TECHNOLOGIES****Course Outcomes:**

- Aware of .net framework components.
- Creating simple data binding applications in VB or C# using ADO.Net connectivity.
- Performing Database operations for windows form.
- Able to create a web applications.
- Creating user interactive web pages.

**(18MC9135) CLOUD COMPUTING****Course Outcomes:**

- Compare the strengths and limitations of cloud computing
- Identify the architecture, infrastructure and delivery models of cloud computing
- Apply suitable virtualization concept.
- Choose the appropriate cloud player, Programming Models and approach.
- Address the core issues of cloud computing such as security, privacy and Interoperability
- Design Cloud Services and Set a private cloud

**(18MC9136) OBJECT ORIENTED ANALYSIS AND DESIGN Using  
UML**

**Course Outcomes:**

- Understand the basic concepts to identify state & behavior of real world objects
- Able to learn the various object oriented methodologies and choose the appropriate one for solving the problem with the help of various case studies
- Understand the concept of analysis, design & testing to develop a document for the project
- Able to implement analysis, design & testing phases in developing a software project

**(18MC9137) CYBER SECURITY  
(DEPARTMENT ELECTIVE – III)**

**Course Outcomes:**

After learning the course the students should be able to:

- Understand cyber-attack, types of cybercrimes, cyber laws and also how to protect them self and ultimately society from such attacks

**(18MC9138) SOFTWARE PROJECT MANAGEMENT  
(DEPARTMENT ELECTIVE – III)**

**Course Outcomes:**

- Understand the activities during the project scheduling of any software application.
- Learn the risk management activities and the resource allocation for the projects.
- Can apply the software estimation and recent quality standards for evaluation of the software projects.
- Acquire knowledge and skills needed for the construction of highly reliable

software project.

- Able to create reliable, replicable cost estimation that links to the requirements of project planning and managing

**(18MC9139) ARTIFICIAL INTELLIGENCE  
(DEPARTMENT ELECTIVE – III)**

**Course Outcomes:**

At the end of this course:

- Student should have a knowledge and understanding of the basic concepts of AI including Search.
- Student can solve the Game Playing problems.
- Student can able to use to planning and learning techniques
- Student should be able to use this knowledge and understanding of appropriate principles and guidelines to synthesise solutions to tasks in AI and to critically evaluate alternatives.
- Student can have ability to use the expert system

**(18MC9140) INFORMATION RETRIEVAL SYSTEMS  
(DEPARTMENT ELECTIVE – III)**

**Course Outcomes:**

- Use different information retrieval techniques in various application areas
- Apply IR principles to locate relevant information large collections of data
- Analyse performance of retrieval systems when dealing with unmanaged data sources
- Implement retrieval systems for web search tasks.

**(18MC9141) M-COMMERCE  
(DEPARTMENT ELECTIVE – IV)**

**Course Outcomes:**

- Able to apply E – commerce principles in market place.
- Able to apply M – commerce principles to various business domains
- Understand the theory and applications of M-commerce in business domain
- Get an exposure to current technological advancements in M-commerce

**(18MC9142) IMAGE PROCESSING  
(DEPARTMENT ELECTIVE – IV)**

**Course Outcomes:**

- Able to enhance images using enhancement techniques.

- Able to restore images using restoration techniques and methods used in digital image processing
  - Able to compress images using compression techniques used in digital image **processing**

**(18MC9143) DESIGN PATTERNS  
(DEPARTMENT ELECTIVE – IV)**

**Course Outcomes:**

- Students demonstrate a thorough understanding of patterns and their underlying principles
- Students know what design pattern to apply to a specific problem
- Students demonstrate what tradeoffs need to be made when implementing a design pattern
- Students will be able to use design patterns when developing software

**(18MC9144) COGNITIVE COMPUTING  
(DEPARTMENT ELECTIVE – IV)**

**Course Outcomes:**

- Understand the broad perspective of Cognitive Computing
- Understand the concept of Analytics in Cognitive computing
- Using the IBMs Watson
- Designing the applications in Cognitive computing

**(18MC9145) .NET TECHNOLOGIES LAB**

**Course Outcomes:**

- Create Simple application using web controls
- Work with States of ASP.NET Pages
- Query textbox and Displaying records & Display records by using database Datalist link control & Databinding using dropdownlist control Inserting record into a database & Deleting record into a database
- Databinding using datalist control & Datalist control templates Databinding using datagrid & Datagrid control template Datagrid hyperlink & Datagrid button column Datalist event & Datagrid paging Creating own table format using datagrid

**(18MC9146) CLOUD COMPUTING LAB**

**Course Outcomes:**

- The student should be able to Design and Implement applications on the Cloud.

- Use the cloud tool kits.

### **(18MC9147) UML LAB**

#### **Course Outcomes:**

- Understand the basic concepts to identify state & behavior of real world objects
- Able to learn the various object oriented methodologies and choose the appropriate one for solving the problem with the help of various case studies
- Understand the concept of analysis, design & testing to develop a document for the project
- Able to implement analysis, design & testing phases in developing a software project

### **(18HS0821) ADVANCED ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB**

#### **Course Outcomes:**

- Flair in Writing and felicity in written expression
- To enhance job prospects
- Improving Effective Speaking Abilities
- To prepare effective Interview techniques

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)  
DEPARTMENT OF CIVIL ENGINEERING**

**M.Tech (Structural Engineering)**

**I M. TECH - I SEM. (SE)**

**(18CE1001) ADVANCED STRUCTURAL ANALYSIS**

**Course Outcomes:**

After completion of this course, the student shall understand

- Analysis of continuous beam by stiffness & flexibility matrix methods
- Analysis of Rigid Jointed frames by Stiffness & flexibility matrix methods
- Analysis of Pin Jointed Structures by Stiffness & Flexibility matrix methods
- Formation global & element stiffness matrix, direct stiffness method
- Equation solution Techniques

**(18CE1002) ADVANCED SOLID MECHANICS**

**Course Outcomes:**

After completion of this course, the student shall understand

- Two-dimensional analysis of stress and strain
- Three-dimensional analysis of stress and strain

**(18CE1008) THEORY OF THIN PLATES AND SHELLS**

**Course Outcomes:**

After completion of this course, the student shall be able to

- Analyze the plates using Navier's and Levy's method
- Analyze the circular, rectangular and square plates by finite difference method
- Design the curved shells and roofs
- Design the various folded plate structures

**(18CE1009) THEORY AND APPLICATIONS OF CEMENT COMPOSITES**

**Course Outcomes:**

At the end of the course, students will be able to

- Formulate constitutive behaviour of composite materials – Ferrocement, SIFCON and Fibre Reinforced Concrete
- Mechanical properties of cement composites
- Admixtures and special uses of cements.
- X-ray diffraction and SEM analysis of materials



### **(18CE1010) THEORY OF STRUCTURAL STABILITY**

#### **Course Outcomes:**

The student shall be able to,

- Analyze elastic and inelastic buckling of bars
- Understand the various numerical methods for treatment of stability problems and buckling of rectangular cross-sectional beams and plates

### **(18HS0837) ANALYTICAL AND NUMERICAL METHODS FOR STRUCTURAL ENGINEERING**

#### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability
- Have acquired computational skills to solve real world problems in engineering

### **(18CE1011) STRUCTURAL HEALTH MONITORING**

#### **Course Outcomes:**

At the end of the course, students will be able to

- Acquire the fundamental knowledge on structural health monitoring and analyse smartmaterials
- Understand the Structural Health Monitoring Applications in civil engineering structures and techniques for health monitoring.
- Assess the different Non-Destructive Testing Methods.
- Assess the health of structure using Durability tests.
- Suggest repairs and rehabilitation measures of the structure

### **(18CE1012) STRUCTURAL OPTIMIZATION**

#### **Course Outcomes:**

At the end of the course, students will be able to

- Acquire the fundamental knowledge on Optimization Techniques
- Understanding the principle of Calculus for optimization
- Understanding Linear Programming Techniques
- Apply Linear Programming techniques to Plastic design of Frames.
- Understanding Dynamic Programming Technique to apply for Design of Beams and Frames

### **(18CE1003) STRUCTURAL DESIGN LAB**

#### **Course Outcomes:**

At the end of the course, students will be able to

- Design and Detail all the Structural Components of Frame Buildings.
- Design and Detail complete Multi-Storey Frame Buildings.

### **(18CE1004) ADVANCED CONCRETE LAB**

#### **Course Outcomes:**

At the end of the course, students will be able to

- Design high grade concrete and study the parameters affecting its performance.
- Conduct Non-Destructive Tests on existing concrete structures.
- Apply engineering principles to understand behaviour of structural/ elements

### **(18HS0823) RESEARCH METHODOLOGY AND IPR**

#### **Course Outcomes:**

- Understood the Meaning of research problem, Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem.
- Got the knowledge of How to get new ideas.
- Acquired the knowledge of various government and NGO or agencies for Research Funding.

### **(18CE1029) DISASTER MANAGEMENT**

#### **Course Outcomes:**

On completion of the course the students will have knowledge on

- Types of disasters and their effects on environment
- Causes of disasters
- Disaster management through engineering applications

### **(18HS0825) SANSKRIT FOR TECHNICAL KNOWLEDGE**

#### **Course Outcomes:**

Students will be able to

- Understanding basic Sanskrit language
- Ancient Sanskrit literature about science & technology can be understood
- Being a logical language will help to develop logic in students

### **(18HS0826) VALUE EDUCATION**

#### **Course outcomes:**

Students will be able to

- Knowledge of self-development.
- Learn the importance of Human values.

- Developing the overall personality.

## **I M. TECH - II SEM. (SE)**

### **(18CE1005) FEM IN STRUCTURAL ENGINEERING**

#### **Course Outcomes:**

After completion of this course, the student shall understand

- The history of FEM, methods of functional approximation
- Principles of Elasticity, isoperimetric formulation
- Finite element analysis of plates

### **(18CE1006) STRUCTURAL DYNAMICS**

#### **Course Outcomes:**

After completion of this course, the student shall understand the concepts OD

- Structural dynamics-single and multi-degree of freedom systems
- Free and Forced vibrations
- Practical Vibration analysis

### **(18CE1013) ADVANCED STEEL DESIGN**

#### **Course Outcomes:**

After completion of this course, the student shall be able to

- Design light Gauge steel compression and Flexural members
- Analyze and design Transmission towers
- Analyze and design continuous beams and portal frames using plastic theory
- Design steel Tension members and laterally restrained beams using limit state method

### **(18CE1014) DESIGN OF FORMWORK**

#### **Course Outcomes:**

- At the end of the course, students will be able to
- Select proper formwork, accessories and material.
- Design the form work for Beams, Slabs, columns, Walls and Foundations.
- Design the form work for Special Structures.

### **(18CE1015) DESIGN OF HIGH RISE STRUCTURES**

#### **Course Outcomes:**

At the end of the course, students,

- understanding on the behavior of tall buildings subjected to lateral building.
- should have knowledge about the rudimentary principles of designing tall buildings as per the existing codes.

### **(18CE1016) DESIGN OF MASONRY STRUCTURES**

#### **Course Outcomes:**

The student shall be able to,

- Understand the masonry design approaches.
- Determine Reinforced Masonry Members.
- Determine strength of stability
- Determine masonry walls in composite action

### **(18CE1017) DESIGN OF ADVANCED CONCRETE STRUCTURES**

#### **Course Outcomes:**

- Analyze the special structures by understanding their behavior.
- Design and prepare detail structural drawings for execution citing relevant IS codes

### **(18CE1018) ADVANCED DESIGN OF FOUNDATIONS**

#### **Course Outcomes:**

At the end of this course, all students should be able to:

- Student will demonstrate the ability to identify a suitable foundation system for a structure
- Student will be capable of analyzing and designing foundations for structures such as tall towers, bridges.

### **(18CE1019) SOIL STRUCTURE INTERACTION**

#### **Course Outcomes:**

At the end of this course students will have the capacity to

- Idealize soil response in order to analyze and design foundation elements subjected to different loadings.

### **(18CE1020) DESIGN OF INDUSTRIAL STRUCTURE**

#### **Course Outcomes:**

- On completion of this course student will be able to plan industrial structures for functional requirements.
- They will be able to design various structures such as Cooling Towers, Chimneys, and Transmission Towers with required foundations.

### **(18CE1007) MODEL TESTING LAB**

#### **Course Outcomes:**

At the end of the course, students will be able to

- Understand the response of structures.
- Prepare the models.

- Conduct model testing for static loading
- Conduct model testing for free and forced vibrations

### **(18HS0838) NUMERICAL ANALYSIS LAB**

**Course Outcomes:** At the end of the course, students will be able to

- Find Roots of non-linear equations by Bisection method and Newton's method.
- Do curve fitting by least square approximations
- Solve the system of Linear Equations using Gauss - Elimination/ Gauss - Seidal Iteration/ Gauss - Jordan Method
- To Find Numerical Solution of Ordinary Differential Equations by Euler's Method, Runge-Kutta Method.

### **(18HS0819) PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS**

#### **Course Outcomes**

Students will be able to:

- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity.
- Study of Neetishatakam will help in developing versatile personality of students.

### **(18HS0827) PEDAGOGY STUDIES**

#### **Course Outcomes:**

Students will be able to understand

- What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

### **(18HS0828) STRESS MANAGEMENT BY YOGA**

#### **Course Outcomes:**

Students will be able to

- Develop healthy mind in a healthy body thus improving social health also improve efficiency.

## **II M. TECH - I SEM. (SE)**

### **(18CE1021) DESIGN OF PRESTRESSED CONCRETE STRUCTURES**

#### **Course Outcomes:**

After completion of this course, the student shall understand

- Concept of pre-stressed concrete
- Losses of Prestress
- Deflections of prestressed concrete elements
- Circular prestressing, Analysis and design of statically indeterminate beams.

### **(18CE1022) ANALYSIS OF LAMINATED COMPOSITE PLATES**

#### **Course outcomes:**

At the end of the course, students will be able to

- Analyse the rectangular composite plates using the analytical methods.
- Analyse the composite plates using advanced finite element method.
- Develop the computer programs for the analysis of composite plates.

### **(18CE1023) FRACTURE MECHANICS OF CONCRETE STRUCTURES**

#### **Course outcomes:**

At the end of the course, students will be able to

- The learner will be able to understand the Basics Concepts of Fracture Mechanics & its Mechanism
- Identify and classify cracking of concrete structures based on fracture mechanics.
- Understanding Stresses at Crack Tip and different Criteria involved
- The Learner Will able to Understand Nonlinear Fracture Mechanics & Failures Surfaces
- The learner will be able to understand the concepts of CTOD and CMD.

### **(18CE1024) DESIGN OF PLATES AND SHELLS**

#### **Course Outcomes:**

At the end of the course, students will be able to

- Analyze and design prismatic folded plate systems
- Analyze and design shells using approximate solutions
- To analyze different types of plates (rectangular and circular) under different boundary connections by various classical methods and approximate methods

### **(18HS0824) BUSINESS ANALYTICS**

#### **Course Outcomes:**

At the end of the course, students will be able to

- Design, device, and query relational databases for operative data.

- Design, implement, populate and query data warehouses for informational data.
- To integrate very large data sets to make business decisions.
- Evaluate the use of data from acquisition through cleansing, warehousing, analytics, and visualization to the ultimate business decision.
- Evaluate the key concepts of business analytics.
- Determine when to implement relational versus document-oriented database structures.
- Outline the relationship of the business analytics process within the organization's decision-making process.
- Examine and apply appropriate business analytic techniques and methods.
- Execute real-time analytical methods on streaming datasets to react quickly to customer needs.
- To critically analyze the predictive analysis methods.

### **(18ME3121) INDUSTRIAL SAFETY**

#### **Course Outcomes:**

Students undergoing this course are able to

- Understand the points of factories act 1948 for health and safety.
- Understand the cost & its relation with replacement economy.
- Understand the concepts of sequence of fault finding activities
- Understand the Program and schedule of preventive maintenance of mechanical and electrical equipment.

### **(18ME3122) ADVANCES IN OPERATIONS RESEARCH**

#### **Course Outcomes:**

Students undergoing this course are able to

- Understand the Inventory Control Models
- Understand the Graphical solution revised simplex method
- Understand the concepts of Kuhn-Tucker conditions min cost flow.
- Understand the Probabilistic inventory control models and Dynamic Programming

### **(18CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**

#### **Course Outcomes:**

- Student can access the present value and future value for money
- Student can apply the principals of Benefit & Cost Analysis and
- Break-Even comparison
- Student can calculate the depreciation cost for construction equipment and can estimate the cost for construction equipment
- Can prepare profit and loss, balance sheets etc

## **(18ME3123) COMPOSITE MATERIALS**

### **Course Outcomes:**

Students undergoing this course are able to

- Understand the need of composite materials.
- Understand the Properties and applications of whiskers, particle reinforcements. Mechanical Behavior of composites.
- Understand the concepts of Manufacturing of Ceramic Matrix Composite and MetalMatrix Composite.
- Understand the various manufacturing method of composites.



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Control Systems (M.Tech)**

**Department of Electrical and Electronics Engineering (EEE)**

**M.Tech I Year - I Sem. (CS)**

**(18CE1029) DISASTER MANAGEMENT (AUDIT COURSE - I)**

**Course Outcomes:**

On completion of the course the students will have knowledge on

1. Types of disasters and their effects on environment
2. Causes of disasters
3. Disaster management through engineering applications

**(18HS0826) VALUE EDUCATION  
(AUDIT COURSE - I)**

**Course Outcomes**

Students will be able to:

1. Knowledge of self-development.
2. Learn the importance of Human values.
3. Developing the overall personality.

**M.Tech, I Year 2<sup>nd</sup> Semester (CS)**

**(18EE2010) OPTIMAL CONTROL THEORY**

**Course Outcomes**

Students will be able to

1. Combine the mathematical methods used in optimal control to derive the solution to variations of the problems studied in the course
2. Use the standard algorithms for numerical solution of optimal control problems and use Matlab to solve fairly simple but realistic problems
3. Integrate the tools learnt during the course and apply them to more complex problems

**(18EE2011) INDUSTRIAL AUTOMATION**

**Course Outcomes**

Students will be able

1. To identify potential areas for automation and justify need for automation
2. To select suitable major control components required to automate a process or an activity
3. To translate and simulate a real time activity using modern tools and discuss the benefits of automation.
4. To identify suitable automation hardware for the given application.

To recommend appropriate modeling and simulation tool for the given manufacturing application

### **(18EE2012)ADVANCEDCONTROLSYSTEMS**

#### **CourseOutcomes**

Students will be able to

1. Apply the concepts of linear algebra and their applications to control system
2. Analyze the system dynamics and Lyapunov stability theory
3. Design linear quadratic controller

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Power Electronics (M.Tech)**

**Department of Electrical and Electronics Engineering (EEE)**

**M.Tech, I Year 1<sup>st</sup> Semester (PE)**

**(18EE2101) ELECTRIC DRIVES SYSTEMS**

**Course Outcomes:**

Students will be able to:

- Model and simulate electric drives systems
- Design modulation strategies of power electronics converters, for drives application
- Design appropriate current/voltage regulators for electric drives
- Select and implement the drives for Industrial Process
- Implement various variable speed drives in Electrical Energy Conversion System

**(18EE2102) MODELING AND ANALYSIS OF ELECTRICAL MACHINES**

**Course Outcomes:**

Students will be able to:

- Knowledge about the dynamic behavior of rotating machines.
- Able to understand equivalent circuit of synchronous machines.
- To understand various practical issues of different machines.

**(18EE2103) ADVANCED POWER ELECTRONIC CIRCUITS**

**Course Outcomes:**

Students will be able to:

- Knowledge about analysis and design of Load Commutated CSI and PWM CSI. Learn analysis and design of series Inverters.
- Acquire knowledge about analysis and design of Switched Mode Rectifiers, APFC,
- DC-DC converters & Resonant converters

**(18EE2104) OPTIMAL AND ADAPTIVE CONTROL**

**Course Outcomes:**

Students will be able to:

- Knowledge in the mathematical area of calculus of variations so as to apply the same for solving optimal control problems.

- Problem formulation, performance measure and mathematical treatment of optimal Control problems.
- Acquire knowledge on solving optimal control design problems by taking into consideration the physical constraints on practical control systems.
- To obtain optimal solutions to controller design problems taking into consideration the limitation on control energy in the real practical world.

### **(18EE2105) POWER QUALITY**

#### **Course Outcomes:**

Students will be able to:

- Acquire knowledge about the harmonics, harmonic introducing devices and effect of harmonics on system equipment and loads
- develop analytical modeling skills needed for modeling and analysis of harmonics in networks and components
- Introduce the student to active power factor correction based on static VAR compensators and its control techniques
- Introduce the student to series and shunt active power filtering techniques for harmonics

### **(18EE2106) DYNAMICS OF ELECTRICAL MACHINES**

#### **Course Outcomes**

Students will be able to:

- Derive Kron's primitive machine as a unified electrical machine model
- Derive the mathematical model and control a 3-phase Induction motor
- Knowledge of transformations for the dynamic analysis of machines
- Knowledge of determination of stability of the machines under small signal and transient conditions
- Study about synchronous machine

### **(18EE2107) STATIC VAR CONTROLLER AND HARMONIC FILTERING**

#### **Course Outcomes**

Students will be able to:

- Acquire knowledge about the fundamental principles of Passive and Active Reactive Power Compensation
- Schemes at Transmission and Distribution level in Power Systems.
- To introduce the student to various single phase and three-phase Static VAR Compensation schemes and their controls
- To develop analytical modeling skills needed for modeling and analysis of such Static VAR

### **(18EE2108) PWM CONVERTERS AND APPLICATION**

### **Course Outcomes:**

Students will be able to:

- Knowledge concepts and basic operation of PWM converters, including basic circuit operation and design
- Learn the steady-state and dynamic analysis of PWM converters along with the applications like solid state drives and power quality
- Able to recognize and use the following concepts and ideas: Steady-State and transient modelling and analysis of power converters with various PWM techniques.

### **(18EE2109) POWER SEMICONDUCTOR DEVICES AND MODELING**

### **Course Outcomes**

Students will be able to:

- Acquire the background required for engineers to meet the role of energy managers and to acquire the skills and techniques required to implement energy management.
- Identify and quantify the energy intensive business activities in an organization.
- Knowledge about standard methodologies for measuring energy in the workplace and energy audit instruments.
- Knowledge about energy efficient motors, load matching and selection of motors.
- Acquire knowledge about reactive power management, capacitor sizing and degree of compensation

### **(18HS0823) RESEARCH METHODOLOGY AND INTELLECTUAL PROPERTY RIGHTS**

### **Course outcomes:**

At the end of this course, students will be able to:

- Understand research problem formulation. Analyze research related information. Follow research ethics
- Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
- Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasize the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
- Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about economic growth and social benefits.

### **(18HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

**(AUDIT COURSE-I)**

**Course outcomes**

Students will be able to:

- Understand how to improve your writing skills and level of readability.
- Learn about what to write in each section.
- Understand the skills needed when writing a Title.
- Ensure the good quality of paper at very first-time submission

**(18CE1029) DISASTER MANAGEMENT  
(AUDIT COURSE-I)**

**Course Outcomes:**

On completion of the course the students will have knowledge on

- Types of disasters and their effects on environment
- Causes of disasters
- Disaster management through engineering applications

**(18HS0825) SANSKRIT FOR TECHNICAL KNOWLEDGE  
(AUDIT COURSE-I)**

**Course Output**

Students will be able to

1. Understanding basic Sanskrit language
2. Ancient Sanskrit literature about science & technology can be understood
3. Being a logical language will help to develop logic in students

**(18HS0826) VALUE EDUCATION  
(AUDIT COURSE-I)**

**Course outcomes**

- Students will be able to:
- 1. Knowledge of self-development.
- 2. Learn the importance of Human values.
- 3. Developing the overall personality.

**M.Tech, I Year 2<sup>nd</sup> Semester (PE)**

**(18EE2112) POWER ELECTRONIC CONVERTERS**

**Course Outcomes:**

Students will be able to:

- To understand the various power semiconductor devices
- To know the various conversion techniques of power semiconductor devices and its applications

**(18EE2113) DIGITAL CONTROL OF POWER ELECTRONICS  
AND DRIVES SYSTEMS**

**Course Outcomes:**

Students will be able to:

- To provide knowledge on modelling and simulation of power simulation circuits and systems.
- The candidate will be able to simulate power electronics systems and analyse the system response.

**(18EE2114) SWITCHED MODE AND RESONANT CONVERTERS**

**Course Outcomes:**

- Acquire knowledge about the principles of operation of non-isolated and isolated hard-switched DC-DC converters
- Acquire knowledge on various loss components in a switched mode converter and choice of switching frequency with a view towards design of such converters

**(18EE2115) INDUSTRIAL LOAD MODELLING AND CONTROL**

**Course Outcomes:**

Students will be able to:

- Knowledge about load control techniques in industries and its application.
- Different types of industrial processes and optimize the process using tools like LINDO and LINGO.
- Apply load management to reduce demand of electricity during peak time.
- Apply different energy saving opportunities in industries

**(18EE2116) ADVANCED DIGITAL SIGNAL PROCESSING**

**Course Outcomes:**

Students will be able to:

- Knowledge about the time domain and frequency domain representations as well as analysis of discrete time signals and systems
- Study the design techniques for IIR and FIR filters and their realization structures.
- Acquire knowledge about the finite word length effects in implementation of digital filters.
- Knowledge about the various linear signal models and estimation of power spectrum of Stationary random

**(18EE2117) ADVANCED MICRO-CONTROLLER BASED SYSTEMS**

**Course Outcomes**

Students will be able to:

- To learn how to program a processor in assembly language and develop an advanced processor based system.

- To learn configuring and using different peripherals in a digital system.
- To compile and debug a Program.
- To generate an executable file and use it.

**(18EE2118) DISTRIBUTED GENERATION**

**Course Outcomes**

Students will be able to:

- To understand the planning and operational issues related to Distributed Generation.
- Acquire Knowledge about Distributed Generation Learn Micro-Grids

**(18EE2119) SMARTGRIDS**

**Course Outcomes:**

Students will be able to:

- Appreciate the difference between smart grid & conventional grid.
- Apply smart metering concepts to industrial and commercial installations.
- Formulate solutions in the areas of smart substations, distributed generation and wide area measurements.
- Come up with smart grid solutions using modern communication technologies

**(18HS0827) PEDAGOGY STUDIES**

**(AUDIT COURSE-II)**

**Course Outcomes:**

Students will be able to understand:

- What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

**(18HS0828) STRESS MANAGEMENT BY YOGA**

**(AUDIT COURSE-II)**

**Course Outcomes:**

Students will be able to:

- Develop a healthy mind in a healthy body thus improving social health also
- Improve efficiency.

**(18HS0819) PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT  
KILLS**

**(AUDIT COURSE-II)**

**Course Outcomes**

Students will be able to:



- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity.
- Study of Neetishatakam will help in developing versatile personality of students.

## **M.Tech, II Year 1<sup>st</sup> Semester (PE)**

### **(18EE2123) SCADA SYSTEM AND APPLICATIONS**

#### **Course Outcomes**

Students will be able to:

- Describe the basic tasks of Supervisory Control Systems (SCADA) as well as their typical applications.
- Acquire knowledge about SCADA architecture, various advantages and disadvantages of each system.
- Knowledge about single unified standard architecture IEC 61850.
- To learn about SCADA system components: remote terminal units, PLCs, intelligent electronic devices, HMI systems, SCADA server.
- Learn and understand about SCADA applications in transmission and distribution sector, industries etc.

### **(18EE2124) FACTS AND CUSTOM POWER DEVICES**

#### **Course Outcomes:**

Students will be able to:

- Acquire knowledge about the fundamental principles of Passive and Active Reactive Power Compensation Schemes at Transmission and Distribution level in Power Systems.
- Learn various Static VAR Compensation Schemes like Thyristor/GTO Controlled.
- Reactive Power Systems, PWM Inverter based Reactive Power Systems and their controls.
- To develop analytical modeling skills needed for modeling and analysis of such Static VAR Systems

### **(18EE2125) HVDC TRANSMISSION SYSTEMS**

#### **Course Outcomes:**

Students will be able to:

- To expose the students to the state of the art HVDC technology.
- Knowledge of modelling and analysis of HVDC system for inter-area power flow regulation.
- Study of Neetishatakam will help in developing

## **(18HS0824)BUSINESSANALYTICS**

### **CourseOutcomes:**

Studentswill beable to:

- Design,device,andqueryrelationaldatabasesforoperativedata.
- Design,implement,populateandquerydatawarehousesforinformationaldata.
- Tointegrateverylargedatasetstomakebusinessdecisions.
- Evaluatetheuseofdatafromacquisitionthroughcleansing,warehousing,analytics,andvisualizationto the ultimate businessdecision.
- Evaluatethekeyconceptsofbusinessanalytics.
- Determinewhentointerrelationalversusdocumentorienteddatabasestructures.

## **(18ME3121)INDUSTRIALSAFETY**

### **CourseOutcomes:**

Studentsundergoingthiscourseare ableto

- Understandthepointsof factories act1948forhealthandsafety.
- Understandthecost&its relationwithreplacemeteconomy.
- Understandtheconceptsofsequenceoffaultfindingactivities
- UnderstandtheProgramandscheduleofpreventivemaintenanceofmechanicalandelectricalerequipment.

## **(18ME3122)ADVANCESINOPERATIONSRESEARCH**

### **CourseOutcomes:**

Studentsundergoingthiscourseare ableto

- UnderstandtheInventoryControlModels
- UnderstandtheGraphicalsolutionrevisedsimplex method
- UnderstandtheconceptsofKuhn-Tuckerconditionsmincostflow.
- UnderstandtheProbabilisticinventorycontrolmodelsandDynamicProgramming

## **(18CE1028)COSTMANAGEMENTOFENGINEERINGPROJECTS**

### **CourseOutcomes:**

- Studentcan access thepresentvalueandfuturevalue formoney
- Studentcanapplytheprincipalsof Benefit&CostAnalysisand
- Break-Evencomparison
- Student can calculate the depreciation cost for construction equipment and can estimate thecostforconstruction equipment
- Canprepareprofitand loss,balancesheetsetc

## **(18ME3123)COMPOSITEMATERIALS**

### **CourseOutcomes:**

Studentsundergoingthiscourseare ableto

- Understandtheneedof compositematerials.
- UnderstandthePropertiesandapplicationsofwhiskers,particlereinforcements.Mecha

nical Behavior of composites.

- Understand the concepts of Manufacturing of Ceramic Matrix Composite and Metal Matrix Composite.
- Understand the various manufacturing methods of composites.

### **(18EE2128) WASTE TO ENERGY**

#### **Course Outcomes:**

Students will be able to:

- To study fundamentals of industrial waste conversion devices
- To understand Manufacture of pyrolytic coils and gases, yields and applications
- To understand the Equilibrium and kinetic consideration in gasifier operation
- To understand the Thermochemical conversion

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**M.Tech (Thermal Engineering)**

**Department of Mechanical Engineering**

**M. Tech. – I Semester (T.E)**

**(18ME3101) Thermodynamics and Combustion**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the concepts of transient flow analysis and real gas mixture.
- Understand the concepts of chemical equilibrium.
- Understand the concepts of Nerst heat theorem.
- Understand the fuel cells and magneto hydro dynamic generators.

**(18ME3102) Advanced Fluid Dynamics**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the governing equations in fluid dynamics.
- Understand the concepts of potential and internal flows
- Understand the concepts of laminar boundary layers
- Understand the role of experiments on fluids and universal velocity distributions.

**(18ME3112) Nuclear Engineering**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the power from fission and conversion and breeding.
- Understand the concepts of criticality of thermal reactors.
- Understand the concepts of solutions for simple cases of reactivity additions
- Understand the Reactor safety philosophy and radiation protection standards

**(18ME3113) Energy Conservation and Management**

**Course Outcomes:**

Students undergoing this course are able

- Understand the Initiating, Organizing and Managing, Energy Management Programs
- Understand the concepts critical assessment of energy usage and Importance of energy management

- Understand the concepts of Energy auditing.
- Understand the relevant international standards and laws.

### **(18ME3114) Air Conditioning System Design**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the Parameters influencing the Effective Temperature.
- Understand the concepts summer, winter and year round air – conditioning systems.
- Understand the concepts of Humidification and dehumidification equipment.
- Understand the Design conditions and load calculation

### **(18ME3115) Jet Propulsion and Rocketry**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the improvement and applications of Jet Propulsion
- Understand the concepts practical air cooled blades Combustion Systems
- Understand the concepts of thermodynamic flow analysis of Jet Propulsion
- Understand the environmental considerations and applications.

### **(18ME3103) Thermal Engineering Lab**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the COP estimation of vapour compression refrigeration
- Understand the concepts Performance test on variable compression ratio of diesel engines
- Understand the concepts of Solar Flat Plate Collector performance
- Understand the Calibration of temperature measurement.

### **(18ME3104) Computer Aided Analysis Lab**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the Analysis of a truss member under loading
- Understand the concepts Analysis of Tapered plate under transverse load
- Understand the concepts of the flow of incompressible gas through an S-bend for laminar flow
- Understand the air flow over a simple geometry (aero foil) in a wind

### **(18HS0823) Research Methodology and IPR**

**Course Outcomes:**

- Understood the Meaning of research problem, Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem.
- Got the knowledge of How to get new ideas.
- Acquired the knowledge of various government and NGO or agencies for Research Funding.

**(18HS0818) English for Research Paper Writing**

**(18CE1029) Disaster Management**

**Course Outcomes:**

On completion of the course the students will have knowledge on

- Types of disasters and their effects on environment
- Causes of disasters
- Disaster management through engineering applications

**(18HS0825) Sanskrit for Technical Knowledge**

**Course Output**

Students will be able to

- Understanding basic Sanskrit language
- Ancient Sanskrit literature about science & technology can be understood
- Being a logical language will help to develop logic in students

**(18HS0826) Value Education**

**Course outcomes**

- Students will be able to:
- Knowledge of selfdevelopment.
- Learn the importance of Human values.

**(18ME3105) Advanced Heat Transfer**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the basic phenomena of heat transfer
- Understand the concepts of laminar and turbulent flows
- Understand the concepts of Integral analysis on laminar free convective heat transfer
- Understand the Radiant heat exchange in grey, non-grey bodies

**(18ME3106) Steam Engineering**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the combustion in boilers and flame temperature.

- Understand the heat savings and application criteria
- Understand the performance evaluation of accessories
- Understand the control and monitoring devices of boiler

**(18ME3116) Refrigeration and Cryogenics**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the working principle of refrigerator
- Understand the design, selection of evaporators, condensers, control systems
- Understand the different types of refrigeration systems.
- Understand the concept of cryogenic system.

**(18ME3117) Design of Heat Exchangers**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the design feature of heat exchangers
- Understand the concepts of LMTD and fouling factors of heat exchanger.
- Understand the concepts of design of Shell and Tube heat exchangers
- Understand the thickness calculations of heat exchanger

**(18ME3118) Computational Fluid Dynamics**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the experimental and hyperbolic equations.
- Understand the geometry modeling and Grid Generation
- Understand the methodology of computational fluid dynamics

**(18ME3119) Modelling of I.C Engines**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the approaches of modeling, model building and integration methods
- Understand the concept fuel spray behavior
- Understand the Mathematical models of SI Engines

**(18ME3107) Computational Fluid Dynamics Lab**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the experimental and hyperbolic equations.
- Understand the geometry modeling and Grid Generation

- Understand the methodology of computational fluid dynamics

**(18ME3108) Thermal Engineering Virtual Lab**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the experimental and Bubble Generation, Growth and Departure from a Submerged Orifice.
- Understand the Virtual Lab on Steam Condensation in Micro channels
- Understand the methodology of Torque Crank Angle Curve of a SI Engine

**(18HS0829) Constitution of India**

**(18HS0827) Pedagogy Studies**

**Course Outcomes**

Students will be able to understand:

- What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy

**(18HS0828) Stress Management by Yoga**

**Course Outcomes:**

Students will be able to:

- Develop healthy mind in a healthy body thus improving social health also
- Improve efficiency.

**(18HS0819) Personality Development through Life Enlightenment Skills**

**Course Outcomes**

Students will be able to:

- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity.
- Study of Neetishatakam will help in developing versatile personality of students.

**(18ME3120) Design of Solar and Wind Systems**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the prediction & measurement, Solar energy utilization.□
- Understand the concepts Nuclear Waste Disposal and Nuclear Fusion.□



- Understand the concepts of Wind Energy Conversion Systems and Various Types of Systems to use Geothermal Energy
- Understand the Direct Energy Conversion

### **(18HS0839) Advanced Mathematical Methods in Engineering**

#### **Course Outcomes:**

At the end of the course, students will demonstrate the ability to:

- Students will be able to analyse and develop the mathematical model of thermal system.
- Student should able analyse the reliability and maintainability of the series and parallel

thermal system.

- Students will be able to solve differential equations using numerical techniques.

### **(18HS0824) Business Analytics**

#### **Course Outcomes:**

- Design, device, and query relational databases for operative data.
- Design, implement, populate and query data warehouses for informational data.
- To integrate very large data sets to make business decisions.
- Evaluate the use of data from acquisition through cleansing, warehousing, analytics, and visualization to the ultimate business decision.

### **(18ME3121) Industrial Safety**

#### **Course Outcomes:**

Students undergoing this course are able to

- Understand the points of factories act 1948 for health and safety.
- Understand the cost & its relation with replacement economy.
- Understand the concepts of sequence of fault finding activities
- Understand the Program and schedule of preventive maintenance of mechanical and electrical equipment.

### **(18ME3021) Advances in Operations Research**

#### **Course Outcomes:**

Students undergoing this course are able to

- Upon completion of this course, the students can able to use the optimization techniques for use engineering and Business problems

### **(18CE1028) Cost Management of Engineering Projects**

#### **Course Outcomes:**

After completion of this course, the student shall be able to

- Implement generic and special Construction Project Management skills to a higher level
- Understand the special management skills required in multidisciplinary and global Construction Industry

- Integrate and apply theoretical concepts, ideas, tools and techniques to Construction practice.
- Can plan, execute, monitor and control construction projects using Construction Project Management Tools such as CPM & PERT

**(18ME3022) Composite Materials**

**Course Outcomes:**

- Upon completion of this course, the students will have an overview of the mechanical behavior and application of composite materials.

**(18EE2128) Waste to Energy**

**Course Outcomes:**

- Upon completion of this course, the students can able to identify the new methodologies / technologies for effective utilization of renewable energy sources.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Computer Aided Design and Manufacturing**

**M. Tech. – I Semester (CAD&M)**

**(18HS0845) Computational Methods**

**Course Outcomes:**

At the end of the course student would demonstrate competence with understanding the theoretical and practical aspects of the use of computational methods. They would be able to establish the limitations, advantages, and disadvantages of different computational methods. Further, they would be able to implement computational methods for solving various engineering problems.

**(18ME3001) Computer Integrated Manufacturing**

**Course Outcome:**

The students will be able to:

- Solve the design problems of different type of transfer mechanism.
- perform design and analysis of automatic storage and retrieval system.
- evaluate the space requirements of different storage system.

**(18ME3011) Geometric Modeling**

**Course Outcomes:**

At the end of the course, the student will:

- understand the need for, and the different applications of geometric modelling techniques
- understand some of the technical solutions
- be able to reason about the range of solutions to problems involving 3D objects

**(18ME3012) CNC Technology & Programming**

**Course Outcomes:**

The students will be able to:

- Understand fundamentals of NC/CNC
- Learn and Write NC Part Programming
- Learn Tooling for NC/CNC
- Learn Maintenance and Trouble Shooting of CNC Machine Tools

**(18ME3013) Quality Engineering and Manufacturing**

**Course Outcomes:**

- Select and use rational sampling, conduct reliability tests and analyze data.
- Analyze the measurement system.

- Compute process capabilities.
- Understand quality engineering methods and tools.

### **(18ME3014) Computer Aided Process Planning**

#### **Course Outcomes:**

At the end of the course, the student will be able to

- Generate the structure of automated process planning system and uses the principle of generative and retrieval CAPP systems for automation
- Select the manufacturing sequence and explains the reduction of total set up cost for a particular sequence
- Explain the generation of tool path and solve optimization models of machining processes
- Create awareness about the implementation techniques for CAPP

### **(18ME3002) Computer Aided Design Lab**

### **(18ME3003) Computer Aided Modeling Lab**

### **(18HS0823) Research Methodology and IPR**

#### **Course Outcomes:**

- Understood the Meaning of research problem, Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem.
- Got the knowledge of How to get new ideas.
- Acquired the knowledge of various government and NGO or agencies for Research Funding.

### **(18HS0818) English for Research Paper Writing**

### **(18CE1029) Disaster Management**

#### **Course Outcomes:**

On completion of the course the students will have knowledge on

- Types of disasters and their effects on environment
- Causes of disasters
- Disaster management through engineering applications

### **(18HS0825) Sanskrit for Technical Knowledge**

#### **Course Output**

Students will be able to

- Understanding basic Sanskrit language
- Ancient Sanskrit literature about science & technology can be understood

- Being a logical language will help to develop logic in students
- (18HS0826) Value Education**

**Course outcomes**

- Students will be able to:
- Knowledge of selfdevelopment.
- Learn the importance of Human values.

**(18ME3004) Finite Element Methods**

**Course Outcomes:**

Students undergoing this course are able to

- Use finite element software to simulate physical behaviors of Mechanical structures.
- Apply FEA principles for components and assembly design.

**(18ME3005) Rapid Prototyping**

**Course Outcome**

- The student will be able to apply solid modeling concepts and techniques in RP
- Analyze and implement the different algorithms associated with STL file errors.
- Able to calculate the layer thickness in different layering techniques and carry out design manipulations for the generation of support structure.
- Able to identify, characterize and select the ideal materials for a given Rapid Prototyping system.

**(18ME3015) Advances in Manufacturing Technology**

**Course Outcome:**

- Define and describe the fundamentals and principals of advanced manufacturing Technology
- Apply relevant theories to solve manufacturing problems
- Explain manufacturing processes via experimental and theoretical analyses
- Relate manufacturing theory to practice through laboratory experiments
- Improve a manufacturing process either working in a team or individually

**(18ME3016) Advanced Optimization Techniques**

**Course Outcome:**

Upon completion of the subject, students will be able to:

- Explain the fundamental knowledge of Linear Programming and Dynamic Programming problems.
- Use classical optimization techniques and numerical methods of optimization.
- Describe the basics of different evolutionary algorithms.

- Enumerate fundamentals of Integer programming technique and apply different techniques to solve various optimization problems arising from engineering areas.

**(18ME3017) Computer Graphics**

**Course Outcome:**

- Learn the principles and commonly used paradigms and techniques of computer graphics.
- Develop a facility with the relevant mathematics of computer graphics.
- Be able to write basic graphics application programs including animation .
- Be able to design programs to display graphic images to given specifications.

**(18ME3018) Robotics**

**Course outcomes:**

- Upon completion of the course, students will be able to understand:
- Importance of robotics in today and future goods production
- Robot configuration and subsystems
- Principles of robot programming and handle with typical robot
- Working of mobile robots

**(18ME3006) Virtual Lab in Manufacturing Engineering**

**(18ME3007) Computer Aided Analysis Lab**

**(18HS0829) Constitution of India**

**(18HS0827) Pedagogy Studies**

**Course Outcomes**

Students will be able to understand:

- What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy

**(18HS0828) Stress Management by Yoga**

**(18HS0819) Personality Development through Life Enlightenment Skills**

**Course Outcomes**

Students will be able to:

- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.

- The person who has studied Geeta will lead the nation and mankind to peace and prosperity.
- Study of Neetishatakam will help in developing versatile personality of students.

**(18ME3019) Mechatronics**

**Course outcomes:**

- Classify various sensors, transducer and actuators according to the applications.
- Explain various system models and controllers.
- Select a controller for a mechanical and Mechatronics system.

**(18ME3020) Mechanics of Composites**

**Course Outcomes:**

- Upon completion of this course, the students will have an overview of the mechanical

behavior and application of composite materials

**(18HS0824) Business Analytics**

**Course Outcomes:**

- Design, device, and query relational databases for operative data.
- Design, implement, populate and query data warehouses for informational data.
- To integrate very large data sets to make business decisions.
- Evaluate the use of data from acquisition through cleansing, warehousing, analytics, and visualization to the ultimate business decision.

**(18ME3121) Industrial Safety**

**Course Outcomes:**

Students undergoing this course are able to

- Understand the points of factories act 1948 for health and safety.
- Understand the cost & its relation with replacement economy.
- Understand the concepts of sequence of fault finding activities
- Understand the Program and schedule of preventive maintenance of mechanical and electrical equipment.

**(18ME3021) Advances in Operations Research**

**Course Outcomes:**

Students undergoing this course are able to

- Upon completion of this course, the students can able to use the optimization techniques for use engineering and Business problems

**(18CE1028) Cost Management of Engineering Projects**

**Course Outcomes:**

After completion of this course, the student shall be able to

- Implement generic and special Construction Project Management skills to a higher level
- Understand the special management skills required in multidisciplinary and global Construction Industry
- Integrate and apply theoretical concepts, ideas, tools and techniques to Construction practice.
- Can plan, execute, monitor and control construction projects using Construction Project Management Tools such as CPM & PERT

**(18ME3022) Composite Materials****Course Outcomes:**

- Upon completion of this course, the students will have an overview of the mechanical behavior and application of composite materials.

**(18EE2128) Waste to Energy****Course Outcomes:**

- Upon completion of this course, the students can able to identify the new methodologies / technologies for effective utilization of renewable energy sources.



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)  
Master of Technology**

**Department of Computer Science and Engineering**

**I M. Tech. – I Sem. (CSE)**

**(18HS0841) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE**

**Course Outcomes:**

After completion of the course, students would be able to:

- To understand the basic notions of discrete and continuous probability.
- To understand the methods of statistical inference, and the role that sampling distributions play in those methods.
- To be able to perform correct and meaningful statistical analyses, of simple to moderate complexity.

**(18CS5001) ADVANCED DATA STRUCTURES**

**Course Outcomes:**

- Understand the implementation of symbol table using hashing techniques.
- Develop and analyze algorithms for red-black trees, B-trees and Splay trees.
- Develop algorithms for text processing applications.
- Identify suitable data structures and develop algorithms for computational geometry problems.

**(16CS5010) MACHINE LEARNING**

**Course Outcomes:**

After completion of course, students would be able to:

- Extract features that can be used for a particular machine learning approach in various IOT applications.
- To compare and contrast pros and cons of various machine learning techniques and to get an insight of when to apply a particular machine learning approach.
- To mathematically analyze various machine learning approaches and paradigms.

**(16CS501) WIRELESS SENSOR NETWORKS**

**Course Outcomes:**

- Describe and explain radio standards and communication protocols for wireless sensor networks.
- Explain the function of the node architecture and use of sensors for various applications.
- Be familiar with architectures, functions and performance of wireless sensor networks systems and platforms.

## **(18CS5012) INTRODUCTION TO INTELLIGENT SYSTEMS**

### **Course Outcomes:**

- Able to Demonstrate knowledge of the fundamental principles of intelligent systems and would be able to analyse and compare the relative merits of a variety of AI problem solving techniques.

## **(16CS5013) DATA SCIENCE**

### **Course outcome**

- Explain how data is collected, managed and stored for data science;
- Understand the key concepts in data science, including their real-world applications and the toolkit used by data scientists;
- Implement data collection and management scripts using MongoDB

## **(16CS5014) DISTRIBUTED SYSTEMS**

### **Course outcomes:**

- Able to demonstrate knowledge of the basic elements and concepts related to distributed system technologies;
- Able to demonstrate knowledge of the core architectural aspects of distributed systems;
- Able to design and implement distributed applications;
- Able to demonstrate knowledge of details the main underlying components of distributed systems (such as RPC, file systems);
- Able to use and apply important methods in distributed systems to support scalability and fault tolerance;
- Able to demonstrate experience in building large-scale distributed applications.

## **(16CS5015) ADVANCED WIRELESS AND MOBILE NETWORKS**

### **Course Outcomes:**

After completion of course, students would be:

- Demonstrate advanced knowledge of networking and wireless networking and understand various types of wireless networks, standards, operations and use cases.
- Be able to design WLAN, WPAN, WWAN, Cellular based upon underlying propagation and performance analysis.
- Demonstrate knowledge of protocols used in wireless networks and learn simulating wireless networks.
- Design wireless networks exploring trade-offs between wire line and wireless links. Develop mobile applications to solve some of the real world problems.

### **(16HS0823) RESEARCH METHODOLOGY AND IPR**

#### **Course outcomes:**

At the end of this course, students will be able to

- Understand research problem formulation.
- Analyze research related information
- Follow research ethics
- Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.
- Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular.
- Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.

### **(18CS5002) ADVANCED DATA STRUCTURES LAB**

### **(18CS5002) MACHINE LEARNING LAB**

### **(18HS0818) ENGLISH FOR RESEARCH PAPER WRITING**

#### **Course outcomes:**

At the end of this course, students will be able to

- Understand that how to improve your writing skills and level of readability
- Learn about what to write in each section
- Understand the skills needed when writing a Title
- Ensure the good quality of paper at very first-time submission

### **(18CE1029) DISASTER MANAGEMENT\***

#### **Course Outcomes:**

On completion of the course the students will have knowledge on

- Types of disasters and their effects on environment
- Causes of disasters
- Disaster management through engineering applications

### **(18HS0825) SANSKRIT FOR TECHNICAL KNOWLEDGE**

#### **Course Outcomes:**

Students will be able to

- Understanding basic Sanskrit language
- Ancient Sanskrit literature about science & technology can be understood
- Being a logical language will help to develop logic in students

#### **(18HS0826) VALUE EDUCATION**

**Course outcomes:**

- Students will be able to:
- Knowledge of self-development.
- Learn the importance of Human values.

**I M. Tech. – II Sem. (CSE)**

#### **(18CS5003) ADVANCE ALGORITHMS**

**Course Outcomes:**

- After completion of course, students would be able to:
- Analyze the complexity/performance of different algorithms.
- Determine the appropriate data structure for solving a particular set of problems.
- Categorize the different problems in various classes according to their complexity.
- Students should have an insight of recent activities in the field of the advanced data structure.

#### **(18CS5004) SOFT COMPUTING**

**Course Outcomes:**

After completion of course, students would be able to:

- Identify and describe soft computing techniques and their roles in building intelligent machines
- Apply fuzzy logic and reasoning to handle uncertainty and solve various engineering problems.
- Apply genetic algorithms to combinatorial optimization problems.
- Evaluate and compare solutions by various soft computing approaches for a given problem

#### **(18CS5017) DATA PREPARATION AND ANALYSIS**

**Course Outcomes:**

After completion of course, students would be:

- Able to extract the data for performing the Analysis.

#### **(18CS5018) SECURE SOFTWARE DESIGN & ENTERPRISE COMPUTING**

**Course Outcomes:**

After completion of course, students would be:

- Students would learn concepts in parallel programming, implementation of programs on GPUs, debugging and profiling parallel programs.

### **(18CS5019) COMPUTER VISION**

#### **Course Outcomes:**

After completion of course, students would be able to:

- Developed the practical skills necessary to build computer vision applications.
- To have gained exposure to object and scene recognition and categorization from images.

### **(18CS5020) HUMAN AND COMPUTER INTERACTION**

#### **Course Outcomes:**

After completion of course, students would be:

- Understand the structure of models and theories of human computer interaction and vision.
- Design an interactive web interface on the basis of models studied.

### **(18CS5021) GPU COMPUTING**

#### **Course Outcomes:**

After completion of course, students would be:

- Students would learn concepts in parallel programming, implementation of programs on GPUs, debugging and profiling parallel programs.

### **(18CS5022) DIGITAL FORENSICS**

#### **Course Outcomes:**

After completion of course, students would be able to:

- Understand relevant legislation and codes of ethics
- Computer forensics and digital detective and various processes, policies and procedures
- E-discovery, guidelines and standards, E-evidence, tools and environment.
- Email and web forensics and network forensics

### **(16HS0816) CONSTITUTION OF INDIA**

#### **Course Outcomes:**

Students will be able to:

- Discuss the growth of the demand for civil rights in India for the bulk of Indians before the arrival of Gandhi in Indian politics.
- Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.

- Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.
- Discuss the passage of the Hindu Code Bill of 1956.

### **(18HS0827) PEDAGOGY STUDIES**

#### **Course Outcomes:**

Students will be able to understand:

- What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?
- What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?
- How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?

### **(18HS0828) STRESS MANAGEMENT BY YOGA**

#### **Course Outcomes:**

Students will be able to:

- Develop healthy mind in a healthy body thus improving social health also
- Improve efficiency.

### **(18HS0819) PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS**

#### **Course Outcomes:**

Students will be able to:

- Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life.
- The person who has studied Geeta will lead the nation and mankind to peace and prosperity.
- Study of Neetishatakam will help in developing versatile personality of students

## **II M. Tech. – I Sem. (CSE)**

### **(18CS5023) MOBILE APPLICATIONS AND SERVICES**

#### **Course Outcomes:**

On completion of the course the student should be able to

- Identify the target platform and users and be able to define and sketch a mobile application
- Understand the fundamentals, frameworks, and development lifecycle of mobile application platforms including iOS, Android, and Phone Gap

- Design and develop a mobile application prototype in one of the platform (challenge project)

### **(18CS5024) COMPILER FOR HPC**

#### **Course Outcomes:**

After completion of course, students would be:

- Familiar with the structure of compiler.
- Parallel loops, data dependency and exception handling and debugging in compiler.

### **(18CS5025) OPTIMIZATION TECHNIQUES**

#### **Course Outcomes:**

**After completion of course, students would be:**

- Formulate optimization problems.
- Understand and apply the concept of optimality criteria for various types of optimization problems.
- Solve various constrained and unconstrained problems in Single variable as well as multivariable.
- Apply the methods of optimization in real life situation.

### **(18HS0824) BUSINESS ANALYTICS**

#### **Course Outcomes:**

**After completion of course, students would be:**

- Analyze and solve problems from different industries such as manufacturing, service, retail, software, banking and finance, sports, pharmaceutical, aerospace etc.
- Analyze data using statistical and data mining techniques and understand relationships between the underlying business processes of an organization.

### **(18ME3121) INDUSTRIAL SAFETY**

#### **Course Outcomes:**

Students undergoing this course are able to

- Understand the points of factories act 1948 for health and safety.
- Understand the cost & its relation with replacement economy.
- Understand the concepts of sequence of fault finding activities
- Understand the Program and schedule of preventive maintenance of mechanical and electrical equipment.

### **(18ME3122) OPERATIONS RESEARCH**

#### **Course Outcomes:**

At the end of the course, the student should be able to

- Students should be able to apply the dynamic programming to solve problems of discrete and continuous variables.
- Students should be able to apply the concept of non-linear programming
- Students should be able to carry out sensitivity analysis
- Student should be able to model the real world problem and simulate it.

### **(18CE1028) COST MANAGEMENT OF ENGINEERING PROJECTS**

#### **Course Outcomes:**

After completion of this course, the student shall be able to

- Implement generic and special Construction Project Management skills to a higher level
- Understand the special management skills required in multidisciplinary and global Construction Industry
- Integrate and apply theoretical concepts, ideas, tools and techniques to Construction practice.
- Can plan, execute, monitor and control construction projects using Construction Project Management Tools such as CPM & PERT

### **(18ME3022) COMPOSITE MATERIALS**

#### **Course Outcomes:**

- Upon completion of this course, the students will have an overview of the mechanical behavior and application of composite materials.

### **(18EE2128) WASTE TO ENERGY**

#### **Course Outcomes:**

- Upon completion of this course, the students can be able to identify the new methodologies / technologies for effective utilization of renewable energy sources.

### **(18CS5008) Dissertation-I /Industrial Project**

#### **II M. Tech. – II Sem. (CSE)**

### **(18CS5009) Phase –II Dissertation II**

  
**PRINCIPAL**  
**PRINCIPAL**  
 Siddharth Institute of Engineering & Technology,  
 Siddharth Nagar  
 PUTTUR - 517 583, Chittoor (Dt.)



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**Department of Civil Engineering**

**I B. Tech. – I Semester (CE)**

**(16HS601) FUNCTIONAL ENGLISH**

**Course Outcomes:**

Students will be able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- Articulate well among themselves and with Faculty.
- Construct compound sentences using common conjunctions.
- Manage to organize and deliver oral presentations.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively.

**(16HS602) ENGINEERING MATHEMATICS-I**

**Course Outcomes:**

- The students become familiar with the application of ordinary differential equations, multiple integrals, Laplace Transforms and their applications
- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems with engineering applications

**(16HS603) ENGINEERING PHYSICS**

**Course Outcomes:**

- The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fibre optics.
- The important properties of crystals like the presence of long range order and periodicity, structure determination using X-ray diffraction are focused with defects in crystals & ultrasonic non destructive techniques.
- The discrepancies between the classical estimates & laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.
- The electronic and magnetic properties of materials were successfully explained by free electron theory and the bases for the band theory are focused.
- The properties and device applications of semiconducting & magnetic materials are illustrated.

**(16CS501) COMPUTER PROGRAMMING**

**Course Outcomes:**

- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs
- Able to write C programs for real world problems using simple and compound data types

## **(16HS606) HUMAN VALUES AND PROFESSIONAL ETHICS**

### **Course Outcomes:**

Students undergoing this course are able to

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society

## **(16HS608) ENGINEERING PHYSICS LABORATORY**

### **Course Outcomes:**

- Would recognize the importance of optical phenomenon like interference and diffraction.
- Would have acquired the practical application knowledge of optical fibre, semiconductor, dielectric and magnetic materials, crystal structure and lasers by the study of their relative parameters.
- Would recognize the significant importance of nanomaterials in various engineering fields.

## **(16CS502) COMPUTER PROGRAMMING LAB**

### **Course Outcomes:**

At the end of the course, students will be able to

- Apply problem solving techniques of C to find solution.
- Use C language features effectively to implement solutions.
- Use C++ language features effectively to solve problems.
- Identify and develop apt searching and sorting technique for a given problem.
- Identity, design and develop the appropriate data structure for a given problem or application.

## **(16ME301) ENGINEERING & IT WORK SHOP LAB**

### **Course Outcomes:**

#### **ENGINEERING WORKSHOP**

After completion of this course, a successful student will be able to :

- Utilize workshop tools for engineering practice.
- Employ skills for the production a component for real time applications.
- Appreciate the hard work and intuitive knowledge of the manual workers.

## **(16HS610) PROFESSIONAL ENGLISH**

### **Course Outcomes:**

Students will be able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- Articulate well among themselves and with Faculty.
- Construct compound sentences using common conjunctions.
- Manage to organize and deliver oral presentations.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively

## **(16HS611) ENGINEERING MATHEMATICS-II**

### **Course Outcomes:**

- The students become familiar with the application of Matrices, Vector calculus, Fourier series, Fourier transforms and Partial differential equations
- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems with engineering applications

## **(16HS604) ENGINEERING CHEMISTRY**

### **Course Outcomes:**

The student is expected to:

- Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially.
- Understand the electrochemical sources of energy
- Understand industrially based polymers, various engineering materials.
- Understand characteristics and applications of fuels and Lubricants.

## **(16ME302) ENGINEERING GRAPHICS**

### **Course Outcomes:**

Students undergoing this course are able to

- Frame ideas based on the conceptual modeling and design
- Provide good understanding of the methods involved in preparing various views in engineering drawings
- Can prepare 2D and 3D diagrams of various objects

## **(16CE101) ENGINEERING MECHANICS**

### **Course Outcomes:**

Students undergoing this course are able to

- Construct free body diagrams and develop appropriate equilibrium equations.
- Understand the concepts of friction and to apply in real life problems.
- Determine the centroid and Moment of Inertia for composite sections.
- Understand the dynamic analysis of rigid body motion.

## **(16HS607) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

### **Course outcomes:**

- To become active participants in the learning process and acquire proficiency in spoken English.
- To speak with clarity and confidence thereby enhances employability skills.
- To prepare effective job application

## **(16HS609) ENGINEERING CHEMISTRY LAB**

### **Course Outcomes:**

On completion of this course, students will have the knowledge in.

- Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.

- Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results.

### **(16CE102) APPLIED MECHANICS LAB**

#### **Course Outcomes:**

Students undergoing this course are able to

- Understand different laws of forces.
- Understand concepts of support reaction.
- Fundamentals of applied mechanics.
- Understand concepts of different types of pendulum

#### **II B.Tech. - I Sem. (CE)**

### **(16HS612) ENGINEERING MATHEMATICS-III**

#### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability
- Have acquired computational skills to solve real world problems in engineering

### **(16EE209) ELECTRICAL & MECHANICAL TECHNOLOGY**

#### **Course Outcomes:**

- After completion of the course the student will be able to
- Understand the fundamentals of electrical circuits.
- Acquire the concept of all types of Electrical Machines like DC, AC, machines and Transformer.
- Know the principle of measuring instruments.

### **(16CE103) STRENGTH OF MATERIALS – I**

#### **Course Outcomes:**

Students undergoing this course are able to:

- The students would be able to understand the behaviour of materials under different stress and strain conditions
- The students would be able to draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading
- The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams under various loading conditions
- Determine shear stress in the shaft subjected to torsional moments

### **(16CE105) SURVEYING**

#### **Course Outcomes:**

- be in a position to apply the basic principle of surveying and usage of surveying instruments in all civil engineering activities, including the construction of buildings,

bridges, roads and high ways, pipe lines, dams, ports and harbours

- be an expert of demarcation of ownership and / or delimitation of land, property, etc. through surveying process
- surveying techniques to collect data for planning, designing and execution, able to employ green field
- use total station and able to assess the electromagnetic distances

### **(16CE106) FLUID MECHANICS**

#### **Course Outcomes:**

On completion of the course, the students will be able to:

- determine the properties of fluid like pressure and their measurement.
- compute forces on immersed plane and curved plates.
- apply continuity equation and energy equation in solving problems on flow through conduits.
- compute the frictional loss in laminar and turbulent flows.

### **(16CE107) BUILDING MATERIALS & CONSTRUCTION**

#### **Course Outcomes:**

On completion of the course, the students will be able to:

- understand properties of various construction materials and their manufacturing process.
- assess the quality of construction materials.
- supervise the construction activities.

### **(16CE107) SURVEYING LAB-I**

#### **Course Outcomes:**

After completion of the course the student will be able to:

- gain knowledge and expertise in operation of various survey instruments for computation of area of a land.
- successfully carry out survey work in all civil Engineering projects, including the construction of buildings, roads and highways, rail track laying with curves, pipe lines, dams, ports and harbor as well as delimitation of land and property, etc.

### **(16CE109) STRENGTH OF MATERIALS LAB**

#### **Course Outcomes:**

After completion of the course the student will be able to:

- estimate Young's modulus, tensional rigidity of mild steel rods
- know the hardness of mild steel and HYSID specimens
- analyze the strength of wood, concrete, stone and bricks
- assess the quality of wood, concrete, stone and bricks

### **(16CS503) DATA STRUCTURES THROUGH C**

#### **Course Outcomes:**

- At the end of the course, students will be able to:
- Design algorithms to implement various data structures.
- Understand and program stacks and list data structures.
- Write programs to implement different types of queues.

- Understand and make use of hash tables in applications like dictionary, spell checker etc.,
- Understand why height balanced trees are advantageous over other data structures.

## **II B.Tech. - II Sem. (CE)**

### **(16HS613) PROBABILITY & STATISTICS**

#### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts Have acquired a proper level of competence for employability

### **(16HS605) ENVIRONMENTAL STUDIES**

#### **Course Outcomes:**

- Based on this course, the Engineering Student will be able to understand/evaluate/develop technologies on the basis of Ecological principles and environmental regulations along with Legislation, Laws and Policies which in turn help in sustainable development.
- Take preventive measures to reduce air, water, soil pollutions and contaminants in food.
- Effectively carry out waste disposal at individual level.
- Involve in preservation of natural resources.

### **(16CE110) BUILDING PLANNING & DRAWING**

#### **Course Outcomes:**

Students undergoing this course are able to

- understand Building Byelaws
- planning a residential & public building
- plot the drawing for approval

### **(16CE111) STRENGTH OF MATERIALS – II**

#### **Course Outcomes:**

On completion of the course, the students will be able to:

- determine different stresses developed in thin and thick cylinders.
- visualize the behaviour of column for combined bending and axial loading.
- determine the behaviour of unsymmetrical bending in members.

### **(16CE113) HYDRAULICS & HYDRAULIC MACHINERY**

#### **Course Outcomes:**

- analyze fluid flows in open channel hydraulics and devices such as weirs and flumes.
- design open channels for most economical sections like rectangular, trapezoidal and circular sections
- measure velocity through instruments in open channel and pipe flow
- select the type of turbine required with reference to available head of water and discharge

## **(16CE114) SURVEYING LAB-II**

### **Course Outcomes:**

Students undergoing this course are able to

- gains in accurate measurement of horizontal and vertical angles by theodolite and total station
- attains skills in computing the horizontal as well as vertical distance using tangential tachometry and expertise in handling of dumpy level, theodolite and total station for developing contour maps and longer sighting of objective distance and difference in elevation

## **(16CE115) COMPUTER AIDED DRAWING LAB**

### **Course Outcomes:**

- The students will be able to draft the plan, elevation and sectional views of the buildings, industrial structures, and framed buildings using computer software's.
- Draw the symbols and plan of a residential building using Auto CAD Software.

## **(16CE118) FLUID MECHANICS AND HYDRAULIC MACHINERY LAB**

### **Course Outcomes:**

Students undergoing this course are able to

- Calibrate Venturimeter & Orifice meter
- Calculate losses in flows
- Estimate the efficiency of different pumps.

Study the performance of different turbines

## **(16HS614) COMPREHENSIVE SOFT-SKILLS**

### **Course Outcomes:**

- To know the importance of Soft Skills.
- To apply Soft Skills in the different environment.
- To enrich the different levels of Soft Skills to develop their personality

## **III B. Tech - I Sem. (C.E)**

### **(16CE117) Structural Analysis – I**

#### **Course Outcomes:**

On completion of the course, the students will be able to:

- Understand the application of Castiglione's theorem.
- Analyse continuous beams and portal frames by slope deflection method.
- Analyse continuous beams and portal frames by moment distribution method.
- Analyse continuous beams and portal frames by Kani's method

### **(16CE118) Concrete Technology**

#### **Course Outcome:**

- Can understand properties of concrete and its various ingredients
- Can be able to perform test on cement, fine aggregate, coarse aggregate and concrete
- Can understand quality related issues with concrete and measures to overcome poor quality concrete during construction

- Able to access the strength of concrete with the help of non-destructive testing
- Able to design the concrete mix

### **(16CE119) Design & Drawing of Reinforced Concrete Structures**

#### **Course Outcomes:**

After completing the course, the student

- Can get an over view of Working Stress Method
- Can understand the concept of Limit State Design
- Can under the IS 456-2000 codal provisions for designing & detailing
- Can design the beams, slabs, stair case, columns & footing for Limit State of Collapse and Limit State of Serviceability

### **(16CE120) Water Resources Engineering - I**

#### **Course Outcomes:**

After completing the course, the student

- Can understand surface hydrology
- Can understand ground water hydrology
- Can estimate crop water requirements
- Can learn & design about various irrigation structures

### **(16CE121) Engineering Geology**

#### **Course Outcomes:**

- This course helps to know the identification of rocks, minerals, engineering geology problems and also basics of earth science.

### **(16CE122) Geotechnical Engineering - I**

#### **Course Outcomes:**

Students who successfully complete this course will be able to:

- Understand the origin of the soil and geological cycle.
- Understand and use IS method for soil classification.
- Understand the basic science of soil compaction.
- Understand basics principles of flow and soil permeability through porous media
- Understand seepage in soil include Laplace equation of continuity

### **(16CE123) Concrete Technology Lab**

#### **Course Outcomes:**

- After completion of this lab the student in position to access the quality of cement by conducting following tests:
  - Normal consistency, Initial Setting & Final Setting of Cement
  - Fineness of Cement & Specific Gravity of Cement
  - Soundness of Cement
  - Compressive Strength of Cement
- Also the student can conduct following tests on concrete related to Compressive



Strength and Workability:

- Slump Cone, Vee – Bee & Compaction Factor for Workability of Concrete
- Compressive Strength of Concrete
- Apart from this student can determine the specific gravity and water absorption on fine aggregate and bulking of fine aggregate.
- Some non-destructive test procedures are also demonstrated to student

### **(16CE124) Engineering Geology Lab**

#### **Course Outcomes:**

After completion of this lab the student:

- Can conduct macroscopic tests on rock forming minerals to identify
- Can conduct macroscopic tests on rocks to identify
- Can be in position to interpret geological models
- Can perform strike and dip problems

### **III B. Tech - II Sem. (C.E)**

#### **(16CE125) Structural Analysis - II**

#### **Course Outcomes:**

On completion of this course, the student will be able to

- Analyze the arches with different end conditions
- Analyze the frames by approximate method of analysis
- Analyze the effects of moving loads on simply supported beams.
- Solve statically indeterminate structures using matrix (Stiffness & flexibility) methods.
- find the collapse loads of different structural frames

#### **(16CE126) Design & Drawing of Steel Structures**

#### **Course Outcomes:**

On completion of this course, the student will be able to

- Design of riveted, welded and bolted connections
- Design of tension members
- Design of compression members, slab base and gusseted base for columns
- Design of laterally supported and unsupported beams
- Design of roof truss

#### **(16CE127) Geotechnical Engineering – II**

#### **Course Outcomes:**

After completion of the course, the student will be able to

- Apply the knowledge of compaction in selecting the compaction equipment.
- Analyze the stability of earthen slopes
- Evaluate the probable settlements of foundations and SBC of soils.
- Estimate load carrying capacity of piles
- Understand the design principles of a gravity retaining wall.

## **(16CE128) Water Resources Engineering-II**

### **Course Outcomes:**

After completion of the course the student is a position to

- Understand canal regulation systems
- Understand designing of cross drainage works
- Be familiar with river engineering concepts
- Plan the reservoir
- Perform hydraulic design of gravity

## **(16CE129) Transportation Engineering – I**

### **Course Outcomes:**

After completion of the course the student will have:

- To apply the knowledge of highway materials in the design of the pavements.
- To design the various highway pavements.
- To estimate the geometrics for highway pavements.

## **(16CE130) Geotechnical Engineering Lab**

### **Course outcomes:**

After successful completion of this laboratory course the student is in a position to:

- Understand the difference between disturbed and undisturbed soil samples
- Evaluate the consistency limits for fine grained soils
- Find coefficient of permeability for fine and coarse grained soils
- Determine maximum dry density at optimum moisture content
- find shear strength of both cohesive and non-cohesive soils

## **(16CE131) Transportation Engineering Lab**

### **Course outcomes:**

After completion of this labs student:

- Can conduct tests related to road aggregate
- Can conduct tests related to bitumen
- Can perform traffic volume studies
- Can perform vehicle speed studies.

## **(16HS615) Advanced English Language and Communication Skills Lab**

### **Course Outcomes:**

- Flair in Writing and felicity in written expression
- To enhance job prospects
- Improving Effective Speaking Abilities
- To prepare effective Interview techniques

## **IV B. Tech - I Sem. (C.E)**

### **(16MB750) Managerial Economics and Financial Analysis**

#### **Course outcomes:**

- The thorough understanding of Managerial Economics and Analysis of Financial

statements facilitates the technocrats –cum- entrepreneurs to take up decisions effectively and efficiently in the challenging Business Environment.

### **(16CE132) Transportation Engineering-II**

#### **Course Outcomes:**

After completion of the course the student will have:

- Able to design and construct different construction and maintenance.
- To analyze, design different components of Railway Engineering, Airport Engineering, Dock and Harbor Engineering

### **(16CE133) Environmental Engineering**

#### **Course Outcomes:**

Students undergoing this course are able to

- Demonstrate an ability to recognize the type of unit operations and processes involved in water and wastewater treatment plants.
- Recognize that water supply and sanitation is an important professional and ethical responsibility of civil and environmental engineer.
- Demonstrate an ability to choose the appropriate unit operations and processes required for satisfactory treatment of water and wastewater.
- Demonstrate an ability to design individual unit operation or process appropriate to the situation by applying physical, chemical, biological and engineering principles.

### **(16CE134) Estimation, Costing and Valuation**

#### **Course Outcome:**

- Explain types of estimate and duties of an Estimator
- Undertake rate analysis of civil engineering works
- Determine the rates of various items of civil works
- Calculate estimated cost of civil construction projects
- Evaluate the actual value of any property.

### **(16CE135) Finite Element Methods in Civil Engineering**

#### **Course Outcomes:**

Students undergoing this course are able to

- Obtain an understanding of the fundamental theory of the FEA method
- Develop the ability to generate the governing FE equations for systems governed by partial differential equations
- Understand the use of the basic finite elements for structural applications using truss, beam, frame, and plane elements
- Understand the application and use of the FE method for heat transfer problems.

### **(16CE136) Remote Sensing & GIS**

#### **Course Outcomes:**

On completion of the course the students will have knowledge on

- Principles of Remote Sensing and GIS
- Analysis of RS and GIS data and interpreting the data for modeling applications

### **(16CE137) Air Pollution & Management**

#### **Course Outcomes:**

- On completion of the course, the students will be able to:
- An understanding of the nature and characteristics of air pollutants, noise pollution and basic concepts of air quality management
- Ability to identify, formulate and solve air and noise pollution problems
- Ability to design stacks and particulate air pollution control devices to meet applicable standards.

### **(16EE239) Neural Networks & Fuzzy Logic**

#### **Course Outcomes:**

At the end of the course the student will be able to

- Understand the basic concept of biological neural networks
- Understand the basic concept of artificial neural networks
- Create Neural Network models.
- Understand the basic concepts of fuzzy logic.
- Create Fuzzy models.

### **(16ME313) Non-Conventional Energy Resources**

#### **Course Outcomes:**

- Upon completion of this course, the students can able to identify the new methodologies / technologies for effective utilization of renewable energy sources.

### **(16CS511) Database Management Systems**

#### **Course Outcome:**

- Students can design the simple database, and can use the SQL instructions in developing the database applications.
- Can apply the ER concepts to design the databases.
- Advanced concepts like triggers, assertions and constraints can be applied effectively in designing the business applications

### **(16CE138) Environmental Engineering Lab**

#### **Course outcomes:**

After successful completion of this laboratory course the student is in a position to:

- Perform common environmental experiments relating to water and wastewater quality, and know which tests are appropriate for given environmental problems.
- Apply the laboratorial results to problem identification, quantification, and basic environmental design and technical solutions.
- Understand and use the water and wastewater sampling procedures and sample preservations.
- Obtain the necessary background for subsequent courses in environmental engineering.

## **(16CE139) Computer Aided Design Lab**

### **Course Outcomes:**

After completion of the course the Students will be able to

- To acquire the skills in using software.
- To analyze and design reinforced concrete structures like frames, slabs and columns.
- To analyze and design steel structures like trusses and communication towers etc.
- To analyze and design any given building plan.

## **IV B. Tech - II Sem. (C.E)**

### **(16CE140) Design and Drawing of Irrigation Structures**

#### **Course outcomes:**

- After completion of the course the student is in position of perform hydraulic design and drawing of irrigation structures.

### **(16CE141) Advanced Foundation Engineering**

#### **Course outcomes:**

- Students will have the ability to select type of foundation required for the soil at a place and able to design shallow, foundation, deep foundation and retaining structures.

### **(16CE142) Advanced Structural Design**

#### **Course Outcomes:**

Students undergoing this course are,

- Able to design the advanced structures like Flat slabs, Water tanks, Retaining walls, Plate Girders, Gantry Girders.
- Able to analyse the prestressed Structures

### **(16CE143) Water Resources Systems Planning & Management**

#### **Course outcomes:**

- The students will be exposed to the economic aspects and analysis of water resources systems by which they will get an idea of comprehensive and integrated planning of a water resources project.
- The students will develop skills in solving problems in operations research through LP, DP and Simulation techniques

### **(16CE144) Construction Technology and Project Management**

#### **Course Outcomes:**

After completion of this course, the student shall be able to

- Implement generic and special Construction Project Management skills to a higher level
- Understand the special management skills required in multidisciplinary and global Construction Industry
- Integrate and apply theoretical concepts, ideas, tools and techniques to Construction

practice.

- Can plan, execute, monitor and control construction projects using Construction Project Management Tools such as CPM & PERT

### **(16CE146) Ground Improvement Techniques**

#### **Course Outcomes:**

After completion of this course, the student shall be able to

- Identify the problems in Expansive soils
- Implement the stabilization methods
- Apply grouting and dewatering techniques

### **(16CE147) Prestressed Concrete**

#### **Course Outcomes**

At the end of this course the student will be able to

- Understand the different methods of prestressing.
- Estimate the effective prestress including the short and long term losses.
- Analyze and design prestressed concrete beams under flexure and shear.
- Understand the relevant IS Codal provisions for prestressed concrete

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**Department of Electrical & Electronics Engineering**

**IB.Tech.–I Semester(E.E.E)**

**(16HS601) FUNCTIONAL ENGLISH**

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**(16HS602) ENGINEERING MATHEMATICS-I**

**Course Outcomes:**

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- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems with engineering applications

**(16HS603) ENGINEERING PHYSICS**

**Course Outcomes:**

- The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fibre optics.
- The important properties of crystals like the presence of long range order and periodicity, structure determination using X-ray diffraction are focused with defects in crystals & ultrasonic non-destructive techniques.
- The discrepancies between the classical estimates & laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.
- The electronic and magnetic properties of materials were successfully explained by free electron theory and the bases for the band theory are focused.
- The properties and device applications of semiconducting & magnetic materials are illustrated.
- The importance of superconducting materials and nanomaterials along with their engineering applications are well elucidated.

**(16CS501) COMPUTER PROGRAMMING**

**Course Outcomes:**

- Able to design the flowchart and algorithm for real world problems Able to learn and understand new programming languages
- Able to construct modular and readable programs
- Able to write C programs for real world problems using simple and compound data types

**(16HS606) HUMAN VALUES AND PROFESSIONAL ETHICS**

**Course Outcomes:**

Students undergoing this course are able to

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society

### **(16HS608) ENGINEERING PHYSICS LABORATORY**

#### **Course Outcomes:**

- Would recognize the importance of optical phenomenon like interference and diffraction.
- Would have acquired the practical application knowledge of optical fibre, semiconductor, dielectric and magnetic materials, crystal structure and lasers by the study of their relative parameters.
- Would recognize the significant importance of nanomaterials in various engineering fields.

### **(16CS502) COMPUTER PROGRAMMING LAB**

#### **Course Outcomes:**

At the end of the course, students will be able to

- Apply problem solving techniques of C to find solution. Use C language features effectively to implement solutions. Use C++ language features effectively to solve problems.
- Identify and develop apt searching and sorting technique for a given problem. Identify, design and develop the appropriate data structure for a given problem or application.

### **(16ME301) ENGINEERING & IT WORKSHOP LAB**

#### **Course Outcomes:**

#### **ENGINEERING WORKSHOP**

After completion of this course, a successful student will be able to

- Utilize workshop tools for engineering practice.
- Employ skills for the production of a component for real time applications. Appreciate the hard work and intuitive knowledge of the manual workers

#### **IT WORKSHOP**

After completion of this course, a successful student will be able to

- Install the software in the computers
- Utilize skills for the development of application software
- Can protect personal computer from virus and other cyber attacks

#### **IB.Tech.–II Semester (E.E.E)**

### **(16HS610) PROFESSIONAL ENGLISH**

#### **Course Outcomes:**

Students will be able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- Articulate well among themselves and with Faculty. Construct compound sentences using common conjunctions. Manage to organize and deliver oral presentations.



- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively

### **(16HS611) ENGINEERING MATHEMATICS-II**

#### **Course Outcomes:**

- The students become familiar with the application of Matrices, Vector calculus, Fourier series, Fourier transforms and Partial differential equations
- The students attain the ability to use mathematical knowledge to analyze, formulate and solve problems with engineering applications

### **(16HS604) ENGINEERING CHEMISTRY**

#### **Course Outcomes:**

The student is expected to:

- Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially.
- Understand the electrochemical sources of energy
- Understand industrially based polymers, various engineering materials. Understand characteristics and applications of fuels and Lubricants.

### **(16ME302) ENGINEERING GRAPHICS**

#### **Course Outcomes:**

Students undergoing this course are able to

- Frame ideas based on the conceptual modeling and design
- Provide good understanding of the methods involved in preparing various views in engineering drawings
- Can prepare 2D and 3D diagrams of various objects

### **(16EE201) ELECTRICAL CIRCUITS**

#### **Course Outcomes:**

- After completing the course, the students should be able to do the following:
- Given a network, find the equivalent impedance by using network reduction techniques
- Given a circuit and the excitation, determine the real power, reactive power, power factor etc.,
- Determine the current through any element and voltage across any element. Apply the network theorems suitably

### **(16HS607) ENGLISH LANGUAGE COMMUNICATIONS SKILLS LAB**

#### **Course outcomes:**

- To become active participants in the learning process and acquire proficiency in spoken English.
- To speak with clarity and confidence thereby enhance employability skills. To prepare effective job application

### **(16HS609) ENGINEERING CHEMISTRY LAB**

#### **Course Outcomes:**

On completion of this course, students will have the knowledge in.

- Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.
- Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results.

## **(16EE202)ELECTRICAL CIRCUITS LAB**

### **Course Outcomes:**

After completing the course, the student should be able to do the following:

- Apply suitable theorems for circuit analysis and verify the results theoretically

## **IIB.Tech.-I Sem.(E.E.E)**

### **(16HS612)ENGINEERING MATHEMATICS-III**

#### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability
- Have acquired computational skills to solve real world problems in engineering

### **(16HS605)ENVIRONMENTAL STUDIES**

#### **Course Outcomes:**

- Based on this course, the Engineering Student will be able to understand/evaluate/develop technologies on the basis of Ecological principles and environmental regulations along with Legislation, Laws and Policies which in turn help in sustainable development.
- Take preventive measures to reduce air, water, soil pollutions and contaminants in food.
- Effectively carry out waste disposal at individual level.
- Involve in preservation of natural resources.

### **(16EC401)BASIC ELECTRONIC DEVICES**

#### **Course Outcomes:**

- Upon completion of the course, students will:
  - Analyze the operating principles of major electronic devices, its characteristics and applications.
  - Design and analyze the DC bias circuitry of BJT and FET.
  - Design and analyze basic transistor amplifier circuits using BJT and FET.

### **(16EE210)GENERATION OF ELECTRIC POWER**

#### **Course Outcomes:**

After completing the course, the student should be able to do the following:

- Estimate the coal requirement, cost per kWh generation and number of units generated for thermal power station
- Estimate the required flow of river water, cost of generation and number of units generated in hydel power generation
- Compute various factors like load factor, plant factor
- Evaluate the tariffs to be charged for the consumers

- Plot the load curve, load duration curve and hence determine the load capacity of the plant

### **(16EE211) ELECTRICAL MACHINES – I**

#### **Course Outcomes:**

After completing the course, the student should be able to do the

- following: Calculate the e.m.f. generated on open circuit and find terminal voltage on load
- Diagnose the failure of DC generator to build up voltage
- Compute the load shared by each generator when several generators operate in parallel
- Determine the gross torque and useful torque developed by DC motor
- Identify suitable method and conditions for obtaining the required speed of DC motor
- Calculate the losses and efficiency of DC generators and motors

### **(16EC405) BASIC ELECTRONIC DEVICES LAB**

#### **Course Outcomes:**

- Students able to learn electrical model for various semiconductor devices and learn the practical applications of these semiconductor devices

### **(16CS503) DATA STRUCTURES THROUGH C (AUDIT COURSE)**

#### **Course Outcomes:**

At the end of the course, students will be able to:

- Design algorithms to implement various data structures.
- Understand and program stacks and list data structures.
- Write programs to implement different types of queues.
- Understand and make use of hash tables in applications like dictionary, spell checker etc.,
- Understand why height balanced trees are advantageous over other data structures.

### **IIB.Tech.-II Sem.(E.E.E)**

### **(16HS613) PROBABILITY & STATISTICS**

#### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability

### **(16CE112) FLUID MECHANICS & HYDRAULIC MACHINERY**

#### **Course Outcomes:**

After completion of this course the student will be able to,

- How to find frictional losses in a pipe when there is a flow between two places. Know types of flow and its measurements and applications.
- Identify the suitable pump required for different purposes.
- Classify the turbines and design criteria based on water availability.

### **(16EE214) ELECTROMAGNETIC FIELDS**

#### **Course Outcomes:**

After going through this course the student acquires:

- Knowledge on basic principles, concepts and fundamental laws of electromagnetic fields.
- The knowledge to understand 3-dimensional coordinate systems, electrostatics, magnetostatics, time, varying fields and interaction between electricity and magnetism.

### **(16EC411) ANALOG ELECTRONIC CIRCUITS**

#### **Course Outcomes:**

On completion of this course the student will be able to understand

- the Methods of biasing transistors & Design of simple amplifier circuits.
- Mid – band analysis of amplifier circuits using small-signal equivalent circuits

To determine gain, input impedance and output impedance.

- Method of calculating cutoff frequencies and to determine bandwidth. Design and analyse different Oscillator circuits.
- Design of circuits for linear wave shaping and Multi-vibrators.

### **(16EE215) ELECTRICAL MACHINES-II**

#### **Course Outcomes:**

After completing the course, the student should be able to do the

- following: Draw the equivalent circuit of transformer
- Conduct O.C, S.C tests and predetermine the regulation and efficiency of transformer. Compute the load shared by each transformer when several transformers operate in parallel
- Draw the circle diagram of a three-phase Induction motor and predetermine the performance characteristics
- Determine the starting torque, maximum torque, slip at maximum torque using given data

### **(16EE217) ELECTRICAL MACHINES-ILAB**

#### **Course Outcomes:**

The student should be able to do the following:

- Conduct experiments to obtain the no-load and load characteristics of D.C. Generators
- Conduct tests on D.C. motors for predetermination of efficiency. Conduct tests on D.C. motors for determination of efficiency

- Control the speed of D.C. motor in a given range using appropriate method
- Identify the reason as to why D.C. Generator is not building up voltage

### **(16EC414) ANALOG ELECTRONIC CIRCUITS LAB**

#### **Course Outcomes:**

- The ability to analyze and design single and multi-stage amplifiers at low, mid and high frequencies.
- Designing and analyzing the transistor at high frequencies
- To understand Different types of linear wave shaping circuits.
- To understand and processing of Non Linear wave shaping circuits
- To learn about Limiting and storage circuits and their applications

### **(16CE116) FLUID MECHANICS AND HYDRAULIC MACHINERY LAB**

#### **Course Outcomes:**

Students undergoing this course are able

- to Calibrate Venturimeter & Orifice meter
- Calculate losses in flows
- Estimate the efficiency of different pumps.
- Study the performance of different turbines.

### **(16HS614) COMPREHENSIVE SOFT-SKILLS (AUDIT COURSE)**

#### **Course Outcomes:**

- To know the importance of Soft Skills.
- To apply Soft Skills in the different environment.
- To enrich the different level of Soft Skills to develop their personality.

### **III B.Tech.-I Sem.(EEE)**

#### **(16EE216) Linear Control Systems**

#### **COURSE OUTCOMES:**

After completing the course, the students should be able to do the following:

- Evaluate the effective transfer function of a system from input to output using
  - (i) block diagram reduction techniques
  - (ii) Mason's gain formula.
- Compute the steady state errors and transient response characteristics for a given system and excitation.
- Determine the absolute stability and relative stability of a system
- Draw root loci.
- Design a compensator to accomplish desired performance. Derive state space model of

agiven physical system and solve the state equation.

## **(16EE218)Electrical PowerTransmissionSystems**

### **CourseOutcomes:**

- Computethe transmission lineparameters.
- Modelagiventransmissionline.
- Estimatetheperformanceofagiventransmissionline.
- Analyzetheeffectofovervoltagesontransmissionlines.
- Explain the construction, types and grading of underground cables and analyze cablePerformance

## **(16EE219)PowerElectronics**

### **CourseOutcomes:**

- Aftergoing through this course,the student acquires knowledgeabout:
- Basicoperatingprinciplesofpowersemiconductorswitchingdevices.
- Theoperationofpowerelectronicconvertersandtheircontrol.
- Basicoperatingprinciplesofchoppersandtheircontrol.

## **(16EE220)ElectricalMachines–III**

### **CourseOutcome:**

- student understands the constructional details of synchronous machines, their loadcharacteristics,ableto solvethe problemson regulation,parallel operationof alternation.
- students should be able understand the working principle methods of application of synchronous motor
- student should be able to understand principle operation of AC series motor, universalmotorreluctancemotor,stepper motor, BLDC motor.

## **(16EC402)SwitchingTheoryandLogicDesign**

### **CourseOutcomes:**

- Abilityto definedifferent Numbersystemandperform Numberbaseconversions.
- Ableto simplify theBoolean functions&design using Logicgates
- Understandthegate-levelminimizationtechniques.
- Designsequentialandcombinationalcircuits.
- Tounderstandanddesign memorysystemslikeRAM,ROM,PLA,PAL

## **(16EC417)LinearICApplications**

### **CourseOutcomes:**

- Understandthebasicbuildingblocksoflinearintegratedcircuitsanditscharacteristics.
- Analyzethelinear,non-linearandspecialized applicationsofoperationalamplifiers.
- UnderstandthetheoryofADCandDAC.
- RealizetheimportanceofOperationalAmplifier.

## **(16EE222) Control Systems And Simulation Lab**

### **COURSEOUTCOMES(COs)**

At theend of thecourse thestudent should beableto

- Designthecontrollers/compensatorsto achievedesiredspecifications.
- Understandtheeffectof locationofpolesandzerosontransientandsteadystatebehaviorof systems.
- Assess the performance, in terms of time domain specifications, of first and second ordersystems.
- UnderstandtheeffectofP,PD,PI,PID controllersonsecondordersystems.
- UseMATLAB/SIMULINKsoftwarefor controlsystemanalysis anddesign.
- UseMATLAB/SIMULINKsoftwareforstatespacemodel.

### **III B. Tech. - II Sem. (EEE)**

#### **(16EE223) Power Semiconductor Drives**

##### **Course Outcomes:**

The students should be able to:

- Identify the choice of the electric drive system based on their applications
- Explain the operation of single and multi-quadrant electric drives
- Analyze single phase and three phase rectifiers fed DC motors as well as chopper fed DC motors
- Explain the speed control methods for AC-AC & DC-AC converters fed to Induction motors and Synchronous motors with closed loop, and open loop operation

#### **(16EE224) Electrical and Electronic Measurements**

##### **Course Outcome:**

After successful completion of the course, student will be

- Able to develop an understanding of construction and working of different measuring instruments
- Able to develop an understanding of construction and working of different AC and DC bridges and its applications
- Familiar with C.T and P.T and its applications
- Familiar with various measuring instruments used to detect electrical quantities such as power and energy.

#### **(16EE225) Switch Gear and Protection**

##### **Course Outcomes:**

- Student gains knowledge on different Protective Equipments or Power Systems
- Know about various protective systems - how it works and where it works?
- Different applications of the relays, circuit breakers, grounding for different elements of power system is also discussed in the subject.
- Ability to express Oil circuit Breaker, Air Blast circuit Breakers, SF<sub>6</sub> Circuit Breaker.
- Ability to identify DMT, IDMT type relays

#### **(16EE226) Power System Analysis**

##### **Course Outcomes:**

The students should be able to:

- Understand the mathematical models of power system components
- Understand the methods for Load flow.
- Understand the fault calculations for various types of faults.
- Understand the power system stability concepts.

### **(16EC423)MicroProcessorsandMicroControllers**

#### **CourseOutcomes:**

- After completion of this subject the students will be able to:
- Do programming with 8086 microprocessors
- Understand concepts of Intel x86 series of advanced processors
- Able to understand the basic concepts of 8051 architecture
- Design and implement some specific real-time applications using 8051 Microcontroller

### **(16HS615)AdvancedEnglishLanguageandCommunication SkillsLab**

#### **Outcomes**

- Flair in Writing and felicity in written expression.
- To enhance job prospects.
- Improving Effective Speaking Abilities.
- To prepare effective Interview techniques.

### **(16EE227)PowerElectronicsandSimulationLab**

#### **CourseOutcomes:**

- Test the turn-on–turn-off characteristics of various power electronic devices. Test and analyze firing circuits for SCRs
- Test different types of voltage controllers, converters and Inverters with R and RL loads

### **(16EC428)MicroProcessors&MicroControllersLab**

#### **LearningOutcome:**

- Able to write Assembly Language programs. Abl
- eto develop 8051 Programs.
- Able to understand Peripheral devices interfacing.

## **IV B.Tech.-ISem.(EEE)**

### **(16EE228)PowerSystemOperation andControl**

**CourseOutcomes:** After completion of the course, the student will be able to:

- Develop the mathematical models of turbines and governors
- Address the Load Frequency Control problem
- Explain how shunt and series compensation helps in reactive power control
- Explain the issues concerned with power system operation in competitive environment

### **(16EE229)ElectricalDistributionSystems**

#### **CourseOutcomes:**

- Know different types of distribution systems and their design
- Usage of protective devices and their installation with coordination.



- Ability to calculate coincidence factor, contribution factor, Loss factor
- Ability to calculate radial distribution substation

### **(16EC422) Digital Signal Processing**

#### **Course Outcomes:**

At the end of the course, the students should be able to:

- Able to obtain different Continuous and Discrete time signals.
- Ability to develop Fast Fourier Transform (FFT) algorithms for faster realization of signals and systems.
- Able to design Digital IIR filters from Analog filters using various techniques (Butterworth and Chebyshev).
- Able to design Digital FIR filters using window techniques, Fourier methods and frequency sampling techniques.
- Ability to design different kinds of interpolator and decimator.

### **(16MB750) Managerial Economics and Financial Analysis**

#### **Course Outcome: -**

- The thorough understanding of Managerial Economics and Analysis of Financial statements facilitates the technocrats –cum- entrepreneurs to take up decision effectively and efficiently in the challenging Business Environment.

### **(16EE230) Principles of Power Quality (ELECTIVE-I)**

#### **Course Outcomes:**

- Understand the basic concept of Power quality issues.
- Understand the basic concept Power quality terminology
- Understand the basic concepts of Power quality Monitoring.
- Understand the basic concepts of custom power devices.

### **(16EE231) HVDC Transmission Systems (ELECTIVE-I)**

#### **Course Outcomes:**

- Compare HVDC and HVAC transmission systems
- Understand the operation of various converters used in HVDC transmission systems
- Devise means to suppress / eliminate harmonics.
- Design HVDC and AC Filters

### **(16EE232) Smart Grid Technology (ELECTIVE-I)**

#### **Course Outcomes:**

The students should have learnt about:

- How to meet the standards for information exchange and for smart metering
- How to preserve data and Communication security by adopting encryption and decryption

procedures.

- Monitoring, operating, and managing the transmission and distribution tasks under smart grid environment

**(16CE145) Elements of Road Traffic Safety  
(Open Elective)**

**Course Outcomes:**

After completion of this course the student:

- Can clearly understand the accident scenario, causes and measure to be taken
- Can know the traffic regulations
- Can understand the parking problems and can give solutions
- Can get an awareness of traffic signs, signals and road markings
- Can understand the need of street light and their proper disposition on road

**(16ME313) Non-Conventional Energy Resources  
(Open Elective)**

**Course Outcomes:**

- Upon completion of this course, the students can able to identify the new methodologies/technologies for effective utilization of renewable energy sources.

**(16CS511) DATABASE MANAGEMENT SYSTEMS**

**Course Outcome:**

- Students can design the simple database, and can use the SQL instructions in developing the database applications.
- Can apply the ER concepts to design the databases.
- Advanced concepts like triggers, assertions and constraints can be applied effectively in designing the business applications

**(16EE233) Power Systems and Simulation Lab**

**COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to:

- Experimental determination (in machine lab) of sequence impedance and subtransient reactances of synchronous machine.
- Conducting experiments to analyze LG, LL, LLG, LLLG faults.
- The equivalent circuit of three winding transformer by conducting a suitable experiment.
- Develop MATLAB program for formation of Y and Z buses.
- Develop MATLAB programs for Gauss-Seidel and fast decoupled load flow studies.
- Develop the SIMULINK model for single area load frequency control problem.

**(16EE234) Electrical Measurements Lab**

**Course Outcomes:**

- Calibrate various electrical measuring/recording instruments.
- Accurately determine the values of inductance and capacitance using a.c. bridges
- Accurately determine the values of very low resistances

- Measure reactive power in 3-phase circuit using single wattmeter
- Determine ratio error and phase angle error of CT

#### **IV B.Tech.-IISem.(EEE)**

##### **(16MB751) Entrepreneurship Development**

#### **Course outcome:**

Creates thorough understanding of the entrepreneurship concepts among the young engineering students to venture into creating jobs rather than seeking jobs.

##### **(16EE235) Advanced Control Theory (ELECTIVE-II)**

#### **Course Outcomes**

- Able to represent mathematical model of a system in state space.
- Understand the properties of state transition matrix and its importance.
- Able to design state feedback controllers.
- Understand the representation of nonlinear systems and their characteristics.
- Able to analyze the stability of given practical system through Lyapunov, Routh-Hurwitz criterion etc.

##### **(16EE236) FACTS Controllers (ELECTIVE-II)**

#### **Course Outcomes:**

After completing this course the student will be able to:

- Understand various control issues, for the purpose of identifying the scope and for selection of specific FACTS controllers.
- Apply the concepts in solving problems of simple power systems with FACTS controllers.

##### **(16EE237) Soft computing Techniques (ELECTIVE-II)**

#### **Course Outcomes:**

At the end of the course the student will be able to

- Understand the basic concept of biological neural networks
- Understand the basic concept of artificial neural networks
- Create Neural Network models for electrical engineering.
- Understand the basic concepts of fuzzy logic.
- Create Fuzzy models for electrical engineering.

##### **(16EE238) Utilization of Electrical Power (Elective-III)**

#### **Course Outcomes:**

**After completion of this course the students are able**

- To understand the basic concepts of illumination engineering and design the various lighting schemes.

- To understand the concepts of electric heating and welding equipments used in industries.
- To study about the various characteristics of electrical drives and to select the particular electrical drive for the given application.
- To understand the basic idea of electrical traction systems and its control.
- To evaluate the specific energy consumption and tractive effort of the given traction system.

**(16EE240) High Voltage Engineering**

**(Elective-III)**

**Course Outcomes:**

- Understand fundamental concepts of high voltage AC, DC, and impulse generation.
- Learn the techniques employed in high voltage measurements.
- Apply analytical and numerical techniques for electric field calculations in high voltage systems.
- Learn the fundamental concept of electric breakdown in liquids, gases, and solids.
- Become familiar with non-destructive test techniques in high voltage engineering.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**Department of Mechanical Engineering**

**I B. Tech. – I Semester (M.E)**

**(16HS601) FUNCTIONAL ENGLISH**

**Course Outcomes:**

Students will be able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- Articulate well among themselves and with Faculty.
- Construct compound sentences using common conjunctions.
- Manage to organize and deliver oral presentations.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively.

**(16HS602) ENGINEERING MATHEMATICS-I**

**Course Outcomes:**

- The students become familiar with the application of ordinary differential equations, multiple integrals, Laplace Transforms and their applications
- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems with engineering applications

**(16HS603) ENGINEERING PHYSICS**

- The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fibre optics.
- The important properties of crystals like the presence of long range order and periodicity, structure determination using X-ray diffraction are focused with defects in crystals & ultrasonic non destructive techniques.
- The discrepancies between the classical estimates & laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.
- The electronic and magnetic properties of materials were successfully explained by free electron theory and the bases for the band theory are focused.
- The properties and device applications of semiconducting & magnetic materials are illustrated.
- The importance of superconducting materials and nanomaterials along with their engineering applications are well elucidated.

**(16CS501) COMPUTER PROGRAMMING**

**Course Outcomes:**

- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs
- Able to write C programs for real world problems using simple and compound data types

### **(16HS606) HUMAN VALUES AND PROFESSIONAL ETHICS**

#### **Course Outcomes:**

Students undergoing this course are able to

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society

### **(16HS608) ENGINEERING PHYSICS LABORATORY**

#### **Course Outcomes:**

- Would recognize the importance of optical phenomenon like interference and diffraction.
- Would have acquired the practical application knowledge of optical fibre, semiconductor, dielectric and magnetic materials, crystal structure and lasers by the study of their relative parameters.
- Would recognize the significant importance of nano materials in various engineering fields.

### **(16CS502) COMPUTER PROGRAMMING LAB**

#### **Course Outcomes:**

At the end of the course, students will be able to

- Apply problem solving techniques of C to find solution.
- Use C language features effectively to implement solutions.
- Use C++ language features effectively to solve problems.
- Identify and develop apt searching and sorting technique for a given problem.
- Identity, design and develop the appropriate data structure for a given problem or application.

### **(16ME301) ENGINEERING & IT WORK SHOP LAB**

#### **Course Outcomes:**

After completion of this course, a successful student will be able to :

- Utilize workshop tools for engineering practice.
- Employ skills for the production a component for real time applications.
- Appreciate the hard work and intuitive knowledge of the manual workers.

## **I B. Tech. – II Sem. (ME)**

### **(16HS610) PROFESSIONAL ENGLISH**

#### **Course Outcomes:**

Students will be able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- Articulate well among themselves and with Faculty.
- Construct compound sentences using common conjunctions.
- Manage to organize and deliver oral presentations.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively

### **(16HS611) ENGINEERING MATHEMATICS-II**

#### **Course Outcomes:**

- The students become familiar with the application of Matrices, Vector calculus, Fourier series, Fourier transforms and Partial differential equations

- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems with engineering applications

### **(16HS604) ENGINEERING CHEMISTRY**

#### **Course Outcomes:**

The student is expected to:

- Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially.
- Understand the electrochemical sources of energy
- Understand industrially based polymers, various engineering materials.
- Understand characteristics and applications of fuels and Lubricants.

### **(16ME302) ENGINEERING GRAPHICS**

#### **Course Outcomes:**

Students undergoing this course are able to

- Frame ideas based on the conceptual modeling and design
- Provide good understanding of the methods involved in preparing various views in engineering drawings
- Can prepare 2D and 3D diagrams of various objects

### **(16CE101) ENGINEERING MECHANICS**

#### **Course Outcomes:**

Students undergoing this course are able to

- Construct free body diagrams and develop appropriate equilibrium equations.
- Understand the concepts of friction and to apply in real life problems.
- Determine the centroid and Moment of Inertia for composite sections.
- Understand the dynamic analysis of rigid body motion.

### **(16HS607) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

#### **Course outcomes:**

- To become active participants in the learning process and acquire proficiency in spoken English.
- To speak with clarity and confidence thereby enhances employability skills.
- To prepare effective job application

### **(16HS609) ENGINEERING CHEMISTRY LAB**

#### **Course Outcomes:**

On completion of this course, students will have the knowledge in.

- Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.
- Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results.

## **(16CE102) APPLIED MECHANICS LAB**

### **Course Outcomes:**

Students undergoing this course are able to

- Understand different laws of forces.
- Understand concepts of support reaction.
- Fundamentals of applied mechanics.
- Understand concepts of different types of pendulum.

## **II B. Tech. – I Semester (ME)**

### **(16HS612) ENGINEERING MATHEMATICS-III**

#### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability
- Have acquired computational skills to solve real world problems in engineering

### **(16ME303) MATERIAL SCIENCES AND METALLURGY**

#### **Course Outcomes:**

Students undergoing this course are able to

- Describe fundamental scientific (chemistry, physics) and engineering principles (material science) in materials processes and material systems.
- Students will get knowledge on bonds of solids and knowing the crystallization of metals
- Students can able to understand the equilibrium diagrams and their usage in the production processes.

### **(16ME304) KINEMATICS OF MACHINERY**

#### **Course Outcomes:**

Students undergoing this course are able to

- Familiarity with common mechanisms used in machines and everyday life.
- Identify different mechanisms, Inversions of kinematic chains
- Ability to perform analysis of different types of links, position, velocity, acceleration analyses.

### **(16ME305) MACHINE DRAWING**

#### **Course Outcomes:**

- Students can understand the working principles of an assembly or subassembly so that he/she will be able to produce the final product by procuring the units from various sources/suppliers and still produce any useful product serving effectively.
- The drawings can be easily prepared and understood by the people in a manufacturing industry.



## **(16CE104) STRENGTH OF MATERIALS**

### **Course Outcomes:**

Students undergoing this course are able to:

- The students would be able to understand the behaviour of materials under different stress and strain conditions.
- The students would be able to draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading.
- The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams under various loading conditions.
- Determine shear stress in the shaft subjected to torsional moments.

## **(16CE112) FLUID MECHANICS & HYDRAULIC MACHINERY**

### **Course Outcomes:**

After completion of this course the student will be able to,

- How to find frictional losses in a pipe when there is a flow between two places.
- Know types of flow and its measurements and applications.
- Identify the suitable pump required for different purposes.
- Classify the turbines and design criteria based on water availability.

## **(16CE109) STRENGTH OF MATERIALS LAB**

### **Course Outcomes:**

After completion of the course the student will be able to,

- Estimate Young's modulus, tensional rigidity of mild steel rods.
- Know the hardness of mild steel and HYSO specimens.
- Analyze the strength of wood, concrete, stone and bricks.
- Assess the quality of wood, concrete, stone and bricks.

## **(16CE116) FLUID MECHANICS AND HYDRAULIC MACHINERY LAB**

### **Course Outcomes:**

Students undergoing this course are able to

- Calibrate Venturi meter & Orifice meter
- Calculate losses in flows
- Estimate the efficiency of different pumps.
- Study the performance of different turbines.

## **(16CS503) DATA STRUCTURES THROUGH C**

### **Course Outcomes:**

- At the end of the course, students will be able to:
- Design algorithms to implement various data structures.
- Understand and program stacks and list data structures.
- Write programs to implement different types of queues.
- Understand and make use of hash tables in applications like dictionary, spell checker etc.,
- Understand why height balanced trees are advantageous over other data structures.

## **II B. Tech. – II Semester (ME)**

### **(16HS613) PROBABILITY & STATISTICS**

#### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts Have acquired a proper level of competence for employability

### **(16EE207) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

#### **Outcomes:**

- After going through this course the student gets a thorough knowledge on basics of Network theorems, Two port networks, DC Motors and Transformers with which he/she can able to apply the above conceptual things to real-world problems and applications.

### **(16ME306) MANUFACTURING TECHNOLOGY**

#### **Course Outcomes:**

Students undergoing this course are able to

- Demonstrate knowledge of engineering principles (metallurgy, mechanics, and/or material science) in manufacturing processes.
- Use appropriate machine tool equipment, standardized methods and apparatus for manufacturing processes.
- Use finite element software to simulate physical behaviors of mechanical structures or systems.
- Apply FEA principles for component and assembly design.

### **(16ME307) ENGINEERING THERMODYNAMICS**

#### **Course Outcomes:**

Students undergoing this course are able to

- Apply the laws of thermodynamics to analyze thermal systems.
- Can understand the energy transformation from one system to other system.
- Can understand the working principles of I.C. Engines.

### **(16ME308) DYNAMICS OF MACHINERY**

#### **Course Outcomes:**

Students undergoing this course are able to

- Understand and apply the basic principles of dynamics.
- Relate the motion of parts in a machine using the principles of kinematics.

### **(16ME309) MANUFACTURING TECHNOLOGY LAB**

#### **Course Outcomes:**

Students undergoing this course are able to

- Demonstrate knowledge of engineering principles (metallurgy, mechanics, and/or material science) in manufacturing processes.
- Use appropriate machine tool equipment, standardized methods and apparatus for manufacturing processes.

### **(16ME305) MATERIAL SCIENCES AND METALLURGY LAB**

#### **Course Outcomes:**

After completion of this course, a successful student will be able to:

- Prepare metallographic samples for microscopic examinations.
- Analyze the microstructure and estimate the amount of porosity and grain size of the casted specimen.
- Apply the knowledge of phase diagrams and testing methods to suit design specification in related areas.
- Use the software for various analyses of microstructures.

### **(16HS614) COMPREHENSIVE SOFT-SKILLS**

#### **Course Outcomes:**

- To know the importance of Soft Skills.
- To apply Soft Skills in the different environment.
- To enrich the different levels of Soft Skills to develop their personality.

### **III B. Tech. – I Semester (M.E)**

#### **(16ME311) Industrial Engineering & Management**

#### **Course Outcomes:**

Students undergoing this course are able to

- Understanding the concepts of production systems, work study and plant layout
- Understanding the concepts of production planning and inventory management systems.

#### **(16ME312) Thermal Engineering**

#### **Course Outcomes:**

Students undergoing this course are able to

- Apply basic knowledge of the principles of thermal systems.
- To apply the thermodynamic concepts into various thermal application like IC engines, Steam Turbines, Compressors and Refrigeration and Air conditioning systems.

#### **(16ME313) Non- Conventional Energy Resources**

#### **Course Outcomes:**

- Upon completion of this course, the students can able to identify the new methodologies / technologies for effective utilization of renewable energy sources.

#### **(16ME314) Design Of Machine Elements– I**

#### **Course Outcomes:**

Students undergoing this course are able to

- Upon completion of this course, the students can able to successfully design machine Components

#### **(16ME315) Automobile Engineering**

#### **Course Outcomes:**

Students undergoing this course are able to

- Understanding of science and engineering principles relevant to automobile engineering.
- Design and critically evaluate components, processes or systems related to automobile.

### **(16ME316) Machine Tools**

#### **Course Outcomes:**

Students undergoing this course are able to

- Understanding of concepts and basic mechanics of metal cutting, working of standard machine tools such as lathe, shaping, milling, drilling, grinding and allied machines, and broaching.
- Use appropriate machine tool equipment, standardized methods and apparatus for manufacturing processes.

### **III B. Tech. – II Semester (M.E)**

#### **(16HS605)Environmental Studies**

#### **Course Outcomes:**

- Based on this course, the Engineering Student will be able to understand/evaluate/develop technologies on the basis of Ecological principles and environmental regulations along with Legislation, Laws and Policies which in turn help in sustainable development.
- Take preventive measures to reduce air, water, soil pollutions and contaminants in food.
- Effectively carry out waste disposal at individual level.
- Involve in preservation of natural resources.

#### **(16MB750) Managerial Economics & Financial Analysis**

#### **Course Outcome:**

- The thorough understanding of Managerial Economics and Analysis of Financial Statements facilitates the Technocrats – cum – Entrepreneurs to take-up decisions effectively and efficiently in the challenging Business Environment.

#### **(16ME319) Design of Machine Elements-II**

#### **Course Outcomes:**

Students undergoing this course are able to

- Apply theoretical knowledge to design drive system equipment's including spur and helical gears, alternative drive systems, hydraulic drive systems, etc.
- Correlate theoretical knowledge with practical applications.

#### **(16ME320)Heat Transfer**

#### **Course Outcomes:**

Students undergoing this course are able to

- Explain the fundamental principles associated with heat transfer phenomena and demonstrate their application in a wide range of application areas.
- Design and analyze heat transfer processes and equipment.

#### **(16ME321) CAD/CAM**

#### **Course Outcomes:**

Students undergoing this course are able to

- Understanding the need of Group Technology as a means of bringing the benefits of mass production to relatively smaller production.

## **IV B. Tech. I Semester (M.E)**

### **(16MB751) Entrepreneurship Development**

#### **Course Outcomes:**

Students undergoing this course are able to

- Upon completion of the course, students will be able to gain knowledge and skills needed to run a business successfully.

### **(16ME324) Operations Research**

#### **Course Outcomes:**

Students undergoing this course are able to

- Upon completion of this course, the students can able to use the optimization techniques for use engineering and Business problems

### **(16ME325) Refrigeration & Air Conditioning**

#### **Course Outcomes:**

Students undergoing this course are able to

- Upon completion of this course, the students can able to demonstrate the operations in different Refrigeration & Air conditioning systems and also able to design Refrigeration & Air conditioning systems.

### **(16ME326) Metrology & Measurements**

#### **Course Outcomes:**

Students undergoing this course are able to

- Understand the Limits, Fits and Tolerance, Know the principle of working of the most commonly used instruments for measuring linear and angular distances.
- Understand working of various instruments used for measuring for displacement, temperature and pressure, speed, stress, strain vibration.

### **(16ME330) Metrology and Measurements Lab**

#### **Course Outcomes:**

Students undergoing this course are able to

- Design of measurement experiments to measure various parameters and correlate with theoretical knowledge.
- Ability to report the results of a laboratory experiment in written, oral & graphical manner.

### **(16ME327) Finite Element Methods**

#### **Course Outcomes:**

Students undergoing this course are able to

- Use finite element software to stimulate physical behaviors of Mechanical structures.
- Apply FEA principles for components and assembly design

### **(16ME328) Quality Control and Reliability Engineering**

#### **Course Outcomes:**

Students undergoing this course are able to

- Upon successful completion of this course, the students can able to apply the concept of SQC in process control for reliable component production

### **(16ME329) Metal Forming Process**

#### **Course Outcomes:**

Students undergoing this course are able to

- Upon successful completion of this course, the students can able to know the concept of stress and strain analysis in 2D and 3D, rolling and Forging processes. And also the student must able to understand the Extrusion process, sheet metal working and Process of plastics.

### **IV B.Tech. – II Semester (M.E)**

#### **(16ME332) Mechatronics**

#### **Course Outcomes:**

Students undergoing this course are able to

- Understanding of mechatronic design principles, instrumentation and interfaces, sensors, actuators and the integration of control systems.
- Knowledge of state-of-the-art developments in mechatronics.

#### **(16ME333) Power Plant Engineering**

#### **Course Outcomes:**

Students undergoing this course are able to

- After completion of this course students are able to understand the various types of Renewable energy sources and working of Steam power plant. Student also knows the working principle of diesel Power plant and Hydro electric power plant.

#### **(16ME335) Modern Manufacturing Methods**

#### **Course Outcomes:**

Students undergoing this course are able to

- After completion of this unit students are able to understand and it's the applications of electron beam and laser beam in manufacturing environment, accuracy, machining speed and etc., with respect to all non-traditional machining processes.

#### **(16ME336) Gas Turbine and Jet Propulsion**

#### **Course Outcomes:**

Students undergoing this course are able to

- Upon completion of this course, the students can able to successfully apply gas dynamics principles in the Jet and Space Propulsion

#### **(16ME337) Automation & Robotics**

#### **Course Outcomes:**

Students undergoing this course are able to

- After completion of this unit students are able to understand robot programming languages which may adopt in different applications of robot. Student also knows the control motion mechanism in all devices of robot and application of robots in manufacturing sector.

## **(16ME338) Advanced Welding Processes**

### **Course Outcomes:**

At the end of the course student will be able to learn the-

- Weldability and perform different weldability testing for different metals.
- Different dissimilar metal and its cladding.
- Application of preheat and PWHT of weld joints as per codes and standards used in fabrication industry.
- Knowledge about different methods for increasing service life of equipment.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**Department of Electronics and Communication Engineering**

**I B. Tech. – I Semester (E.C.E)**

**(16HS601) FUNCTIONAL ENGLISH**

**Course Outcomes:**

Students will be able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- Articulate well among themselves and with Faculty.
- Construct compound sentences using common conjunctions.
- Manage to organize and deliver oral presentations.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively.

**(16HS602) ENGINEERING MATHEMATICS-I**

**Course Outcomes:**

- The students become familiar with the application of ordinary differential equations, multiple integrals, Laplace Transforms and their applications
- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems with engineering applications

**(16HS604) ENGINEERING CHEMISTRY**

**Course Outcomes:**

The student is expected to:

- Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially.
- Understand the electrochemical sources of energy
- Understand industrially based polymers, various engineering materials.
- Understand characteristics and applications of fuels and Lubricants.

**(16CS501) COMPUTER PROGRAMMING**

**Course Outcomes:**

- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs
- Able to write C programs for real world problems using simple and compound data types

**(16ME302) ENGINEERING GRAPHICS**

**Course Outcomes:**

Students undergoing this course are able to

- Frame ideas based on the conceptual modeling and design
- Provide good understanding of the methods involved in preparing various views in engineering drawings



- Can prepare 2D and 3D diagrams of various objects

### **(16HS607) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

#### **Course outcomes:**

- To become active participants in the learning process and acquire proficiency in spoken English.
- To speak with clarity and confidence thereby enhances employability skills.
- To prepare effective job application

### **(16HS609) ENGINEERING CHEMISTRY LAB**

#### **Course Outcomes:**

On completion of this course, students will have the knowledge in.

- Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.
- Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results.

### **(16CS502) COMPUTER PROGRAMMING LAB**

#### **Course Outcomes:**

At the end of the course, students will be able to

- Apply problem solving techniques of C to find solution.
- Use C language features effectively to implement solutions.
- Use C++ language features effectively to solve problems.
- Identify and develop apt searching and sorting technique for a given problem.
- Identity, design and develop the appropriate data structure for a given problem or application.

### **I B. Tech. – II Sem. (E.C.E)**

#### **(16HS610) PROFESSIONAL ENGLISH**

##### **Course Outcomes:**

Students will be able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- Articulate well among themselves and with Faculty.
- Construct compound sentences using common conjunctions.
- Manage to organize and deliver oral presentations.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively.

#### **(16HS611) ENGINEERING MATHEMATICS-II**

##### **Course Outcomes:**

- The students become familiar with the application of Matrices, Vector calculus, Fourier series, Fourier transforms and Partial differential equations
- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems with engineering applications.

### **(16HS603) ENGINEERING PHYSICS**

#### **Course Outcomes:**

- The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fibre optics.
- The important properties of crystals like the presence of long range order and periodicity, structure determination using X-ray diffraction are focused with defects in crystals & ultrasonic non-destructive techniques.
- The discrepancies between the classical estimates & laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.
- The electronic and magnetic properties of materials were successfully explained by free electron theory and the bases for the band theory are focused.
- The properties and device applications of semiconducting & magnetic materials are illustrated.
- The importance of superconducting materials and nanomaterials along with their engineering applications are well elucidated.

### **(16HS606) HUMAN VALUES AND PROFESSIONAL ETHICS**

#### **Course Outcomes:**

Students undergoing this course are able to

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society.

### **(16EE205) NETWORK ANALYSIS**

#### **Course outcomes:**

After completing the course the student should be able to do the following:

- Given a network, find the equivalent impedance by using network reduction techniques
- Determine the current through any element and voltage across any element
- Apply the network theorems suitably

### **(16HS608) ENGINEERING PHYSICS LABORATORY**

#### **Course Outcomes:**

- Would recognize the importance of optical phenomenon like interference and diffraction.
- Would have acquired the practical application knowledge of optical fiber, semiconductor, dielectric and magnetic materials, crystal structure and lasers by the study of their relative parameters.
- Would recognize the significant importance of nanomaterials in various engineering fields.

### **(16ME301) ENGINEERING & IT WORK SHOP LAB**

#### **Course Outcomes:**

#### **ENGINEERING WORKSHOP**

After completion of this course, a successful student will be able to :

- Utilize workshop tools for engineering practice.
- Employ skills for the production a component for real time applications.
- Appreciate the hard work and intuitive knowledge of the manual workers.

## **IT WORKSHOP**

After completion of this course, a successful student will be able to:

- Can install the softwares in the computers
- Utilize skills for the development of application softwares
- Can protect personal computer from virus and other cyber attacks

## **II B.Tech. - I Sem. (E.C.E)**

### **(16HS612) ENGINEERING MATHEMATICS-III**

#### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability
- Have acquired computational skills to solve real world problems in engineering

### **(16EC401) BASIC ELECTRONIC DEVICES**

#### **Course Outcomes:**

Upon completion of the course, students will:

- Analyze the operating principles of major electronic devices, its characteristics and applications.
- Design and analyze the DC bias circuitry of BJT and FET.
- Design and analyze basic transistor amplifier circuits using BJT and FET.

### **(16EC402) SWITCHING THEORY & LOGIC DESIGN**

#### **Course Outcomes:**

- Ability to define different Number system and perform Number base conversions.
- Able to simplify the Boolean functions & design using Logic gates
- Understand the gate-level minimization techniques.
- Design sequential and combinational circuits.
- To understand and design memory systems like RAM, ROM, PLA, PAL

### **(16EC403) SIGNALS AND SYSTEMS**

#### **Course Outcomes:**

- For integral-differential equations, the students will have the knowledge to make use of Laplace transforms.
- For continuous time and Discrete Time signals the students will make use of Fourier transform and Fourier series.
- For discrete time signals the students will make use of Z transforms.
- The concept of convolution and correlation is useful for analysis in the areas of linear systems and communication theory.

### **(16EC404) RANDOM SIGNAL AND STOCHASTIC PROCESSES**

#### **Course Outcomes:**

- A student will be able to determine the temporal and spectral characteristics of random signal response of a given linear system.

### **(16HS605) ENVIRONMENTAL STUDIES**

#### **Course Outcomes:**

- Based on this course, the Engineering Student will be able to understand/evaluate/develop technologies on the basis of Ecological principles and environmental regulations along with Legislation, Laws and Policies which in turn help in sustainable development.
- Take preventive measures to reduce air, water, soil pollutions and contaminants in food.
- Effectively carry out waste disposal at individual level.
- Involve in preservation of natural resources.

### **(16EC405) BASIC ELECTRONIC DEVICES LAB**

#### **Course Outcomes:**

- Students able to learn electrical model for various semiconductor devices and learns the practical applications of the semiconductor devices

### **(16CS503) DATA STRUCTURES THROUGH C (AUDIT COURSE)**

#### **Course Outcomes:**

- At the end of the course, students will be able to:
- Design algorithms to implement various data structures.
- Understand and program stacks and list data structures.
- Write programs to implement different types of queues.
- Understand and make use of hash tables in applications like dictionary, spell checker etc.,
- Understand why height balanced trees are advantageous over other data structures.

## **II B. Tech -II Sem. (E.C.E.)**

### **(16EC407) ELECTRONIC CIRCUITS ANALYSIS**

#### **Course Outcomes:**

Upon completion of this course, student will be able to:

- Analyze the frequency response of the BJT, FET amplifiers at low and high frequencies.
- Analyze and design multistage amplifiers with compound connections, feedback amplifiers, oscillators, power amplifiers and tuned amplifiers.

### **(16EC408) COMPUTER ORGANIZATION AND ARCHITECTURE**

#### **Course Outcomes:**

- Ability to use memory and I/O devices effectively
- Able to explore the hardware requirements for cache memory and virtual memory
- Ability to design algorithms to exploit pipelining and multiprocessors

### **(16EC409) ELECTRO MAGNETIC THEORY AND TRANSMISSION LINES**

#### **Course Outcomes:**

This course provides the foundational education in static electromagnetic fields, and time varying electromagnetic waves. Through lecture, and out-of-class assignments, students are provided learning

experiences that enable them to:

- Analyze and solve the problems of electric and magnetic fields that vary with three dimensional spatial co-ordinates as well as with time.
- Become proficient with analytical skills for understanding propagation of electromagnetic waves in different media.
- Understand the concept of transmission lines & their applications.

### **(16EC410) PULSE AND DIGITAL CIRCUITS**

#### **Course Outcomes:**

- Able to design different pulse circuits based on the above concepts.
- Ability to design different logic gates

### **(16EE212) ELECTRICAL TECHNOLOGY**

#### **Course Outcome:**

- After going through this course the student gets a thorough knowledge on DC Motors & Generators, Transformers and Induction motors with which he/she can able to apply the above conceptual things to real-world problems and applications.

### **(16EC412) ELECTRONIC CIRCUIT ANALYSIS LAB**

#### **Course Outcomes:**

- The ability to analyze and design single and multistage amplifiers at low, mid and high frequencies.
- Designing and analyzing the transistor at high frequencies.
- Determine the efficiencies of power amplifiers.
- Determine Frequency response and design of tuned amplifiers.
- Able to Analyze all the circuits using simulation software and Hardware.

### **(16EC413) PULSE & DIGITAL CIRCUITS LAB**

#### **Course Outcomes:**

- Student understands the various design and analysis to generate various types of signals.
- Student can design various digital circuits based on the application and specifications.

### **(16HS614) COMPREHENSIVE SOFT-SKILLS (AUDIT COURSE)**

#### **Course Outcomes:**

- To know the importance of Soft Skills.
- To apply Soft Skills in the different environment.
- To enrich the different levels of Soft Skills to develop their personality.

### **III B. Tech –I Sem. (E.C.E.)**

### **(16EC415) Analog Communications**

#### **Learning Outcomes:**

This course provides the foundational education in Analog Communication systems, and applications. The students are provided the learning experience through class room teaching and solving assignment & tutorial problems. At the end of course, students should be able to:

- Acquire knowledge on the basic concepts of Analog Communication Systems.
- Analyze the analog modulated and demodulated systems.
- Verify the effect of noise on the performance of communication systems.
- Know the fundamental concepts of information and capacity.

### **(16EC416) Electronic Measurements and Instrumentation**

#### **Course Outcomes:**

- After the completion of the course the students will be able to understand basic principles involved in the meters for measuring voltage, current, resistance, frequency and so on.
- Employ CRO for measuring voltage, current, resistance, frequency and so on.
- Understand principles of measurements associated with different bridges.
- Get complete knowledge regarding working of advanced instruments such as logic analyzers and spectrum analyzers.

### **(16EC417) Linear IC Applications**

#### **Course Outcomes:**

- Understand the basic building blocks of linear integrated circuits and its characteristics.
- Analyze the linear, non-linear and specialized applications of operational amplifiers.
- Understand the theory of ADC and DAC.
- Realize the importance of Operational Amplifier.

### **(16EC418) Antennas & Wave Propagation**

#### **Course Outcomes:**

Upon successful completion of the course, students will be able to:

- Approximate parametric equations for the calculation in the far field region.
- Write parametric integral expressions for a given current source.
- Calculate electromagnetic fields for a given vector potential.
- Discover pattern multiplication principle for array antennas.

### **(16EE216) Linear Control Systems**

#### **COURSE OUTCOMES:**

After completing the course, the student should be able to do the following:

- Evaluate the effective transfer function of a system from input to output using (i) block diagram reduction techniques (ii) Mason's gain formula.
- Compute the steady state errors and transient response characteristics for a given system and excitation.
- Determine the absolute stability and relative stability of a system.
- Draw root loci.
- Design a compensator to accomplish desired performance.
- Derive state space model of a given physical system and solve the state equation.

### **(16MB750) Managerial Economics & Financial Analysis**

**Course Outcome:**

The thorough understanding of Managerial Economics and Analysis of Financial Statements facilitates the Technocrats – cum – Entrepreneurs to take-up decisions effectively and efficiently in the challenging Business Environment.

**(16EC419) Analog Communications Lab****Course Outcomes:**

After completion of the course the students will be able

- To experience real time behavior of different analog modulation schemes
- Technically visualize spectra of different analog modulation schemes
- Analyze practical behavior of different elements available in analog communication system such as filters, amplifiers etc.
- Measure characteristics of radio receiver measurements.

**(16HS616) Aptitude Practice-I****Course Outcomes:**

At the end of the course, students would be expected to:

- Have developed the subtle way of approaching in the candidate.
- Have acquired the decision making with in no time.
- Have acquired logical thinking during professional tenure.
- Have obtained quick decision making skills.

**III B. Tech –II Sem. (E.C.E.)****(16EC421) Digital Communications****Course Outcomes:**

After the completion of the course, student will be able to:

- Understand the elements of DC & the fundamental concepts of sampling theorem along with different coding and modulation techniques
- Understand the basic principles of baseband and pass band digital modulation schemes
- Analyze probability of error performance of digital systems and are able to design digital communications

**(16EC422) Digital Signal Processing****Course Outcomes:**

At the end of the course, the student should be able to:

- Able to obtain different Continuous and Discrete time signals.
- Ability to develop Fast Fourier Transform (FFT) algorithms for faster realization of signals and systems.
- Able to design Digital IIR filters from Analog filters using various techniques (Butterworth and Chebyshev).
- Able to design Digital FIR filters using window techniques, Fourier methods and frequency sampling techniques.
- Ability to design different kinds of interpolator and decimator.

### **(16EC423) Microprocessors & Microcontrollers**

#### **Course Outcomes:**

After completion of this subject the students will be able to:

- Do programming with 8086 microprocessors
- Understand concepts of Intel x86 series of advanced processors
- Able to understand the basic concepts of 8051 architecture
- Design and implement some specific real time applications Using 8051 Microcontroller

### **(16EC424) Digital IC Applications**

#### **Course Outcomes:**

- Capable of using Computer-aided design tools to model, simulate, verify, analyze, and synthesize complex digital logic circuits.
- Efficient designing of any Digital System using basic structure ICs .
- Able to design and prototype with standard cell technology and programmable logic.
- Apply design test for digital logic circuits, and design for testability.

### **(16EC425) Microwave Engineering**

#### **Course Outcomes:**

- Ability to analyze micro-wave circuits incorporating hollow, dielectric and planar waveguides, transmission lines, filters and other passive components, active devices.
- Ability to Use S-parameter terminology to describe circuits and to explain how microwave devices and circuits are characterized in terms of their “S”- Parameters.
- Ability to understanding of microwave transmission lines and how to Use microwave components such as isolators, Couplers, Circulators, Tees, Gyrotors etc.

### **(16HS615) Advanced English Language and Communication Skills Lab**

#### **Course Objectives:**

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students’ fluency in English, through a well-developed vocabulary
- To enable them listening spoken English at normal conversational speed by educated English speakers
- To respond appropriately in different social-cultural and professional contexts
- To develop drafting skills among the students.

### **(16EC426) Digital Communications Lab**

#### **Course Outcomes:**

After completion of the course the students will be able to experience real time behavior of different digital modulation schemes and technically visualize spectra of different digital modulation schemes.

### **(16EC427) Digital IC Applications Lab**

#### **Course Outcome:**

After completion of the course the students will be able to

- Design and draw the internal structure of the various digital integrated circuits
- Develop VHDL/Verilog HDL source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessary synthesizer.
- Verify the logical operations of the digital IC’s (Hardware) in the laboratory



## **(16HS617) Aptitude Practice-II**

### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have developed the subtle way of approaching in the candidate.
- Have acquired the decision making with in no time.
- Have acquired logical thinking during professional tenure.
- Have obtained quick decision-making skills.

## **IV B. Tech –I Sem. (E.C.E.)**

### **(16MB751) Entrepreneurship Development**

**Course outcome:** Creates thorough understanding of the entrepreneurship concepts among the young engineering students to venture into creating jobs rather than seeking jobs.

### **(16EC429) Embedded Systems**

#### **Course Outcomes:**

- Able to understand the fundamental concepts of embedded systems.
- Able to learn the architecture of Advanced AVR microcontrollers.
- Able to learn to program the Advanced AVR microcontrollers.
- Able to understand the basic concepts of Internet of Things (IoT).

### **(16EC430) Optical Fiber Communication**

#### **Course Outcomes:**

- To learn the basic elements of optical fiber transmission link, fiber modes configurations and structures.
- To understand the different kind of losses, signal distortion in optical wave guides and other signal degradation factors.
- To learn the various optical source materials and optical receivers such as LED structures, quantum efficiency, Laser diodes, PIN, APD diodes, noise performance in photo detector, receiver operation and configuration.
- Analyze the use of analog and digital links such as the various criteria like power loss wavelength to be considered for point to point link in digital link system.
- To learn the fiber optical network components, variety of networking aspects, and operational principles WDM

### **(16EC431) VLSI Design**

#### **Course Outcomes:**

- Complete Knowledge about Fabrication process of ICs
- Able to design VLSI circuits as per specifications given.
- Capable of optimizing the design of Arithmetic / logic building Blocks at all levels of Design/Fabrication.
- Can implement circuit through various design styles ( semi- Custom, Full Custom)

### **(16EC432) Digital Image Processing**

#### **Course Outcomes:**

- Review the fundamental concepts of a digital image processing system.
- Analyze images in the frequency domain using various transforms.
- Evaluate the techniques for image enhancement and image restoration.

- Categorize various compression techniques.
- Interpret Image compression standards.
- Interpret image segmentation and representation techniques.

**(16CE145) Elements of Road Traffic Safety  
(OPEN ELECTIVE)**

**Course Outcomes:**

After completion of this course the student:

1. Can clearly understand the accident scenario, causes and measure to be taken
2. Can know the traffic regulations
3. Can understand the parking problems and can give solutions
4. Can get an awareness of traffic signs, signals and road markings
5. Can understand the need of street light and their proper disposition on road

**(16EE239) Neural Networks & Fuzzy Logic  
(OPEN ELECTIVE)**

**Course Outcomes:**

At the end of the course the student will be able to

- Understand the basic concept of biological neural networks
- Understand the basic concept of artificial neural networks
- Create Neural Network models.
- Understand the basic concepts of fuzzy logic.
- Create Fuzzy models.

**(16ME313) Non- Conventional Energy Source  
(Open Elective)**

**Course Outcomes:**

Upon completion of this course, the students can able to identify the new methodologies / technologies for effective utilization of renewable energy sources.

**(16CS511) DATABASE MANAGEMENT SYSTEMS  
(Open Elective)**

**Course Outcome:**

- Students can design the simple database, and can use the SQL instructions in Developing the database applications.
- Can apply the ER concepts to design the databases.
- Advanced concepts like triggers, assertions and constraints can be applied effectively in designing the business applications

**(16EC435) Microwave & Optical Communications Lab**

**Course Outcomes:**

- Capable of Applying Microwave Concepts/ Microwave components and test them.
- Able to design and analyze an optical fiber communications link

#### **IV B. Tech –II Sem. (E.C.E.)**

##### **(16EC437) Real Time Operating Systems**

###### **Course Outcomes:**

- After completion of the course students able to
- Know about the basic concepts of embedded systems
- Understand the different architectural features of embedded systems
- Understand the goal embedded systems in real time design applications

##### **(16EC438) Radar & Navigational Aids**

###### **Course Outcomes:**

- To become familiar with fundamentals of radar.
- To gain in knowledge about the different types of radar and their operation.

##### **(16EC440) Spread Spectrum Communications**

###### **Course Outcomes:**

At the end of the course the students should be able to:

- Understand the general concepts of spread spectrum techniques.
- Generate spread spectrum signals through hardware and computer simulations.
- Know various applications of spread spectrum techniques and working operation of CDMA systems of 2G and 3G standards.

##### **(16EC441) Wireless Communication & Networks**

###### **Course Outcomes:**

After completion of this course the student will be able to

- Understand basics of Wireless Communications and its evolution process.
- Know about the mechanism of radio mobile propagation and its effects.
- Apply various types of diversity and equalization techniques to counter balance the effects of Wireless Channel.
- Recognize the importance of Wireless Networking and multiple access techniques in the present day mobile communications
- Analyze and design mobile systems using OFDM technology for mitigating the ISI effects at higher data rates.

##### **(16CS527) Computer Networks**

###### **Course Outcome:**

- Use appropriate transmission media to connect to a computer network and Internet
- Work on the open issues for their project
- Start using the Internet effectively
- Able to design new protocols for computer network

##### **(16EC442) Cellular & Mobile Communications**

###### **Course Outcomes:**

- To understand the concept of cellular communication
- To understand the basics of wireless communication
- Knowledge of GSM mobile communication standard, its architecture, logical channels, advantages and limitations.

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**  
**Department of Computer Science and Engineering**

**I B. Tech. – I Sem. (CSE)**

**(16HS601) FUNCTIONAL ENGLISH**

**Course Outcomes:**

Students will be able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- Articulate well among themselves and with Faculty.
- Construct compound sentences using common conjunctions.
- Manage to organize and deliver oral presentations.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively.

**(16HS602) ENGINEERING MATHEMATICS-I**

**Course Outcomes:**

- The students become familiar with the application of ordinary differential equations, multiple integrals, Laplace Transforms and their applications
- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems with engineering applications

**(16HS604) ENGINEERING CHEMISTRY**

**Course Outcomes:**

The student is expected to:

- Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially.
- Understand the electrochemical sources of energy
- Understand industrially based polymers, various engineering materials.
- Understand characteristics and applications of fuels and Lubricants.

**(16CS501) COMPUTER PROGRAMMING**

**Course Outcomes:**

- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs
- Able to write C programs for real world problems using simple and compound data types

**(16ME302) ENGINEERING GRAPHICS**

**Course Outcomes:**

Students undergoing this course are able to

- Frame ideas based on the conceptual modeling and design

- Provide good understanding of the methods involved in preparing various views in engineering drawings
- Can prepare 2D and 3D diagrams of various objects

### **(16HS607) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

#### **Course outcomes:**

- To become active participants in the learning process and acquire proficiency in spoken English.
- To speak with clarity and confidence thereby enhances employability skills.
- To prepare effective job application

### **(16HS609) ENGINEERING CHEMISTRY LAB**

#### **Course Outcomes:**

- On completion of this course, students will have the knowledge in.
- Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results.
- Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results.

### **(16CS502) COMPUTER PROGRAMMING LAB**

#### **Course Outcomes:**

At the end of the course, students will be able to

- Apply problem solving techniques of C to find solution.
- Use C language features effectively to implement solutions.
- Use C++ language features effectively to solve problems.
- Identify and develop apt searching and sorting technique for a given problem.
- Identity, design and develop the appropriate data structure for a given problem or application.

### **I B. Tech. – II Sem. (CSE)**

#### **(16HS610) PROFESSIONAL ENGLISH**

#### **Course Outcomes:**

Students will be able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- Articulate well among themselves and with Faculty.
- Construct compound sentences using common conjunctions.
- Manage to organize and deliver oral presentations.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively

#### **(16HS611) ENGINEERING MATHEMATICS-II**

#### **Course Outcomes:**

- The students become familiar with the application of Matrices, Vector calculus, Fourier series, Fourier transforms and Partial differential equations
- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems with engineering applications

### **(16HS603) ENGINEERING PHYSICS**

#### **Course Outcomes:**

- The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fibre optics.
- The important properties of crystals like the presence of long range order and periodicity, structure determination using X-ray diffraction are focused with defects in crystals & ultrasonic non destructive techniques.
- The discrepancies between the classical estimates & laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.
- The electronic and magnetic properties of materials were successfully explained by free electron theory and the bases for the band theory are focused.
- The properties and device applications of semiconducting & magnetic materials are illustrated.
- The importance of superconducting materials and nanomaterials along with their engineering applications are well elucidated.

### **(16HS606) HUMAN VALUES AND PROFESSIONAL ETHICS**

#### **Course Outcomes:**

Students undergoing this course are able to

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society

### **(16CS503) DATA STRUCTURES THROUGH C**

#### **Course Outcome:**

At the end of the course, students will be able to:

- Design algorithms to implement various data structures.
- Understand and program stacks and list data structures.
- Write programs to implement different types of queues.
- Understand and make use of hash tables in applications like dictionary, spell checker etc.,
- Understand why height balanced trees are advantageous over other data structures.

### **(16HS608) ENGINEERING PHYSICS LABORATORY**

#### **Course Outcomes:**

- Would recognize the importance of optical phenomenon like interference and diffraction.
- Would have acquired the practical application knowledge of optical fibre, semiconductor, dielectric and magnetic materials, crystal structure and lasers by the study of their relative parameters.
- Would recognize the significant importance of nanomaterials in various engineering fields.

### **(16CS504) DATA STRUCTURES THROUGH C LAB**

#### **Course Outcomes:**

At the end of the course the student will be able to:

- Implement data structures like array, list, stack, queue, various trees, and graphs.
- Design an appropriate data structure to solve a real world problem.
- Develop various types of Programs in sorting.
- Implement the binary search tree operations.

## **(16ME301) ENGINEERING & IT WORK SHOP LAB**

### **Course Outcomes:**

#### **ENGINEERING WORKSHOP**

After completion of this course, a successful student will be able to:

- Utilize workshop tools for engineering practice.
- Employ skills for the production a component for real time applications.
- Appreciate the hard work and intuitive knowledge of the manual workers.

#### **IT WORKSHOP**

After completion of this course, a successful student will be able to:

- Can install the software in the computers
- Utilize skills for the development of application software
- Can protect personal computer from virus and other cyber attacks

### **II B. Tech. – I Semester (CSE)**

#### **(16HS612) ENGINEERING MATHEMATICS-III**

### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability
- Have acquired computational skills to solve real world problems in engineering

#### **(16HS605) ENVIRONMENTAL STUDIES**

### **Course Outcomes:**

- Based on this course, the Engineering Student will be able to understand/evaluate/develop technologies on the basis of Ecological principles and environmental regulations along with Legislation, Laws and Policies which in turn help in sustainable development.
- Take preventive measures to reduce air, water, soil pollutions and contaminants in food.
- Effectively carry out waste disposal at individual level.
- Involve in preservation of natural resources.

#### **(16CS505) ADVANCED DATA STRUCTURES THROUGH C++**

### **Course Outcomes:**

- To develop skills to design and analyze linear and nonlinear data structures.
- Develop algorithms for manipulating linked lists, stacks, queues, trees and graphs.
- Develop recursive algorithms as they apply to trees and graphs

#### **(16CS506) DIGITAL LOGIC DESIGN**

### **COURSE OUTCOMES (COs)**

At the end of this course, the student will be able to

- Compare various Number systems and implement Boolean Algebra operations
- Design and implement Combinational and Sequential logic circuits
- Implement Analog to Digital conversion and Digital to Analog conversion
- Design and develop sequential logic circuits
- Understand the working of logic families and logic gates
- Implement the given logical problem using PLDs

## **(16CS507) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE**

### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions.
- Have developed ability in writing in various contexts.
- Have acquired a proper level of competence for employability

## **(16EE207) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Determine the equivalent impedance of given network by using network reduction techniques.
- Determine the current through any element and voltage across any element
- Apply the network theorems suitably.
- Analyze the operating principles of motor and transformer.
- Analyze the operating principles of major electronic devices, its characteristics and applications.
- Design and analyze the DC bias circuitry of BJT and FE

## **(16CS508) ADVANCED DATA STRUCTURES THROUGH C++ LAB**

### **Course Outcomes:**

- To develop skills to design and analyze linear and nonlinear data structures.
- Develop algorithms for manipulating linked lists, stacks, queues, trees and graphs.
- Develop recursive algorithms as they apply to trees and graphs.

## **(16EE208) ELECTRICAL AND ELECTRONICS ENGINEERING LAB**

### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Students will understand all the fundamental components about electrical engineering and electronics engineering.
- Make electrical connections by wires of appropriate ratings.
- Understand the usage of common electrical and electronic measuring instruments.
- Understand the basic characteristics of transformers and electrical machines.

## **(16CS538) ETHICAL HACKING**

### **Course Outcomes:**

- To understand how intruders escalate privileges.
- To understand Intrusion Detection, Policy Creation, Social Engineering, Buffer
- Overflows and different types of Attacks and their protection mechanisms.
- To learn about ethical laws and tests.

## **II B. Tech. – II Semester (CSE)**

### **(16HS615) PROBABILITY & STATISTICS**

### **Course Outcomes:**

At the end of the course, students would be expected to:



- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability

### **(16CS509) OBJECT ORIENTED PROGRAMMING**

#### **Course Outcomes:**

- Solve problems using object oriented approach and implement them using Java
- Write efficient programs with multitasking.
- Create own Exceptions and handle Exceptions.
- Develop GUI Components.
- Develop application projects and design Java Application to connect Database

### **(16CS510) COMPUTER ORGANIZATION**

#### **Course Outcomes:**

- Use memory and I/O devices effectively
- Understand the CPU design and computer arithmetic
- Understand the design of control unit
- Explain hardware requirements for cache memory and virtual memory
- Design algorithms to exploit pipelining and multiprocessors

### **(16CS511) DATABASE MANAGEMENT SYSTEMS**

#### **Course Outcome:**

- Students can design the simple database, and can use the SQL instructions in developing the database applications.
- Can apply the ER concepts to design the databases.
- Advanced concepts like triggers, assertions and constraints can be applied effectively
- in designing the business applications

### **(16CS512) OPERATING SYSTEMS**

#### **Course Outcome:**

- Able to use operating systems effectively.
- Write System and application programs to exploit operating system functionality.
- Add functionality to the existing operating systems

### **(16CS513) OBJECT ORIENTED PROGRAMMING LAB**

#### **Course Outcome:**

- Solve problems using object oriented concepts.
- Write efficient programs for string handling and file handling.
- Write efficient programs to perform multitasking and exception handling.
- Develop GUI Components.
- Develop Java applications to connect database.

### **(16CS514) DATABASE MANAGEMENT SYSTEMS LAB**

#### **Course Outcome:**

- Apply ER concepts to design databases.

- Design simple database using a tool and implement it using SQL.
- Access normalization relations of relational model using normal forms
- Apply all constraints to develop a business application using cursors, triggers and
- Stored

### **(16CS515) OPERATING SYSTEMS LAB**

#### **Course Outcomes:**

Upon completion of this course the students should:

- Understand process management, concurrent processes and threads, memory
- management, virtual memory concepts, deadlocks
- Compare performance of processor scheduling algorithms
- Produce algorithmic solutions to process synchronization problems

### **(16HS614) COMPREHENSIVE SOFT-SKILLS**

#### **Course Objectives:**

The main objectives of this course are:

- To help the students understand interpersonal skills.
- To support them in building interpersonal skills.
- To enhance the ability to work with others

### **III B. Tech. – I Sem. (CSE)**

#### **(16CS516) UNIX & SHELL PROGRAMMING**

#### **Course Outcomes:**

Upon completion of the course, students shall be able to

- Understand UNIX architecture and get familiar with UNIX environment.
- Work with UNIX utilities and to develop shell scripts.
- The fundamental skills required to write simple and complex Shell scripts to automate jobs and processes in the UNIX environment.

#### **(16CS517) FORMAL LANGUAGES AND AUTOMATA THEORY**

#### **Course Outcome:**

At the end of the course, students will be able to

- Construct finite state diagrams while solving problems of computer science
- Find solutions to the problems using Turing machines
- Design of new grammar and language

#### **(16CS518) SOFTWARE ENGINEERING & ARCHITECTURE**

#### **Course Outcome:**

At the end of the course, students can able to

- Define and develop a software project from requirement gathering to implementation.
- Ability to code and test the software
- Ability to plan, Estimate and Maintain software systems

#### **(16CS519) WEB TECHNOLOGIES**

#### **Course Outcome:**

At the end of the course, students can able to

- Familiarity with WWW technical concepts: IP addressing, routing, client-server interaction.
- Exposure to basic Web Technologies.
- Exposure to database Technologies using java

### **(16CS521) DESIGN AND ANALYSIS OF ALGORITHMS**

#### **Course Outcomes:**

At the end of the course, students can able to

- Able to explain good principles of algorithm design.
- Analyze the Time & Space complexity of the algorithms and estimate their worst-case, average-case, Best case running times of algorithms using asymptotic notations.
- Use techniques divide and conquer, greedy, dynamic programming, backtracking, branch and bound to solve the problems.
- Identify and analyze criteria and specifications appropriate to new problems and choose the appropriate algorithmic design technique for their solution.
- Able to prove that a certain problem is NP-Complete

### **III B. Tech.- II Sem. (CSE)**

#### **(16EC423) MICROPROCESSORS & MICRO CONTROLLERS**

#### **Course Outcomes:**

After completion of this subject the students will be able to:

- Do programming with 8086 microprocessors
- Understand concepts of Intel x86 series of advanced processors
- Able to understand the basic concepts of 8051 architecture
- Design and implement some specific real time applications Using 8051 Microcontroller

#### **(16CS524) COMPILER DESIGN**

#### **COURSE OUTCOMES (COs)**

On successful completion of the course students will be able to

- Specify and analyze the lexical, syntactic and semantic structures of advanced language features
- Separate the lexical, syntactic and semantic analysis into meaningful phases for a compiler to undertake language translation
- Write a scanner, parser, and semantic analyzer without the aid of automatic generators
- Turn fully processed source code for a novel language into machine code for a novel computer
- Implement techniques for intermediate code and machine code optimization
- Design the structures and support required for compiling advanced language features.

#### **(16CS525) SOFTWARE TESTING**

#### **Course Outcomes:**

After completion of this subject the students will be able to:

- Understand the basic testing procedures.
- Generating test cases and test suites.
- Test the applications manually and by automation using different testing methods

## **(16CS526) OBJECT ORIENTED ANALYSIS AND DESIGN**

### **Course Outcomes:**

After completion of this subject the students will be able to:

- Show the importance of systems analysis and design in solving complex problems.
- Explain the importance of modeling and how the Unified Modeling Language (UML) represents an object-oriented system using a number of modeling views.
- Construct various UML models using the appropriate notation.
- Compare the difference between various object relationships.

## **(16CS527) COMPUTER NETWORKS**

### **Course Outcomes:**

After completion of this subject the students will be able to:

- Use appropriate transmission media to connect to a computer network and Internet
- Work on the open issues for their project
- Start using the Internet effectively
- Able to design new protocols for computer network

## **(16CS529) COMPUTER NETWORKS & MICROPROCESSOR AND MICROCONTROLLER LABORATORY**

### **Course Outcomes:**

- Able to design routing protocols in networks.
- Able to write coding for networking applications.
- Implement the data link layer framing methods such as character stuffing and bit stuffing.
- To write a program for implementing on a data set characters the three CRC polynomials – CRC 12, CRC16 and CRC CCIP
- Implement Dijkstra's algorithm to compute the shortest path through graph.
- Take an example subnet graph with weights indicating delay between nodes. Now obtain Routing table at each node using distance vector routing algorithm.
- Take an example subnet of hosts. Obtain broadcast tree for it.
- Write a program for Hamming Code generation for error detection and correction.
- Write a program for congestion control using Leaky bucket algorithm.

## **IV B. Tech. - I Sem. (CSE)**

### **(16MB750) MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS**

#### **Course Outcomes:**

- The thorough understanding of Managerial Economics and Analysis of Financial statements facilitates the technocrats –cum- entrepreneurs to take up decisions effectively and efficiently in the challenging Business Environment.

### **(16CS530) CYBER SECURITY**

#### **Course Outcomes:**

After completion of this subject the students will be able to:

- Able to recognize crime signatures
- Able to identify the virus signature
- Able to implement Investigation

- Able to Implement Forensics
- Able to implement Cyber Laws

### **(16CS531) DATA WAREHOUSING AND DATA MINING**

#### **Course Outcomes:**

After completion of this subject the students will be able to:

- Applying preprocessing methods for any given raw data.
- Utilizing Data mining algorithms to build analytical applications.
- Developing practical work of Data Mining techniques and design hypotheses based on the analysis to conceptualize a Data Mining Solution to practical problem

### **(16CS532) MOBILE APPLICATION DEVELOPMENT**

#### **Course Outcome:**

At the end of the course students will be assessed to determine whether they are able to

- Describe the limitations and challenges of working in a mobile and wireless environment as well as the commercial and research opportunities presented by these technologies
- Describe and apply the different types of application models/architectures used to develop mobile software applications
- Describe the components and structure of a mobile development frameworks (Android SDK and Eclipse Android Development Tools (ADT)) and learn how and when to apply the different components to develop a working system

### **(16CS533) SYSTEM APPLICATIONS & PRODUCT (SAP)**

#### **Course Outcomes:**

- Adopt and apply an integrated perspective to business processes.
- Effectively use SAP® ERP to execute the key steps in the procurement process.
- Ability to use SAP ERP to extract meaningful information about the production process.
- Extract and evaluate meaningful information about the material planning process using the SAP ERP system.

### **(16CS534) SOFTWARE PROJECT MANAGEMENT**

#### **Course Outcomes:**

At the end of course student should be able to:

- Actively participate or successfully manage a software development project by applying project management concepts
- Demonstrate knowledge of project management terms and techniques
- Work on Microsoft project, IBM RUP & open source software project management tools

### **(16CS535) HUMAN COMPUTER INTERACTION**

#### **Course Outcomes:**

At the end of the course students will be assessed to determine whether they are able to:

- Find innovative ways of interacting with computers
- Help the disabled by designing non-traditional ways of interacting
- Use cognitive psychology in the design of devices for interaction

### **(16CE145) ELEMENTS OF ROAD TRAFFIC SAFETY**

#### **Course Outcomes:**

After completion of this course the student:

- Can clearly understand the accident scenario, causes and measure to be taken
- Can know the traffic regulations
- Can understand the parking problems and can give solutions
- Can get an awareness of traffic signs, signals and road markings
- Can understand the need of street light and their proper disposition on road

### **(16EE239) NEURAL NETWORKS & FUZZY LOGIC**

#### **Course Outcomes:**

At the end of the course the student will be able to

- Understand the basic concept of biological neural networks
- Understand the basic concept of artificial neural networks
- Create Neural Network models.
- Understand the basic concepts of fuzzy logic.
- Create Fuzzy models.

### **(16ME313) NON- CONVENTIONAL ENERGY SOURCE**

#### **Course Outcomes:**

- Upon completion of this course, the students can able to
- Identify the new methodologies / technologies for effective utilization of renewable energy sources.

### **(16CS540) MOBILE APPLICATION DEVELOPMENT LAB**

#### **Course Outcomes:**

At the end of the course, the student should be able to:

- Design and implement various mobile applications using emulators.
- Deploy applications to hand-held devices

## **IV B. Tech. – II Sem. (CSE)**

### **(16MB751) ENTREPRENEURSHIP DEVELOPMENT**

#### **Course Outcomes:**

- Creates thorough understanding of the entrepreneurship concepts among the young engineering students to venture into creating jobs rather than seeking jobs.

### **(16CS536) DATA SCIENCE & ANALYTICS**

#### **Course Outcome:**

Upon successful completion of this course, participants should be able:

- To understand the fundamental concepts of database management. These concepts include aspects of database design, database languages, and database-system implementation.
- To learn a powerful, flexible and scalable general purpose database to handle big data.
- To Deploy the Data Analytics Lifecycle to address big data analytics projects
- To Apply appropriate analytic techniques and tools to analyze big data, create statistical models, and identify insights that can lead to actionable results

- To Select appropriate data visualizations to clearly communicate analytic insights to business sponsors and analytic audience

### **(16CS537) ARTIFICIAL INTELLIGENCE**

#### **Course Outcomes:**

- Possess the ability to formulate an efficient problem space for a problem expressed in English.
- Possess the ability to select a search algorithm for a problem and characterize its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique.
- Possess the ability to apply AI techniques to solve problems of Game Playing, Expert Systems, Machine Learning and Natural Language Processing.

### **(16CS538) CLOUD COMPUTING**

#### **Course Outcomes:**

At the end of course student will be able to:

- Understanding the systems, protocols and mechanisms to support cloud computing.
- Develop applications for cloud computing.
- Understanding the hardware necessary for cloud computing.
- Design and implement a novel cloud computing applications

### **(16CS541) MOBILE COMPUTING**

#### **Course Outcomes:**

At the end of the course the student will be able to

- Students able to use mobile computing more effectively.
- Students gain understanding of the current topics in MANETs and WSNs, both from an industry and research point of views.
- Acquire skills to design and implement a basic mobile ad hoc or wireless sensor network via simulations.

### **(16CS542) REAL TIME SYSTEMS**

#### **Course Outcomes:**

- Understand the basics of an embedded system Program an embedded system
- Design, implement and test an embedded system.
- Identify the unique characteristics of real-time systems
- Explain the general structure of a real-time system
- Define the unique design problems and challenges of real-time systems

### **(16CS543) PYTHON PROGRAMMING**

#### **Course Outcomes:**

At the end of the course the student will be able to

- Making Software easily right out of the box.
- Experience with an interpreted Language.
- To build software for real needs.
- Prior Introduction to testing software

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**Bachelor of Technology**

**AGRICULTURE ENGINEERING**

**B. Tech I Year I Semester**

**(16HS601) FUNCTIONAL ENGLISH**

**Course Outcomes:**

Students undergoing this course are able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- Articulate well among themselves and with Faculty.
- Construct compound sentences using common conjunctions.

**(16HS602) ENGINEERING MATHEMATICS-I**

(Common to all Branches)

**Course Outcomes:**

- The students become familiar with the application of ordinary differential equations, multiple integrals, Laplace Transforms and their applications
- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems with engineering applications

**(16HS603) ENGINEERING PHYSICS**

(Common to CIVIL, AG, EEE & ME)

**COURSE OUTCOMES:**

- The different realms of physics and their applications in both scientific and technological systems are achieved through the study of physical optics, lasers and fiber optics.
- The important properties of crystals like the presence of long range order and periodicity, structure determination using X-ray diffraction are focused with defects in crystals & ultrasonic nondestructive techniques.
- The discrepancies between the classical estimates & laboratory observations of physical properties exhibited by materials would be lifted through the understanding of quantum picture of subatomic world.
- The electronic and magnetic properties of materials were successfully explained by free electron theory and the bases for the band theory are focused.
- The properties and device applications of semiconducting & magnetic materials are illustrated.
- The importance of superconducting materials and nano material's along with their engineering applications are well elucidated.



## **(16CS501) COMPUTER PROGRAMMING**

(Common to All Branches)

### **Course Outcome:**

- Able to design the flowchart and algorithm for real world problems.
- Able to learn and understand new programming languages.
- Able to construct modular and readable programs.
- Able to write C programs for real world problems using simple and compound data types.

## **(16HS606) HUMAN VALUES AND PROFESSIONAL ETHICS**

### **Course Outcomes:**

Students undergoing this course are able to

- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society

## **(16HS608) ENGINEERING PHYSICS LAB**

(Common to CIVIL, EEE & ME)

### **Course Outcomes:**

- Would recognize the importance of optical phenomenon like interference and diffraction.
- Would have acquired the practical application knowledge of optical fibre, semiconductor, dielectric and magnetic materials, crystal structure and lasers by the study of their relative parameters.
- Would recognize the significant importance of nanomaterials in various engineering fields.

## **(16CS502) COMPUTER PROGRAMMING LAB**

### **Course Outcome:**

At the end of the course, students will be able to

- Apply problem solving techniques of C to find solution.
- Use C language features effectively to implement solutions.
- Use C++ language features effectively to solve problems.
- Identify and develop apt searching and sorting technique for a given problem.
- Identify, design and develop the appropriate data structure for a given problem or application.

## **(16ME301) ENGINEERING & IT WORK SHOP LAB**

### **Course Outcomes:**

#### **ENGINEERING WORKSHOP:**

After completion of this course, a successful student will be able to:

- Utilize workshop tools for engineering practice.
- Employ skills for the production a component for real time applications.
- Appreciate the hard work and intuitive knowledge of the manual workers.

#### **IT WORKSHOP:**

After completion of this course, a successful student will be able to:

- Can install the software's in the computers.
- Utilize skills for the development of application software.
- Can protect personal computer from virus and other cyber-attacks.

### **B.Tech I Year II Semester**

#### **(16HS610) PROFESSIONAL ENGLISH**

### **Course Outcomes:**

Students undergoing this course are able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- Articulate well among themselves and with Faculty.

#### **(16HS611) ENGINEERING MATHEMATICS-II**

### **Course Outcomes:**

- The students become familiar with the application of Matrices, Vector calculus, Fourier series, Fourier transforms and Partial differential equations.
- The students attain the abilities to use mathematical knowledge to analyze, formulate and solve problems with engineering applications.

#### **(16HS604) ENGINEERING CHEMISTRY**

### **Course Outcomes:**

The student is expected to:

- Differentiate between hard and soft water. Understand the disadvantages of using hard water domestically and industrially. Select and apply suitable treatments domestically and industrially.
- Understand the electrochemical sources of energy
- Understand industrially based polymers, various engineering materials.
- Understand characteristics and applications of fuels and Lubricants.

## **(16ME302) ENGINEERING GRAPHICS**

### **Course Outcomes:**

Students undergoing this course are able to

- Frame ideas based on the conceptual modeling and design
- Provide good understanding of the methods involved in preparing various views in engineering drawings
- Can prepare 2D and 3D diagrams of various objects.

## **(16CE101) ENGINEERING MECHANICS**

(Common to Civil, AG and ME)

### **Course Outcomes:**

Students undergoing this course are able to

- Construct free body diagrams and develop appropriate equilibrium equations.
- Understand the concepts of friction and to apply in real life problems.
- Determine the centroid and Moment of Inertia for composite sections.
- Understand the dynamic analysis of rigid body motion.

## **(16HS607) ENGLISH LANGUAGE AND COMMUNICATION SKILLS (ELCS) LAB**

### **Course outcomes:**

- To become active participants in the learning process and acquire proficiency in spoken English.
- To speak with clarity and confidence thereby enhances employability skills.
- To prepare effective job application

## **(16HS609) ENGINEERING CHEMISTRY LAB**

### **Course Outcomes:**

On completion of this course, students will have the knowledge in.

- Handling different types of instruments for analysis of materials using small quantities of materials involved for quick and accurate results, and
- Carrying out different types of titrations for estimation of concerned in materials using comparatively more quantities of materials involved for good results.

## **(16CE102) APPLIED MECHANICS LAB**

### **Course Outcomes:**

Students undergoing this course are able to

- Understand different laws of forces.
- Understand concepts of support reaction.
- Fundamentals of applied mechanics.
- Understand concepts of different types of pendulum.

## **B.Tech II Year I Semester**

### **(16HS612) ENGINEERING MATHEMATICS-III**

### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions

- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability
- Have acquired computational skills to solve real world problems in engineering

### **(16AG701) ENGINEERING PROPERTIES OF BIOLOGICAL MATERIALS**

#### **Course Outcomes:**

After completion of the course the student will be able to:

- Measure the physical, thermal, optical and rheological properties of the biological materials
- Use the properties data in design of the equipment and process.

### **(16CE104) STRENGTH OF MATERIALS**

#### **Course Outcomes:**

Students undergoing this course are able to:

- The students would be able to understand the behaviour of materials under different stress and strain conditions.
- The students would be able to draw bending moment, shear force diagram, bending stress and shear stress distribution for beams under the different conditions of loading.
- The student would be able to apply knowledge to analyse concept of deflection, bending moment and shear force diagram in beams under various loading conditions.
- Determine shear stress in the shaft subjected to torsional moments.

### **(16CE112) FLUID MECHANICS & HYDRAULIC MACHINERY**

#### **Course Outcomes:**

After completion of this course the student will be able to,

- How to find frictional losses in a pipe when there is a flow between two places.
- Know types of flow and its measurements and applications.
- Identify the suitable pump required for different purposes.
- Classify the turbines and design criteria based on water availability.

### **(16EE207) BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

#### **PART – A**

#### **BASIC ELECTRICAL ENGINEERING**

#### **Course Outcomes:**

- After going through this course, the student gets a thorough knowledge on basics of Network theorems, two port networks, DC Motors and Transformers with which he/she can able to apply the above conceptual things to real-world problems and applications.

### **(16CE155) SOIL SCIENCE & SOIL MECHANICS**

#### **Course Outcomes:**

At the end of the course, students would be expected to:

- Fundamental knowledge of soil physical parameters.
- The procedures involved in soil survey, soil classification.
- The phase relationship and soil compaction.
- Concepts of bearing capacity and slope stability.

## **(16CE158) STRENGTH OF MATERIALS / SOIL MECHANICS LAB**

### **Course Outcomes:**

After completion of the course the student will be able to,

- Estimate Young's modulus, tensional rigidity of mild steel rods.
- Know the hardness of mild steel and HYS specimens.
- Analyze the strength of wood, concrete, stone and bricks.
- Assess the quality of wood, concrete, stone and bricks.

## **(16CE116) FLUID MECHANICS & HYDRAULIC MACHINERY LAB**

### **Course Outcomes:**

Students undergoing this course are able to

- Calibrate Venturimeter & Orificemeter
- Calculate losses in flows
- Estimate the efficiency of different pumps.
- Study the performance of different turbines.

## **(16CS503) DATA STRUCTURES THROUGH C**

### **Course Outcome:**

At the end of the course, students will be able to:

- Design algorithms to implement various data structures.
- Understand and program stacks and list data structures.
- Write programs to implement different types of queues.
- Understand and make use of hash tables in applications like dictionary, spell checker etc.,
- Understand why height balanced trees are advantageous over other data structures.

## **B. Tech II Year II Semester**

### **(16HS613) PROBABILITY & STATISTICS**

(Common to CE, AG, ME & CSE)

### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions.
- Have developed ability in writing in various contexts.
- Have acquired a proper level of competence for employability.

## **(16AG702) PRINCIPLES OF AGRONOMY AND SOIL SCIENCE**

### **Course Outcomes:**

After completion of the course the student will be able to:

- Different crops and cropping techniques
- Know the techniques to determine index properties and engineering properties such as shear strength, compressibility and permeability by conducting appropriate tests.

## **(16CE156) HYDROLOGY**

### **Course Outcomes:**

At the end of the course, students would be expected to:

- an understanding of the key drivers on water resources, hydrological processes and their integrated behavior incatchments,
- ability to construct and apply a range of hydrological models to surface water and groundwater problems including Hydrograph, Flood/Drought management, artificial recharge
- ability to conduct Spatial analysis of rainfall data and design water storagereservoirs

## **(16CE105) SURVEYING**

### **Course Outcomes:**

- be in a position to apply the basic principle of surveying and usage of surveying instruments in all civil engineering activities, including the construction of buildings, bridges, roads and high ways, pipe lines, dams, ports and harbors
- be an expert of demarcation of ownership and / or delimitation of land, property, etc. through surveyingprocess.
- surveying techniques to collect data for planning, designing and execution, able to employ greenfield.
- use total station and able to assess the electromagneticdistances.

## **(16ME344) THEORY OF MACHINES**

### **Course Outcomes:**

Students undergoing this course are able to

- Familiarity with common mechanisms used in machines and everydaylife.
- Identify different mechanisms, Inversions of kinematicchains
- Ability to perform analysis of different types of links, position, velocity, acceleration analyses.

## **(16ME345) TRACTOR AND AUTOMOTIVE ENGINES**

### **Course Outcomes:**

After completion of the course the student will be able to:

- Know the working principles of IC engines, auxiliary systems, the combustion aspects of SI and CI engines in addition to the methods of improvingperformance.
- Know the thermodynamic concepts in ICEngines.

## **(16CE157) SURVEYING LAB**

### **Course Outcomes:**

After completion of the course the student will be able to:

- Gain knowledge and expertise in operation of various survey instruments for computation of area of aland.
- Gains in accurate measurement of horizontal and vertical angles by theodolite and total station.
- Attains skills in computing the horizontal as well as vertical distance using tangential

tachometry and expertise in handling of dumpy level, theodolite and total station for developing contour maps and longer sighting of objective distance and difference in elevation.

### **(16AG703) AGRONOMY AND SOIL SCIENCE LAB**

#### **Course Outcomes:**

After completion of the course the student will be able to:

- Different crops and cropping techniques
- Know the techniques to determine index properties and engineering properties such as shear strength, compressibility and permeability by conducting appropriate tests.

### **(16HS614) COMPREHENSIVE SOFT-SKILLS**

#### **Course Outcomes:**

- To know the importance of Soft Skills.
- To apply Soft Skills in the different environment.
- To enrich the different levels of Soft Skills to develop their personality.

### **B. Tech III Year I Semester**

#### **(16AG704) AGRICULTURAL PROCESS ENGINEERING**

##### **Course outcomes:**

Students will be familiar with

- Be proficient in the use of processing machinery and scope of the process engineering.
- Be proficient in an ability to identify, formulate and solve engineering problems.
- Various basic terms related to machine design aspects.
- Some of the basic concepts related to food processing cleaning and grading of cereals.

#### **(16AG705) SOIL AND WATER CONSERVATION ENGINEERING**

##### **Course outcomes:**

Students will be familiar with

- Various basic terms related to Soil Erosions, Rainfall-Runoff relationships.
- Some of the basic concepts related to soil conservation.
- Simple terms related to soil loss estimation models.
- Recognize importance of various soil conservation structures and their designs.
- Understand the importance of hydrometry.

#### **(16AG706) IRRIGATION AND DRAINAGE ENGINEERING**

##### **Course outcomes:**

Students will be familiar with

- Various basic terms related to development of irrigation in India and AP and classification of irrigation projects.
- Some of the basic concepts related to water conservation.
- Simple terms related to soil loss estimation models.
- Recognize importance of various micro irrigation systems and designs.

- Understand the importance of drainage system, drainage problems.

### **(16AG707) FARM MACHINERY AND EQUIPMENT –I**

#### **Course outcomes:**

Students will be familiar with

- Apply basic knowledge of the Farm Mechanization importance.
- To apply the transplanting concepts into various fields
- Various basic terms related to seed metering mechanisms.
- Some of the basic concepts related to forces acting on tillage tools.
- Simple terms related to soil and machine.

### **(16ME307) ENGINEERING THERMODYNAMICS**

#### **Course Outcomes:**

Students undergoing this course are able to

- Apply the laws of thermodynamics to analyze thermal systems.
- Can understand the energy transformation from one system to another system.
- Can understand the working principles of I.C. Engines.

### **(16AG708) DESIGN OF AGRICULTURAL MACHINERY**

#### **Course outcomes:**

Students will be familiar with

- Be proficient in the use of software for analysis and design.
- Be proficient in an ability to identify, formulate and solve engineering problems.
- Various basic terms related to machine design aspects.
- Some of the basic concepts related to Fundamental units, Mass and Weight, inertia, Laws of motion, force, moment of force, couple mass density, torque, work, power and energy.

### **(16AG709) SOIL AND WATER CONSERVATION ENGINEERING (LAB)**

#### **Course outcomes:**

Students will be familiar with

- Various basic terms related to Soil Erosions, Rainfall-Runoff relationships.
- Some of the basic concepts related to soil conservation.
- Simple terms related to soil loss estimation models.
- Recognize importance of various soil conservation structures and their designs.
- Understand the importance of hydrometry.

### **(16AG710) IRRIGATION AND DRAINAGE ENGINEERING (LAB)**

#### **Course outcomes:**

Students will be familiar with

- Various basic terms related to development of irrigation in India and AP and classification of irrigation projects.
- Some of the basic concepts related to water conservation.
- Simple terms related to soil loss estimation models.
- Recognize importance of various micro irrigation systems and designs.
- Understand the importance of drainage system, drainage problems.



## **(16HS616) APTITUDE PRACTICE-I**

### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have developed the subtle way of approaching in the candidate.
- Have acquired the decision making with in notime.
- Have acquired logical thinking during professional tenure.
- Have obtained quick decision-making skills.

### **B. Tech III Year II Semester**

## **(16HS605) ENVIRONMENTAL STUDIES**

### **Course Outcomes:**

- Based on this course, the Engineering Student will be able to understand/evaluate/develop technologies on the basis of Ecological principles and environmental regulations along with Legislation, Laws and Policies which in turn help in sustainable development.
- Take preventive measures to reduce air, water, soil pollutions and contaminants in food.
- Effectively carry out waste disposal at individual level.
- Involve in preservation of natural resources.

## **(16AG711) AGRO INDUSTRIES AND BI-PRODUCT UTILIZATION**

### **Course outcomes:**

Studies will be familiar with

- Familiar about byproducts utilization and energy saving.
- Be familiar about oil production from byproducts.
- Production of paper and wax from agricultural wastes.
- Familiar about Planning waste management systems

## **(16AG712) FARM MACHINERY AND RENEWABLE ENERGY RESOURCES**

### **Course outcomes:**

Studies will be familiar with

- Apply basic knowledge of the Farm Mechanization importance.
- To apply the transplanting concepts into various fields
- Various basic terms related to seed metering mechanisms.
- Some of the basic concepts related to forces acting on tillage tools.
- Simple terms related to soil and machine.
- Apply knowledge about renewable energy sources and their importance in feature.
- Knowledge about biogas and gas production in simple ways.

## **(16ME343) HEAT & MASS TRANSFER**

### **Course outcomes:**

- Understand the basic laws of heat transfer.
- Account for the consequence of heat transfer in thermal analyses of engineering systems.
- Analyze problems involving steady state heat conduction in simple geometries.
- Develop solutions for transient heat conduction in simple geometries.
- Obtain numerical solutions for conduction and radiation heat transfer problems.
- Understand the fundamentals of convective heat transfer process.

## **(16AG713) TRACTOR SYSTEM AND CONTROLS**

### **Course outcomes:**

- Knowledge on systems like transmission system, types of clutch, types of gears, tractor power outlets like P.T.O., tractor stability testing tractor and ergonomic etc.,
- To impart knowledge about different systems in tractor.
- Identify different systems.

## **(16AG714) FARM MACHINERY AND RENEWABLE ENERGY RESOURCES (LAB)**

### **Course outcomes:**

Studies will be familiar with

- Apply basic knowledge of the Farm Mechanization importance.
- To apply the transplanting concepts into various fields
- Various basic terms related to seed metering mechanisms.
- Some of the basic concepts related to forces acting on tillage tools.
- Simple terms related to soil and machine.
- Apply knowledge about renewable energy sources and their importance in feature.
- Knowledge about biogas and gas production in simple ways.

## **(16AG715) WORKSHOP TECHNOLOGY (LAB)**

### **Course outcomes:**

Studies will be familiar with

- Utilize workshop tools for engineering practice.
- Employ skills for the production a component for real time applications.
- Appreciate the hard work and intuitive knowledge of the manual workers.

## **(16ME331) COMPUTER AIDED ENGINEERING (LAB)**

### **Course Outcomes:**

Students undergoing this course are able to

- Understanding the need of Group Technology as a means of bringing the benefits of mass production to relatively smaller production.

## **(16HS617) APTITUDE PRACTICE-II**

**(Common to All Branches)**

**Course Outcomes:**

At the end of the course, students would be expected to:

- Have developed the subtle way of approaching in the candidate.
- Have acquired the decision making with in notime.
- Have acquired logical thinking during professional tenure.
- Have obtained quick decision-making skills.

**B. Tech IV Year I Semester****(16MB750) MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS****Course outcomes:**

- The thorough understanding of Managerial Economics and Analysis of Financial Statements facilitates the Technocrats – cum – Entrepreneurs to take-up decisions effectively and efficiently in the challenging Business Environment.

**(16AG716) DAIRY AND FOOD ENGINEERING****Course outcomes:**

- Knowledge on milk and food processing unit operations offer strength to students to handle pasteurization, sterilization, packaging, etc. of dairy products and control spoilage of food through process operations such as evaporation, freezing, membrane processing etc.,

**(16AG717) GREENHOUSE TECHNOLOGY****Course outcomes:**

Studies will be familiar with

- Be proficient about identify the types and structures of existing greenhouse.
- Students will learn the different systems for climate control in greenhouse and their management.
- Familiar with the techniques of light management and CO<sub>2</sub> enrichment used for increasing and control crop production.

**(16ME325) REFRIGERATION & AIR CONDITIONING****Course Outcomes:**

Students undergoing this course are able to

- Upon completion of this course, the students can able to demonstrate the operations in different Refrigeration & Air conditioning systems and also able to design Refrigeration & Air conditioning systems.

## **(16AG718) MICRO IRRIGATION ENGINEERING**

### **Course outcomes:**

Studies will be familiar with

- Recognize importance of various micro irrigation systems and designs.
- Various basic terms related to development of irrigation in India and AP and classification of irrigation projects.
- Be proficient about planning and design of micro irrigation systems
- Various basic terms related to micro irrigation.
- Proficient about water saving techniques.

## **(16AG719) TRACTOR DESIGN AND TESTING (DEPARTMENT ELECTIVE-I)**

### **Course outcomes:**

Studies will be familiar with

- Be proficient in the use of software for analysis and design.
- Be proficient in an ability to identify, formulate and solve engineering problems.
- Various basic terms related to machine design aspects.

## **(16AG721) REMOTE SENSING & GIS APPLICATION (DEPARTMENT ELECTIVE-I)**

### **Course outcomes:**

On completion of the course the students will have knowledge on

- Principles of Remote Sensing and GIS
- Analysis of RS and GIS data and interpreting the data for modeling applications

## **(16CE145) ELEMENTS OF ROAD TRAFFIC SAFETY**

**(OPEN ELECTIVE)**

### **Course Outcomes:**

After completion of this course the student:

- Can clearly understand the accident scenario, causes and measure to be taken
- Can know the traffic regulations
- Can understand the parking problems and can give solutions
- Can get an awareness of traffic signs, signals and road markings
- Can understand the need of street light and their proper disposition on road

## **(16EE239) NEURAL NETWORKS & FUZZY LOGIC**

**(OPEN ELECTIVE)**

### **Course Outcomes:**

At the end of the course the student will be able to

- Understand the basic concept of biological neural networks
- Understand the basic concept of artificial neural networks
- Create Neural Network models.
- Understand the basic concepts of fuzzy logic.
- Create Fuzzy models.

### **(16EC443) MATLAB PROGRAMMING**

#### **Course Objectives:**

- Understand the MATLAB Desktop, Command window and the Graph Window Be able to do simple and complex calculation using MATLAB Be able to carry out numerical computations and analyses Understand the mathematical concepts upon which numerical methods Ensure you can competently use the MATLAB programming environment Understand the tools that are essential in solving engineering problems

### **(16CS511) DATABASE MANAGEMENT SYSTEMS (OPEN ELECTIVE)**

#### **Course Outcome:**

- Students can design the simple database, and can use the SQL instructions in developing the database applications.
- Can apply the ER concepts to design the databases.
- Advanced concepts like triggers, assertions and constraints can be applied effectively in designing the business applications

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Master of Business Administration**

**I MBA – I Semester**

**(16MB701) MANAGEMENT & ORGANIZATIONAL BEHAVIOUR**

**Course Outcomes:**

After the completion of course Students will be able to:

- Able to describe the basic principles, levels, skills of management and management theories and apply the concepts in real world.
- Analyze the various managerial functions to be performed and decision making in different contexts.
- Recognize, differentiate and assess for an individual, the concept of perception, values, attitudes and personality.
- Comprehend the various theories of motivation, leadership, and explore group dynamics for the benefit of the organizations.
- Apply leadership skills in different organizational contexts and lead the people.

**(16MB702) FINANCIAL ACCOUNTING& ANALYSIS**

**Course Outcomes:**

After the completion of course Students will be able to:

- Develop and understand the nature and purpose of financial statements in relationship to decision making.
- Determine the useful life and value of the depreciable assets.
- Recognize the relationship between the financing, investing and dividend decisions of the firm during the given point of time.
- Explain how cost volume profit analysis is to be applied by managers to answer various operating decisions, such as what level sales required to break even, how many units of Products are to be sold in order to earn a target level of profit.
- Gain an insight to a broad range of cost accounting concepts and their terminology

**(16MB704) STATISTICS FOR MANAGEMENT**

**Course Outcomes:**

After the completion of course Students will be able to:

- Implement managerial applications of statistical methods in business problems
- Measure a central value of an observation and variation of an observation with its central value

- Gain better numerical understanding and its key applications to make valid findings and conclusions of data that has collected through different sources.
- Relate all possible kinds of relationships of dependent variables with independent variables
- Formulate hypothesis and test the same with tools of hypothesis testing to draw a proper conclusions about population.

### **(16MB705) MANAGERIAL ECONOMICS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Assess the importance of micro economics in business management
- Assess the roles of managers as economists in firms
- Analyze the internal and external decisions to be made by managers
- Analyze the demand and supply conditions and assess the position of a company
- Design competitive strategies, including costing, pricing, product differentiation, according to the natures of products and the structures of the markets.

### **(16HS610) PROFESSIONAL ENGLISH**

#### **Course Outcomes:**

On successful completion of this course, the student will be able to

- Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
- Apply communication skills through various language learning activities.
- Analyze the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
- Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
- Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.
- Use effective communicative approaches by preparing job application, report and other kinds of writing correspondences.

### **(16MC849) FUNDAMENTALS OF COMPUTER AND INFORMATION SYSTEM**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate ability to create documents and Excel sheets for information storage
- Develop the documentation of using MS-Word.
- Sort the data and apply the mathematical calculation using MS-Excel.
- Develop the business presentation using MS-PowerPoint
- Gain an understanding of techniques of Google search engine.

## **(16HS607) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB**

### **Course Outcomes:**

- Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
- Apply communication skills through various language learning activities.
- Analyse the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
- Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
- Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

## **(16MC850) FUNDAMENTALS OF COMPUTER AND INFORMATION SYSTEM LAB**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate ability to create documents and Excel sheets for information storage
- Develop the documentation of using MS-Word.
- Sort the data and apply the mathematical calculation using MS-Excel.
- Develop the business presentation using MS-PowerPoint
- Gain an understanding of techniques of Google search engine.

## **I MBA. – II Sem.**

### **(16MB706) HUMAN RESOURCE MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding of the concept of human resource management and its relevance in organizations.
- Explain the current theory and practice of recruitment and selection. This includes but is not limited to the supply of human resource and the advantages and disadvantages of external and internal recruiting.
- Assess the relevant recruitment and selection, and performance appraisal methods to be used in different contexts.
- Develop, implement, and evaluate compensation, employee orientation, training, and development programs.
- Demonstrate the significance of contemporary issues such as diversity management, talent management and so on to both employers and employees

### **(16MB707) FINANCIAL MANAGEMENT**

#### **Course Outcomes:**



After the completion of course Students will be able to:

- Demonstrate the applicability of the concept of Financial Management; understand its objectives and role of a Financial Manager.
- Analyze and evaluate the investment decisions.
- Manage the working capital requirements of a firm
- Apply the Leverage and EBIT EPS Analysis associated with financial data of the firm
- Demonstrate an understanding of the Cost of capital.

### **(16MB709) MARKETING MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate strong conceptual knowledge in the functional area of marketing management.
- Develop an understanding of various facets of Marketing management
- Demonstrate the ability to take decisions and plan, develop, execute and control marketing strategies
- Ensure various marketing programs for the attainment of organizational marketing goals.
- Demonstrate analytical skills in identification and resolution of problems pertaining to marketing management.

### **(16MB710) BUSINESS RESEARCH METHODS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop understanding on various kinds of business research concepts.
- Gain knowledge on Research process and hypothesis development with different research design.
- Demonstrate adequate knowledge on sampling procedure and data collection methods.
- Apply knowledge of measurement & scaling techniques as well as the quantitative data analysis for research problems.
- Assess the importance of Research Report writing in systematic way.

### **(16MB711) OPERATIONS MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Identify the elements of operations management and various transformation processes to enhance productivity and competitiveness.
- Analyze and evaluate various facility alternatives and their capacity decisions.

- Develop a balanced line of production & scheduling and sequencing techniques in operation environments
- Develop aggregate capacity plans and MPS in operation environments.
- Plan and implement suitable materials handling principles and practices in the operations.

### **(16MB712) MANAGEMENT INFORMATION SYSTEMS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the importance of information system in decision making.
- Determine information system requirements for all management levels by describing the differences between various types of information systems.
- Apply probability theory in decision making situations.
- Apply an ERP system to manage a company.
- Implement and evaluate all aspects management information systems

### **(16MB713) WORLD TRADE ORGANIZATION & INTELLECTUAL PROPERTY RIGHTS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Identify different types of Intellectual Properties (IPs), the right of ownership, scope of protection as well as the ways to create and to extract value from IP
- Recognize the crucial role of IP in organizations of different industrial sectors for the purposes of product and technology development
- Identify activities and constitute IP infringements and the remedies available to the IP owner
- Describe the precautions steps to be taken to prevent infringement of proprietary rights in products and technology development.
- Be familiar with the processes of Intellectual Property Management (IPM) and various approaches for IPM and conducting IP and IPM auditing and explain how IP can be managed as a strategic resource and suggest IPM strategy.
- Be able to anticipate and subject to critical analysis arguments relating to the development and reform of intellectual property right institutions and their likely impact on creativity and innovation.

### **(16MB714) CROSS CULTURAL MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Appreciate the critical role of culture in international business and the importance of managing cultural differences

- Analyze the interacting spheres of culture including organizational culture, professional culture, national culture, and industry culture.
- Discern the influence of culture on different functions of management including communication, negotiation, marketing, leadership, motivation, human resource management and teams.
- Display an understanding of cultural difference in interactions with different nationalities and an awareness of and sensitivity to cross-cultural issues.
- Understand and explain issues of cultural awareness when conducting international business
- Build mind-set and skill-set of a competent leader who appreciates and leverages diversity in talents and organizations s/he works with

### **(16MB715) BUSINESS COMMUNICATION LAB**

#### **Course Outcomes:**

- Remember and understand the different aspects of the English language proficiency with emphasis on LSRW skills.
- Apply communication skills through various language learning activities.
- Analyse the English speech sounds, stress, rhythm, intonation and syllable division for better listening and speaking comprehension.
- Evaluate and exhibit acceptable etiquette essential in social and professional Settings.
- Create awareness on mother tongue influence and neutralize it in order to improve fluency in spoken English.

### **(16MB716) INDUSTRY ANALYSIS REPORT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an understanding of the dynamics of a specific industry.
- Compare various issues particular to an industry.
- Develop cross-functional perspective of the functioning of a business enterprise and an industry.
- Develop awareness about the future prospective problems based on secondary source of data.
- Learn and examine the trends of growth or decline in industry.
- Analyze the issues of an industry and an enterprise with respect to set basic parameters

### **(COE-II) COMPREHENSIVE ONLINE EXAMINATION-II**

#### **Course Outcomes:**

- 1 Identify some of the traps to avoid when setting up a new business
- 2 Engage with like-minded professionals online

- 3 Prepare a business plan for the bank
- 4 Analyse your online competition
- 5 Demonstrate how to pin a photo on Pinterest

### **(16HS619) HUMAN VALUES AND PROFESSIONAL ETHICS FOR MANAGER**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the moral issues in a society to live in harmony in the society
- Maintain professional, personal ethics and avoid discriminatory practices.
- Handle ethical dilemmas in various functional disciplines and live in balance with environment
- Realize the significance of mutual trust and abiding by the code of conduct in the organizations and as well in the society.
- Gain an insight into ethics, responsibilities, code of conduct in organizations.

#### **II MBA. – I Sem.**

### **(16MB717) BUSINESS ETHICS AND CORPORATE GOVERNANCE**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Apply various ethical principles in business and corporate social responsibility practices
- Recognize how personal ethics can influence behavior and apply in decision making
- Explain the ethical challenges facing the various functional departments
- Identify the organizational and cultural variables that impact ethical judgment
- Analyze various ethical codes in corporate governance
- Identify organizational policies and systems that employ ethical conduct

### **(16MB718) ENTREPRENEURSHIP DEVELOPMENT.**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Discern distinct entrepreneurial traits and identify the successful elements of successful entrepreneurial ventures
- Consider the legal and financial conditions for starting a venture and to assess the opportunities and constraints for new ventures
- Design strategies for the successful implementation of ideas
- Comprehend the evaluation of business opportunity from the prospective of an investor
- Identify the most suitable sources of finance for start-ups

- Write and execute their own business plan

### **(16MB719) BUSINESS LAWS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an insight into various laws in the country to regulate business aspects
- Identify the legal principles in making contractual agreements.
- Recognize the importance of business law in economic, political and on social context.
- Analyze the legal issues involved in the formation and winding up of a company.
- Explain to compute Income Tax and various forms of Taxes.

### **(16MB720) SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about investment management and trading securities
- Examine and value the major investment vehicles and strategies to allocate funds
- Make decisions of allocation and selection of assets based on trade-off between risk and return, risk mitigating tools and investment avenues.
- Define the objectives in constructing and managing a portfolio and learn to create an investment policy statement.
- Develop knowledge of modern portfolio theory and effect of diversification on investment portfolios
- Gain knowledge to measure and evaluate portfolio performance and to manage the risk.
- 

### **(16MB721) SALES AND DISTRIBUTION MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an understanding about the roles and responsibilities of the Sales Managers
- Manage and enhance the sales force productivity and performance.
- Get an insight towards distribution channels, their organization structures and to make value addition to channels.
- Plan and implement an effective sales strategy for their organizations.
- Design and implement distribution channel strategy.
- Manage the Channels efficiency and effectiveness across countries

### **(16MB722) PERFORMANCE MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an insight towards performance management and performance appraisal.

- Compare and contrast various organizational performance management programs and best practices and define attributes of effective performance management systems.
- Assess how increased employee involvement can contribute to effective performance and coach employees to identify career paths and resources available to support individual development.
- Practically experience a number of tools which are critical to the new performance management systems.
- Realize the value of and drawbacks of modern performance management systems such as 360, MBO conducted in the organizations.
- Develop an understanding towards the issues involved in effective performance management

### **(16MB723) ENTERPRISE RESOURCE PLANNING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Make basic use of Enterprise software, and its role in integrating business functions
- Analyze the strategic options for ERP identification and adoption.
- Develop and design the modules used in ERP systems
- Create reengineered business processes for successful ERP implementation.
- Customize the existing modules of ERP systems.
- Examine the places where formal development approaches of ERP systems can be fruitful and where they may not be so helpful.

### **(16MB724) RISK MANAGEMENT AND INSURANCE**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the Principles, essential features and objectives of risk management.
- Gain knowledge of the range of financial and financial related risks facing organizations.
- Examine the role of public policy including social insurance in personal financial planning and risk management.
- Determine approach to risk management through risk identification, risk measurement and risk management (or mitigation)
- Identify, understand operational risk and how to manage it.
- Assess significance of insurance policies and calculation of insurance premiums for living and non – living objects.

### **(16MB725) ADVERTISING AND SALES PROMOTION MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about various types of advertising and its forms.
- Realize the significance of advertising agency and the client agency relationship through selection of media
- Handle advertising budget and measure the effectiveness of advertising.
- Comprehend the values and ethics in advertising and apply in practice
- Identify various suitable sales promotion tools and techniques for various groups
- Organize and measure the effectiveness of sales promotion campaigns.

### **(16MB726) KNOWLEDGE MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the key theories and models that inform knowledge management
- Critically apply theory to organisations in order to identify and justify effective knowledge management strategies and activities
- Access and evaluate essentials relating to knowledge management
- Communicate clearly and implement effectively varying formats and technologies
- Design problem solutions based upon research findings and critical assessment of current theory and practice
- Develop an insight towards the future of knowledge management from industry perspective

### **(16MB727) DATA WAREHOUSING AND MINING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an understanding towards Data Warehouse fundamentals, Data Mining Principles
- Design data warehouse with dimensional modeling and apply OLAP operations.
- Identify appropriate data mining algorithms to solve real world problems
- Compare and evaluate different data mining techniques like classification, prediction, clustering and association rule mining
- Describe complex data types with respect to spatial and web mining.
- Apply and select suitable methods for data analysis.

### **(16MB728) FINANCIAL INSTITUTIONS, MARKETS AND SERVICES**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate an awareness of the current structure and regulation of the Indian financial services sector.

- Apply concepts relevant to financial markets and financial institutions, such as the flow of funds, levels of interest rates and interest rate differentials
- Identify the functions of financial markets and institutions and examine their impact on the level of interest rates and interest differentials.
- Describe the instruments, participants and operation of the money market and role of intermediaries in the primary market
- Explore the integration of international financial markets and analyze the implications for financial managers.
- Evaluate and create strategies to promote financial products and services

### **(16MB729) CUSTOMER RELATIONSHIP MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate how knowledge of consumer behaviour can be applied to marketing.
- Identify and explain factors which influence consumer behaviour.
- Relate internal dynamics such as personality, perception, learning motivation and attitude to the choices consumers make.
- Realize the principal factors that influence consumers as individuals and decision makers with an application to the buying decision process.
- Develop marketing strategies that are consumer based and create and enhance customer
- Discern the concept of Consumerism and legislative responses to consumerism, and marketer responses to consumer issues

### **(16MB730) TRAINING AND DEVELOPMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the role of training and development in human resources management.
- Describe the psychology of the learning process on which training is based.
- Analyze the training needs of an organization.
- Assess, design, access and implement various methods, techniques and sources of training.
- Evaluate the value of the training once completed from the individual employee and the organization's viewpoint.
- Develop an appropriate training strategy for today's organization

### **(16MB731) SUPPLY CHAIN MANAGEMENT**

#### **Course Outcomes:**



After the completion of course Students will be able to:

- Appreciate the evolution and identify the role of supply chain management in the economy
- Identify and evaluate the drivers of supply chain management
- Analyze the importance of make or buy decisions and identify appropriate suppliers
- Appraise the importance of supply chain networks
- Assess the risk associated with supply chain practices and take better decisions
- Familiarize with and apply various computer based supply chain optimization tools

### **(16MB732) MANAGEMENT CONTROL SYSTEMS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the role of cost accounting in the business management of manufacturing and non- manufacturing companies.
- Apply accounting methods of cost calculation and interpret cost accounting statements.
- Analyze and evaluate information for cost ascertainment, planning, control and decision making
- To know the various stock valuation methods adopted by various business organisations.
- Gain an understanding between the relationship between cost accounting, financial accounting and management accounting role in decision making.
- Prepare a budget and use budgets for performance evaluation after flexing the budget.

### **(16MB733) PRODUCT AND BRAND MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Gain an insight into the fundamental concepts of product and brand development
- Use the brand positioning framework to develop a brand, keep it relevant, expand a brand internationally, and reposition a brand
- Use tools and metrics to measure branding and interpret brand performance
- Recognize the importance of using branding strategies in an organization.
- Develop an understanding about the differences in branding to various sectors
- Assess and apply branding strategies to various products across different sectors.

### **(16MB734) HUMAN RESOURCE PLANNING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about how to plan for human resources and implement techniques of man power forecasting and inventorying

- Analyze the role of recruitment and selection in relation to the organization's business
- Competency to recruit, select and appraise the performance of the employees
- Handle employee issues such as employee separation and evaluate new trends in managing the staff in organizations
- Appraise succession plans and critical staffing objectives and evaluate the complexities of downsizing issues and the role of HR planning in the process of downsizing
- Develop appropriate technologies and management patterns to improve business

### **(16MB735) E – BUSINESS**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop <sup>an</sup> understanding about the E- Markets and E- business infrastructure and trends
- Identify various procurement methods, their benefits and risks and assess different options for integration of organizations' information systems with e-procurement suppliers.
- Analyze different types of portal technologies and deployment methodologies commonly used in the industry for security and reliability of E- business.
- Analyze the effectiveness of network computing and cloud computing policies in a multi-location organization.
- Analyze real business cases regarding their e-business strategies and transformation processes and choices.
- Integrate theoretical frameworks with business strategies.

### **(16MB736) BUSINESS SIMULATION LAB**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the EXCEL lessons
- Get familiarize with basic to intermediate skills for using Excel in the classroom vis-à-vis Business Applications
- Hands on experience on MS Excel Utilities
- Create solutions for Data Management and Reporting
- Gain an understanding about the SPSS and experts in handling data files and carry out basic statistical analysis
- Test basic hypothesis using t tests, Chi Square tests and ANOVA.

### **(COE-III) COMPREHENSIVE ONLINE EXAMINATION-III**

#### **Course Outcomes:**

- 1 Identify some of the traps to avoid when setting up a new business
- 2 Engage with like-minded professionals online

- 3 Prepare a business plan for the bank
- 4 Analyse your online competition
- 5 Demonstrate how to pin a photo on Pinterest

### **(16HS616) APTITUDE TEST-I**

#### **Course Outcomes:**

- Plan, and engage in, an independent and sustained critical investigation and evaluation of a chosen research topic relevant to environment and society
- Systematically identify relevant theory and concepts, relate these to appropriate methodologies and evidence, apply appropriate techniques and draw appropriate conclusions
- Engage in systematic discovery and critical review of appropriate and relevant information sources
- Appropriately apply qualitative and/or quantitative evaluation processes to original data
- Understand and apply ethical standards of conduct in the collection and evaluation of data and other resources
- Communicate research concepts and contexts clearly and effectively both in writing and orally

#### **II MBA – II Sem.**

### **(16MB737) STRATEGIC MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Describe major theoretical concepts, background work and research output in the field of strategic management.
- Develop an understanding of the strategic management process and the functional strategies
- Conduct analysis using various tools and frameworks to make strategic decisions
- Explain the basic concepts, principles and practices associated with strategy formulation and implementation
- Analyze various strategies and explore appropriate strategic implementation at business and corporate levels
- Analyze and evaluate critically real life company situations and develop creative solutions, using a strategic management perspective

### **(16MB738) ENVIRONMENTAL BUSINESS MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Demonstrate an understanding of comprehensive systemic analysis across both physical and behavioural dimensions involving society, the environment, and the economy.
- Analyze the role of environmental sustainability in the promotion of comprehensive justice and equity.
- Gain an insight towards the basic sustainability concepts of evolutionary processes, inter-generational debt, socio-political adaptation, climate change, ecosystem services, and environmental justice
- Articulate a comprehensive world view that integrates diverse approaches to sustainability.
- Realize the significance of environmental reporting and green product management
- Identify how globalized processes impact socio ecological systems. Develop appropriate technologies and management patterns to create harmony with the environment

### **(16MB739) FINANCIAL DERIVATIVES**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the various financial derivative securities (Futures, Forwards and Options).
- Describe standard derivative contracts, their properties and functionality.
- Analyze the role and relationship between forward and futures prices.
- Apply scientific methods for valuation of options and other derivatives, in continuous and discrete time.
- Interpret and apply risk measures that are commonly used in risk management.
- Describe how swaps can reduce market risks and use a simulation to assess a risk hedging strategy based on interest rate swaps

### **(16MB740) SERVICES MARKETING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding understand the characteristics of services, understand consumer behavior in services, align service design and standards, delivering service, managing services promises
- To segment markets for services and create value in the market for new services
- Implement pricing and promotion strategies for services
- Focus on the role of marketing communication and set communication strategies for service marketing
- Plan and execute the delivery of services based on the requirement.
- Develop appropriate strategies for marketing of the services

## **(16MB741) ORGANIZATIONAL DEVELOPMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding and appreciation of the various concepts of organizational development
- Learn how to apply some of the key concepts and tools organizational development and change leadership and management.
- Discuss and analyze diagnostic tools used to assess organizational effectiveness.
- Identify major types of organizational development interventions.
- Demonstrate how to evaluate organizational development interventions
- Apply human resource intervention techniques in different management scenarios.

## **(16MB742) DATA COMMUNICATION AND NETWORK ANALYSIS**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Explain the concept of Data communication and networks, layered architecture and their applications
- Evaluate data communication link considering elementary concepts of data link layer protocols for error detection and correction.
- Analyse and Set up protocol designing issues for Communication networks.
- Apply various network layer techniques for designing subnets and supernets and analyse packet flow on basis of routing protocols.
- Estimate the congestion control mechanism to improve quality of service of networking application
- Understand and design application layer protocols and internet applications such as network security

## **(16MB743) INTERNATIONAL FINANCIAL MANAGEMENT**

### **Course Outcomes:**

After the completion of course Students will be able to:

- Analyse, apply and evaluate information within the global financial environment of foreign exchange to solve problems and make informed decisions.
- Review the problems of dealing in foreign currency and the advantages and disadvantages of overseas funding
- Demonstrate the use of foreign exchange derivatives and other methods to manage foreign exchange exposure and risk
- Describe the issues pertaining to cross-border investment decisions and financing MNCs

- Analyse the complexities associated with management of cost of funds in the capital Structure in MNCs
- Analyse, evaluate and synthesize both quantitative and qualitative financial information to influence problem solving and decision making

### **(16MB744) INTERNATIONAL MARKETING**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the major issues related to international marketing
- To assess an organization's ability to enter and analyse various strategies to enter and compete in international markets
- Identify and analyse opportunities within international marketing environments
- Handle new product development and branding in international markets
- Realize the factors that affect the distribution channels and structures in international markets and take appropriate decisions
- Develop an understanding towards the procedures and documentation in the export and import process in the country and apply in practice

### **(16MB745) GLOBAL HUMAN RESOURCE MANAGEMENT**

#### **Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about importance of Human resource at international level and also identify the differences between domestic and international human resource management
- To understand and assess the various cultural and human variables that influence in the workplace.
- Understand the nature, sources and different methods for recruiting people at international level and apply them along with compensation of human resources based on their skills.
- Perform the functional roles of HRM in International context especially in recruitment and selection, performance management, training, learning and development and repatriation.
- Apply different appraisal methods and trainings that are available for International staffing.
- Assess about the industrial relations in other nations and also to manage people in different locations.

### **(16MB746) CORPORATE INFORMATION MANAGEMENT**

**Course Outcomes:**

After the completion of course Students will be able to:

- Define an information system from both a technical and business perspective and distinguish between computer literacy and information systems literacy
- Identify the major management challenges to building and using information systems in organizations
- Identify managerial risks related to information system organization processing and utilizing
- Explain how enterprise systems and industrial networks create new efficiencies for businesses
- Apply outsourcing of business activities and manage the risk and relationship with outsourcing agencies
- Highlight the role of projects in modern day business organizations and sensitize the complexities of project management.

**(16MB747) SEMINAR (CONTEMPORARY ISSUES ON BUSINESS)****Course Outcomes:**

After the completion of course Students will be able to:

- Develop an understanding about the issues in the business enterprises across various industrial sectors
- Practice and maintain communication, logical and analytical skills learnt in the MBA program
- Construct new ability to practice new problem solving skills and use these skills in personal life.
- Demonstrate necessary skills to handle day-to-day managerial responsibilities, such as making speeches, giving effective presentations and maintaining one's poise in private and public
- Develop proactive thinking to perform effectively in the dynamic socio economic business systems
- Learn the etiquette essentials to perform in various communication roles as business managers

**(16MB748) PROJECT WORK****Course Outcomes:**

- Plan, and engage in, an independent and sustained critical investigation and evaluation of a chosen research topic relevant to environment and society
- Systematically identify relevant theory and concepts, relate these to appropriate methodologies and evidence, apply appropriate techniques and draw appropriate conclusions

- Engage in systematic discovery and critical review of appropriate and relevant information sources
- Appropriately apply qualitative and/or quantitative evaluation processes to original data
- Understand and apply ethical standards of conduct in the collection and evaluation of data and other resources
- Communicate research concepts and contexts clearly and effectively both in writing and orally

#### **(COE-IV) COMPREHENSIVE ONLINE EXAMINATION-IV**

##### **Course Outcomes:**

- 1 Identify some of the traps to avoid when setting up a new business
- 2 Engage with like-minded professionals online
- 3 Prepare a business plan for the bank
- 4 Analyse your online competition
- 5 Demonstrate how to pin a photo on Pinterest



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY  
(AUTONOMOUS)**

**Master of Computer Applications**

**I MCA – I Semester**

**(16HS601) FUNCTIONAL ENGLISH**

**Course Outcomes:**

Students will be able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively.
- Articulate well among themselves and with Faculty.
- Construct compound sentences using common conjunctions.
- Manage to organize and deliver oral presentations.
- Demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively.

**(16HS613) PROBABILITY & STATISTICS**

**Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability

**(16HS618) MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE**

**Course Outcomes:**

At the end of the course, students would be expected to:

- Have acquired ability to participate effectively in group discussions
- Have developed ability in writing in various contexts
- Have acquired a proper level of competence for employability

**(16MC801) COMPUTER PROGRAMMING AND PROBLEM SOLVING**

**Course Outcomes:**

Upon completion of the subject, students will be able to

- Student can effectively apply problem solving techniques in designing the solutions for a wide range of problems.
- Write, compile and debug programs in C language.
- Design programs involving decision structures, loops and functions.
- Explain the difference between call by value and call by reference
- Understand the dynamics of memory by the use of pointers.

### **(16MC802) COMPUTER ORGANIZATION**

#### **Course Outcomes:**

- Able to design digital circuits by simplifying the Boolean functions
- Able to understand the organization and working principle of computer hardware components
- Able to understand mapping between virtual and physical memory
- Acquire knowledge about multiprocessor organization and parallel processing
- Able to trace the execution sequence of an instruction through the processor

### **(16HS607) ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB**

#### **Course outcomes:**

- To become active participants in the learning process and acquire proficiency in spoken English.
- To speak with clarity and confidence thereby enhances employability skills.
- To prepare effective job application

### **(16MC803) P. C. SOFTWARE LAB**

#### **Course Outcomes:**

- Able to disassemble and assemble the PC back to working condition.
- Able to know installation of softwares.
- Able to understand mapping between virtual and physical memory.
- Able to know Software troubleshooting and Hardware Troubleshooting.
- Able to work on MS Office tools

### **(16MC804) C PROGRAMMING LAB**

#### **Course Outcomes:**

Upon completion of the subject, students will be able to

- Write, compile and debug programs in C language.
- Apply Problem solving techniques to find solutions to problems.
- Ale to use C language features effectively and implement solutions using C language.
- Able to improve logical skills.
- Design programs involving decision structures, loops and functions.
- Explain the difference between call by value and call by reference
- Understand the dynamics of memory by the use of pointers.
- Design programs involving files.

### **I MCA – II Semester**

### **(16HS610) PROFESSIONAL ENGLISH**

#### **Course Outcomes:**

Students will be able to

- Use LSRW skills through the prescribed text and develop their ability to communicate effectively

- Articulate well among themselves and with Faculty.
- Construct compound sentences using common conjunctions.
- Manage to organize and deliver oral presentations.
- Demonstrate the skills needed to participate in a conversation that builds knowledge Collaboratively

### **(16MB749) ACCOUNTING & FINANCIAL MANAGEMENT**

#### **Course Outcomes:**

- This course is designed to introduce students to the principles, concepts, and applications of financial accounting and management.

### **(16MC805) OOPS THROUGH JAVA**

#### **Course Outcomes:**

Students who have completed this course able to:

- Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Have the ability to write a computer program to solve specified problems.
- Able to do the java collection framework programs.
- Work with GUI, Event handling mechanism.

### **(16MC806) DATA STRUCTURES**

#### **Course Outcomes:**

- Learn how to use data structure concepts for realistic problems.
- Ability to identify appropriate data structure for solving computing problems in C language.
- Ability to solve problems independently and think critically.

### **(16MC807) DATABASE MANAGEMENT SYSTEMS**

#### **Course Outcomes:**

- Understand the basic concepts of the database and data models.
- Design a database using ER diagrams and map ER into Relations and normalize the relations.
- Acquire the knowledge of query evaluation to monitor the performance of the DBMS.
- Develop a simple database applications using normalization.
- Acquire the knowledge about different special purpose databases and to critique how they differ from traditional database systems.

## **(16MC808) JAVA PROGRAMMING LAB**

### **Course Outcomes:**

After completion of this course, the students would be able to

- Understand programming language concepts, particularly Java and object-oriented concepts.
- Write, debug, and document well-structured Java applications
- Implement Java classes from specifications
- Effectively create and use objects from predefined class libraries
- Understand the behavior of primitive data types, object references, and arrays
- Apply decision and iteration control structures to implement algorithms
- Write simple recursive algorithms
- Implement interfaces, inheritance, and polymorphism as programming techniques.
- Implement Java collection framework as programming techniques.

## **(16MC809) DATA STRUCTURES THROUGH C LAB**

### **Course Outcomes:**

At the end of this lab session, the student will

- Be able to design and analyze the time and space efficiency of the data structure ·
- Be capable to identify the appropriate data structure for given problem · Have practical knowledge on the applications of data structures

## **(16MC810) DATABASE MANAGEMENT SYSTEMS LAB**

### **Course Outcomes:**

- Able to master the basic concepts and understand the applications of database systems.
- Able to construct an Entity-Relationship (E-R) model from specifications and to transform to relational model.
- Able to construct unary/binary/set/aggregate queries in Relational Algebra.
- Understand and apply database normalization principles.
- Able to construct SQL queries to perform CRUD operations on database. (Create, Retrieve, Update, Delete)
- Understand principles of database transaction management, database recovery, security.

## **(16HS616) APTITUDE PRACTICE-I**

### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have developed the subtle way of approaching in the candidate.
- Have acquired the decision making with in no time.
- Have acquired logical thinking during professional tenure.
- Have obtained quick decision making skills.

## II MCA – I Semester

### (16MC811) COMPUTER NETWORKS

#### Course Outcomes:

- Able to trace the flow of information from one node to another node in the network
- Able to Identify the components required to build different types of networks
- Able to understand the functionalities needed for data communication into layers
- Able to choose the required functionality at each layer for given application
- Able to understand the working principles of various application protocols
- Acquire knowledge about security issues and services available

### (16MC812) OBJECT ORIENTED ANALYSIS AND DESIGN (USING UML)

#### Course Outcomes:

- Understand the basic concepts to identify state & behavior of real world objects
- Able to learn the various object oriented methodologies and choose the appropriate one for solving the problem with the help of various case studies
- Understand the concept of analysis, design & testing to develop a document for the project
- Able to implement analysis, design & testing phases in developing a software project

### (16MC813) OPERATING SYSTEMS

#### Course Outcomes:

- Able to understand the operating system components and its services
- Implement the algorithms in process management and solving the issues of IPC
- Able to demonstrate the mapping between the physical memory and virtual memory
- Able to understand file handling concepts in OS perspective
- Able to understand the operating system components and services with the recent OS

### (16MC814) LINUX PROGRAMMING

#### Course Outcomes:

- Work confidently in Linux environment.
- Work with shell script to automate different tasks as Linux administration

### (16MC815) DATA WAREHOUSING AND MINING

#### Course Outcomes:

Upon Completion of the course, the students will be able to

- Store voluminous data for online processing
- Preprocess the data for mining applications
- Apply the association rules for mining the data
- Design and deploy appropriate classification techniques
- Cluster the high dimensional data for better organization of the data
- Discover the knowledge imbibed in the high dimensional system

- Evolve Multidimensional Intelligent model from typical system
- Evaluate various mining techniques on complex data objects

#### **(16MC816) UML LAB**

#### **(16MC817) OPERATING SYSTEMS AND LINUX PROGRAMMING LAB**

##### **Course Outcomes:**

Upon completion of this course the students should:

- Understand process management, concurrent processes and threads, memory management, virtual memory concepts, deadlocks
- Compare performance of processor scheduling algorithms
- Produce algorithmic solutions to process synchronization problems

#### **(16MC818) DATA WAREHOUSING AND MINING LAB**

##### **Course Outcomes:**

After undergoing the course students will be able to

- Synthesize the data mining fundamental concepts and techniques from multiple perspectives.
- Develop skills and apply data mining tools for solving practical problems
- Advance relevant programming skills.
- Gain experience and develop research skills by reading the data mining literature.

#### **AUDIT COURSE**

#### **(16HS614) COMPREHENSIVE SOFT SKILLS**

##### **Course Outcomes:**

- To know the importance of Soft Skills.
- To apply Soft Skills in the different environment.
- To enrich the different levels of Soft Skills to develop their personality.

### **II MCA – II Semester**

#### **(16MC819) SOFTWARE ENGINEERING**

##### **Course Outcomes:**

- Get an insight into the processes of software development
- Able to understand the problem domain for developing SRS and various models of software engineering
- Able to Model software projects into high level design using DFD diagrams
- Able to Measure the product and process performance using various metrics
- Able to Evaluate the system with various testing techniques and strategies

## **(16MC820) WEB TECHNOLOGIES**

### **Course Outcomes**

Student be able to:

- Do the server side programming, maintain sessions.
- Establish the DB connections and access the data.
- Design pages using PHP and AJAX.

## **(16MC821) COMPUTER GRAPHICS**

### **Course Outcomes:**

- Gain proficiency in 3D computer graphics API programming
- Enhance the perspective of modern computer system with modeling, analysis and interpretation of 2D and 3D visual information

## **(16MC822) BIG DATA ANALYTICS DEPARTMENT ELECTIVE – I**

### **Course Outcomes:**

The students will be able to:

- Work with big data platform
- Analyze the big data analytic techniques for useful business applications.
- Design efficient algorithms for mining the data from large volumes.
- Analyze the HADOOP and Map Reduce technologies associated with big dataanalytics
- Explore on Big Data applications Using Pig and Hive
- Understand the fundamentals of various bigdata analysis techniques

## **(16MC823) NEURAL NETWORKS& FUZZY LOGIC**

### **Course Outcomes:**

- Understand basic knowledge of fuzzy sets and fuzzy logic.
- Apply basic fuzzy inference and approximate reasoning.
- Understand principles of neural networks.
- Apply basic fuzzy system modelling methods.

## **(16MC824) DISTRIBUTED SYSTEMS**

### **Course Outcomes:**

After completion of this course, the student is:

- Able to explain what a distributed system is, why you would design a system as a distributed system, and what the desired properties of such systems are;
- Able to list the principles underlying the functioning of distributed systems, describe the problems and challenges associated with these principles, and evaluate the

- effectiveness and shortcomings of their solutions;
- Able to recognize how the principles are applied in contemporary distributed systems, explain how they affect the software design, and be able to identify features and design decisions that may cause problems;
  - Able to design a distributed system that fulfills requirements with regards to key distributed systems properties (such as scalability, transparency, etc.), be able to recognize when this is not possible

**(16MC825) SERVICE ORIENTED ARCHITECTURE  
(DEPARTMENT ELECTIVE – I)**

**Course Outcomes:**

- Known about the basic principles of service oriented architecture , its components and techniques
- Understand the architecture of web services
- Able to design and develop web services using protocol
- Understand technology underlying the service design
- Acquire the fundamental knowledge of cloud computing

**(16MC826) INFORMATION SECURITY  
(DEPARTMENT ELECTIVE-II)**

**Course Outcomes:**

- Apply cryptographic algorithms for encrypting and decryption for secure data transmission
- Understand the importance of Digital signature for secure e-documents exchange
- Understand the program threats and apply good programming practice
- Get the knowledge about the security services available for internet and web applications
- Gain the knowledge of security models and published standards

**(16MC827) SOCIAL NETWORKS AND SEMANTIC WEB  
(DEPARTMENT ELECTIVE – II)**

**Course Outcomes:**

- Understand semantic web basics, architecture and technologies
- Able to represent data from a chosen problem in XML with appropriate semantic tags obtained or derived from the ontology
- Able to understand the semantic relationships among these data elements using ResourceDescription Framework (RDF)
- Able to design and implement a web services application that “discovers” the data



and/or other web services via the semantic web

- Able to discover the capabilities and limitations of semantic web technology for social networks

**(16MC828) GEOLOGICAL INFORMATION SYSTEMS  
(DEPARTMENT ELECTIVE – II)**

**Course Outcomes:**

- Understand GIS concepts and spatial data representation
- Able to design spatial data input in raster form as well as vector form
- Understand vector data analysis and output functions
- Understand raster data geo processing
- Able to design a GIS model for real world problem

**(16MC829) .NET TECHNOLOGIES  
(DEPARTMENT ELECTIVE – II)**

**Course Outcomes:**

- Aware of .net framework components.
- Creating simple data binding applications in VB using ADO.Net connectivity.
- Able to create a web form application using c#.
- Performing Database operations for windows form.
- Able to create a web applications.
- Creating user interactive web pages.

**(16MC830) SOFTWARE ENGINEERING LAB**

**Course Outcomes:**

- Able to prepare various phases of Spiral model.
- Able to draw E-R diagram, DFD, UML diagrams for the project
- Able to develop PERT and CPM project schedule methods.
- Able to analyze and prepare RMMM plan.

**(16MC831) WEB TECHNOLOGIES LAB**

**Course Outcomes**

Student is able to:

- Design and work with HTML5 and CSS applications.
- Usage of javascript functions and objects.
- Do the server side programming, maintain sessions.
- Establish the DB connections and access the data.
- Ability to work on Java Server Page
- Design pages using PHP and AJAX.

### **(16MC832) COMPUTER GRAPHICS LAB**

#### **Course Outcomes:**

- Able to analyze the basic concepts of computer graphics.
- Able to design scans conversion problems using C programming.
- Able to implement Line, circle and ellipse algorithms
- Able to implement clipping and filling techniques for modifying an object.
- Able to analyze and implement the concepts of different typeof geometric transformationoperations on objects in 2D and 3D.
- Able to implement the practical programs of modeling, viewing of objects in 2D

### **AUDIT COURSE**

#### **(16HS617) APTITUDE PRACTICE – II**

#### **Course Outcomes:**

At the end of the course, students would be expected to:

- Have developed the subtle way of approaching in the candidate.
- Have acquired the decision making with in no time.
- Have acquired logical thinking during professional tenure.
- Have obtained quick decision making skills.

### **III MCA – I Semester**

#### **(16MC833) SOFTWARE TESTING**

#### **Course Outcomes:**

- Test the software by applying testing techniques to deliver a product free from bugs
- Evaluate the web applications using bug tracking tools.
- Investigate the scenario and the able to select the proper testing technique
- Explore the test automation concepts and tools
- Deliver quality product to the clients by way of applying standards such as TQM, SixSigma
- Evaluate the estimation of cost, schedule based on standard metrics

#### **(16MC834) MOBILE APPLICATION DEVELOPMENT**

#### **Course Outcomes:**

- Students understood the aspects of mobile programming that make it unique from programming for other platforms
- Students program mobile applications for the Android operating system by use basic andadvanced phone features
- Also deploy applications to the Android marketplace for distribution

## **(16MC835) SOFTWARE PROJECT MANAGEMENT**

### **Course Outcomes:**

- Understand the activities during the project scheduling of any software application.
- Learn the risk management activities and the resource allocation for the projects.
- Can apply the software estimation and recent quality standards for evaluation of the software projects.
- Acquire knowledge and skills needed for the construction of highly reliable software project.
- Able to create reliable, replicable cost estimation that links to the requirements of project planning and managing

## **(16MC836) CYBER SECURITY (DEPARTMENT ELECTIVE – III)**

### **Course Outcomes:**

After learning the course the students should be able to:

- Understand cyber-attack, types of cybercrimes, cyber laws and also how to protect themselves and ultimately society from such attacks

## **(16MC837) IMAGE PROCESSING (DEPARTMENT ELECTIVE – III)**

### **Course Outcomes:**

- Able to enhance images using enhancement techniques.
- Able to restore images using restoration techniques and methods used in digital image processing
- Able to compress images using compression techniques used in digital image processing

## **(16MC838) ARTIFICIAL INTELLIGENCE (DEPARTMENT ELECTIVE – III)**

### **Course Outcomes:**

At the end of this course:

- Student should have a knowledge and understanding of the basic concepts of AI including Search.
- Student can able to solve optimization problems.
- Student can solve the Game Playing problems.
- Student can able to use to planning and learning techniques
- Student should be able to use this knowledge and understanding of appropriate principles and guidelines to synthesise solutions to tasks in AI and to critically evaluate alternatives.
- Student can have ability to use the expert system.

**(16MC839) INFORMATION RETRIEVAL SYSTEMS**  
**(DEPARTMENT ELECTIVE – III)**

**Course Outcomes:**

- Use different information retrieval techniques in various application areas
- Apply IR principles to locate relevant information large collections of data
- Analyse performance of retrieval systems when dealing with unmanaged data sources
- Implement retrieval systems for web search tasks.

**(16MC840) M-COMMERCE**  
**(DEPARTMENT ELECTIVE – IV)**

**Course Outcomes:**

- Able to apply E – commerce principles in market place.
- Able to apply M – commerce principles to various business domains
- Understand the theory and applications of M-commerce in business domain
- Get an exposure to current technological advancements in M-commerce

**(16MC841) CLOUD COMPUTING**  
**(DEPARTMENT ELECTIVE – IV)**

**Course Outcomes:**

- Compare the strengths and limitations of cloud computing
- Identify the architecture, infrastructure and delivery models of cloud computing
- Apply suitable virtualization concept.
- Choose the appropriate cloud player, Programming Models and approach.
- Address the core issues of cloud computing such as security, privacy and Interoperability
- Design Cloud Services and Set a private cloud

**(16MC842) DESIGN PATTERNS**  
**(DEPARTMENT ELECTIVE – IV)**

**Course Outcomes:**

- Students demonstrate a thorough understanding of patterns and their underlying principles
- Students know what design pattern to apply to a specific problem
- Students demonstrate what tradeoffs need to be made when implementing a design pattern
- Students will be able to use design patterns when developing software

**(16MC843) COGNITIVE COMPUTING  
(DEPARTMENT ELECTIVE – IV)**

**Course Outcomes:**

- Understand the broad perspective of Cognitive Computing
- Understand the concept of Analytics in Cognitive computing
- Using the IBMs Watson
- Designing the applications in Cognitive computing

**(16MC844) SOFTWARE TESTING LAB**

**Course Outcomes:**

By the end of the course, you should:

- Have an ability to apply software testing knowledge and engineering methods.
- Have an ability to design and conduct a software test process for a software testing project.
- Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation.
- Have an ability understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods.
- Have an ability to use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects.
- Have basic understanding and knowledge of contemporary issues in software testing, such as component-based software testing problems
- Have an ability to use software testing methods and modern software testing tools for their testing projects.

**(16MC845) MOBILE APPLICATION DEVELOPMENT LAB**

**Course Outcomes:**

At the end of the course, the student should be able to:

- Design and implement various mobile applications using emulators.
- Deploy applications to hand-held devices

**(16MC846) SOFTWARE PROJECT MANAGEMENT LAB**

**Course Outcomes**

Students will get familiar with HOW TO:

- Start MS Project, Create a Project Plan from a template, Switch to a different view, View a report, Create a visual report.
- Create a new project plan & its start date, set working & non-working time, enter properties about a project plan, enter new tasks in the project, set duration for each

task &to create, a milestone task, organizing tasks into phases, link adjacent and non-adjacent tasks, enter a task note, enter a task hyper link, check a Project plan's duration and other statistics, display project's entire duration in Gantt Chart View.

- Setup work (people and equipment) resources, material resources, cost resources, Enter work (people & material) resource pay rates, to make a onetime adjustment to an individual resource's working time, to edit regular work week for an individual resource, to document resources with resource notes.

## **(16HS615) ADVANCED ENGLISH LANGUAGE AND COMMUNICATION SKILLSLAB**

### **Course Outcomes:**

- Flair in Writing and felicity in written expression
- To enhance job prospects
- Improving Effective Speaking Abilities
- To prepare effective Interview techniques

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**  
**(AUTONOMOUS)**  
**DEPARTMENT OF CIVIL ENGINEERING**  
**M.Tech (Structural Engineering)**

**M.Tech I Year -I Sem**

**(16CE2001) ADVANCED CONCRETE TECHNOLOGY**

**Course Outcomes:**

Students undergoing this course are able to

- Know the various materials in concrete and admixtures
- Do the Mix design by different methods
- Get a thorough knowledge of various types of cement, aggregates and properties of special concrete
- Know the different procedures for testing concrete

**(16CE2002) THEORY OF ELASTICITY**

**Course Outcomes:**

After completion of this course, the student shall understand

- Two dimensional analysis of stress and strain
- Three dimensional analysis of stress and strain

**(16CE2003) ADVANCED STRUCTURAL ANALYSIS**

**Course Outcomes:**

- After completion of this course, the student shall understand
- Analysis of continuous beam by stiffness & flexibility matrix methods
- Analysis of Rigid Jointed frames by Stiffness & flexibility matrix methods
- Analysis of Pin Jointed Structures by Stiffness & Flexibility matrix methods
- Formation global & element stiffness matrix, direct stiffness method
- Equation solution Techniques

**(16CE2004) STRUCTURAL DYNAMICS**

**Course Outcomes:**

After completion of this course, the student shall understand

- Structural dynamics-single and multi-degree of freedom systems
- Free and Forced vibrations
- Practical Vibration analysis

**(16CE2005) ADVANCED PRESTRESSED CONCRETE**

**Course Outcomes:**

After completion of this course, the student shall understand

- Concept of pre-stressed concrete
- Losses of Prestress
- Deflections of prestressed concrete elements
- Circular prestressing, Analysis and design of statically indeterminate beams.

### **(16CE2006) LOW COST HOUSING TECHNIQUES**

#### **Course Outcomes:**

After completion of this course, the student shall understand

- Housing Scenario and Housing Finance
- Use of Land and Planning for Housing
- Housing the Urban poor
- Development and Adoption of Low Cost Housing Technology
- Alternative building materials for Low Cost Housing
- 

### **(16CE2007) BRIDGE ENGINEERING**

#### **Course Outcomes:**

After completion of this course, the student shall be able to

- Design Box Culverts, Deck Slab Bridges,
- Design T-Beam Bridges,
- Design post tensioned Prestressed Concrete slab bridge decks and Bridge Bearings.

### **(16CE2008) PRE-FABRICATED CONCRETE STRUCTURES**

#### **Course Outcomes:**

After completion of this course, the student shall understand

- Functional Design Principles of Pre-Fabricated Structures
- Design of Floors, Stairs, Roofs and Walls
- Design of Industrial buildings

## **M.Tech I Year -II Sem**

### **(16CE2009) STRUCTURAL ENGINEERING LABORATORY**

#### **Course Outcomes:**

Students undergoing this course are able to,

- Determine the water/cement ratio on workability and strength of concrete.
- Determine the mechanical properties of hardened concrete.
- Determine the proportion of the mix design for different grades of concrete
- Perform non-destructive failure analysis for hardened concrete.

### **(16CE2010) ADVANCED REINFORCED CONCRETE DESIGN**



**Course Outcomes:**

After completion of this course, the student shall be able to (as per 13456 2000),

- Estimation of crack width and Redistribution of moments in Reinforced concrete beam.
- Design of deep beams, ribbed (voided) slabs.
- Design of Grid floors, flat slabs.
- Design of plain concrete walls.
- Design of shear walls.

**• (16CE2011) ADVANCED STRUCTURAL STEEL DESIGN****Course Outcomes:**

After completion of this course, the student shall be able to,

- Design light Gauge steel compression and Flexural members
- Analyze and design Transmission towers
- Analyze and design continuous beams and portal frames using plastic theory
- Design steel Tension members and laterally restrained beams using limit state method

**(16CE2012) FINITE ELEMENT METHODS****Course Outcomes:**

The student shall be able to know

- The history of FEM, methods of functional approximation
- Principles of Elasticity, isoperimetric formulation
- Finite element analysis of plates

**(16CE2013) THEORY AND DESIGN OF PLATES AND SHELLS****Course Outcomes:**

After completion of this course, the student shall be able to

- Analyze the plates using Navier's and Levy's method
- Analyze the circular, rectangular and square plates by finite difference method
- Design the curved shells and roofs
- Design the various folded plate structures

**(16CE2014) STABILITY OF STRUCTURES****Course Outcomes:**

The student shall be able to,

- Analyze elastic and inelastic buckling of bars
- Understand the various numerical methods for treatment of stability problems and buckling of rectangular cross-sectional beams and plates

### **(16CE2015) EXPERIMENTAL STRESS ANALYSIS**

#### **Course Outcomes:**

Students will be able to know,

- Fundamental approach to experimental analysis
- Photo elasticity
- Principal stresses and shear stresses using strain rosettes, strain measurements through strain gauges and non-destructive techniques

### **(16CE2016) CONSTRUCTION PROJECT MANAGEMENT**

#### **Course Outcomes:**

After completion of this course, the student shall understand

- The concept of a project along with Quality & Safety concerns in Construction
- Plan a project using various Networking Techniques and Optimization Techniques
- Prepare budget of a project and construction cost estimates

### **(16CE2017) EARTHQUAKE RESISTANT STRUCTURES**

#### **Course Outcomes:**

Analyze the forces acting on structures due to earthquake,

- Computation of design moments and shears for framed structure as per IS:1893 and its detailing
- Apply the concepts in the design of structures
- Implementing the selection process of materials and construction form of superstructure

### **(16CE2018) COMPUTING TECHNIQUES LABORATORY**

#### **Course Outcomes:**

After completion of the course the student will be able to

- Understand the software usages for structural members
- Analyze plane, space frames and dynamic response and natural frequency for beams and frames
- Design, detailing and estimations of RC members
- Design the steel members like truss, beams and columns

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**

**(AUTONOMOUS)**

**Control Systems (M.Tech)**

**Department of Electrical and Electronics Engineering (EEE)**

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**

**(AUTONOMOUS)**

**Master of Technology**

**Department of Computer Science and Engineering**

**M.Tech I Year -I Sem. (CSE)**

**(16CS5801) OBJECT ORIENTED SOFTWARE ENGINEERING**

**Course Outcomes:**

On successful completion of this course, student will be able to

- Define and develop a software project from requirement gathering to implementation
- Ability to code and test the software
- Ability to plan, estimate and maintain software systems
- Understand the basic testing procedures
- Able to generate test cases and test suites.
- Test the applications manually by applying different testing methods and automation tools.

**(16CS5802) ADVANCED COMPUTER NETWORKS**

**Course Outcomes:**

On successful completion of this course, the student will be able to

- Explain the terminology and concepts of OSI and TCP/IP Reference models and identify different physical media used for data transmission
- Illustrate and implement the services of Data link layer
- Describe the principles of network layer and categorize routing algorithms used for data transmission
- Identify the essential services of transport layer

- Interpret the functioning of various protocols of Application layer
- Understand the principles of net working

### **(16CS5803) PROGRAMMING IN PYTHON**

#### **Course Outcomes:**

At the end of the course the student will be able to

- Making Software easily right out of the box.
- Experience with an interpreted Language.
- To build software for real needs.
- Prior Introduction to testing software

### **(16CS5804) ADVANCED DATA STRUCTURES AND ALGORITHMS**

#### **Course Outcome:**

At the end of the course, students will be able to:

- Design algorithms to implement various data structures.
- Understand and program stacks and list data structures.
- Write programs to implement different types of queues.
- Understand and make use of hash tables in applications like dictionary, spell checker etc.,
- Understand why height balanced trees are advantageous over other data structures.

### **(16CS5805) CYBER CRIME INVESTIGATIONS AND DIGITAL FORENSICS**

#### **Course Outcomes:**

After completion of this subject the students will be able to:

- Able to recognize crime signatures
- Able to identify the virus signature
- Able to implement Investigation
- Abe to Implement Digital Forensics
- Able to implement Cyber Laws

### **(16CS5806) ADVANCES IN DATABASES**

#### **COURSE OUTCOMES (COs)**

On successful completion of this course, the student will be able to

- Develop relational algebra expressions for queries and optimize them.
- Design the databases using E\_R method for a given specification of requirements.
- Apply Normalization techniques on given database.
- Determine the transaction atomicity, consistency, isolation, and durability for a given transaction-processing system.
- Implement the isolation property, including locking, time stamping based on concurrency control and Serializability of scheduling.
- Understand Physical Storage Media and RAID concepts.

### **(16CS5807) ADVANCED OPERATING SYSTEMS**

#### **Course Outcomes:**

On successful completion of the course students will be able to

- Discuss the various synchronization, scheduling and memory management issues
- Demonstrate the Mutual exclusion, Deadlock detection and agreement protocols of distributed operating system
- Discuss the various resource management techniques for distributed systems
- Identify the different features of real time and mobile operating systems
- Install and use available open source kernel
- Modify existing open source kernels in terms of functionality or features used

### **(16CS5808) COMPUTER VISION**

#### **Course Outcomes:**

After completion of course, students would be able to:

- Developed the practical skills necessary to build computer vision applications.
- To have gained exposure to object and scene recognition and categorization from images.

### **(16CS5809) SOFTWARE LAB- 1 (COVERING THE EXPERIMENTS: PYTHON)**

**M.Tech I Year -II Sem. (CSE)**

### **(16CS5810) SOFTWARE ARCHITECTURE AND DESIGN PATTERNS**

#### **Course Outcomes:**

At the end of the course the student will be able to

- Understand the architecture, creating it and moving from one to any, different structural patterns.
- Analyze the architecture and build the system from the components.
- Design creational and structural patterns.
- Learn about behavioral patterns.
- Do a case study in utilizing architectural structures.

### **(16CS5811) CLOUD COMPUTING**

#### **Course Outcomes:**

At the end of course student will be able to:

- Understanding the systems, protocols and mechanisms to support cloud computing.
- Develop applications for cloud computing.
- Understanding the hardware necessary for cloud computing.
- Design and implement a novel cloud computing applications

## **(16CS5812) DATA ANALYTICS**

### **Course Outcomes:**

On successful completion of the course students will be able to

- Understand how to leverage the insights from big data analytics
- Analyze data by utilizing various statistical and data mining approaches
- Perform analytics on real-time streaming data
- Develop Real Time Analytics Platform (RTAP) Applications
- Understand the various NoSql alternative database models
- Able to gain knowledge on Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data analytics

## **(16CS5813) JAVA & WEB TECHNOLOGIES**

### **Course Outcomes:**

On successful completion of this course, student will be able to

- Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on object identity.
- Design and Implementation of Application Programming Interfaces.
- Create dynamic and interactive web sites using HTML, CSS
- Gain knowledge of client side scripting using java sript and DHTML
- Demonstrate understanding of what is XML and how to parse and use XML data
- Able to do server side programming with Java Servelets, JSP and PHP

## **(16CS5814) OBJECT ORIENTED ANALYSIS AND DESIGN**

### **Course Outcomes:**

After completion of this subject the students will be able to:

- Show the importance of systems analysis and design in solving complex problems.
- Explain the importance of modeling and how the Unified Modeling Language (UML) represents an object-oriented system using a number of modeling views.
- Construct various UML models using the appropriate notation.
- Compare the difference between various object relationships.

## **(16CS5815) MACHINE LEARNING**

### **Course Outcomes:**

After completion of course, students would be able to:

- Extract features that can be used for a particular machine learning approach in various IOT applications.
- To compare and contrast pros and cons of various machine learning techniques and to get an insight of when to apply a particular machine learning approach.

- To mathematically analyze various machine learning approaches and paradigms.

### **(16CS5816) DISTRIBUTED SYSTEMS**

#### **Course outcomes:**

- Able to demonstrate knowledge of the basic elements and concepts related to distributed system technologies;
- Able to demonstrate knowledge of the core architectural aspects of distributed systems;
- Able to design and implement distributed applications;
- Able to demonstrate knowledge of details the main underlying components of distributed systems (such as RPC, file systems);
- Able to use and apply important methods in distributed systems to support scalability and fault tolerance;
- Able to demonstrate experience in building large-scale distributed applications.

### **(16CS5817) IMAGE PROCESSING AND PATTERN RECOGNITION**

After successful completion of this course, student will be able to

- Understand machine learning concepts and range of problems that can be handled by machine learning.
- Compare and parameterize different learning algorithms.
- Apply the machine learning concepts in real life problems

### **(16CS5818) SOFTWARE LAB- 2 (COVERING THE EXPERIMENTS: JWT TASKS & UML TASKS)**

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