**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 energyloss 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. 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 solidsand 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 counter map using levelling instrument
4. To measure horizontal and vertical angles using theodolite and tacheometric 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)**

Aftercompleting 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 if 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)**

Afterperforming 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 TRADITIONALKNOWLEDGE

**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 ofdifferent Signal Analyzers and Digitalmeters
5. Understand the operation ofseveral types of transducers
6. Choose suitableTransducers 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

**BachelorofTechnology**

**Department of Electrical & Electronics Engineering**

**IB.Tech–ISem.**

## (19HS0801)APPLIEDCHEMISTRY

### COURSE OUTCOMES

- Apply Nernst equation for calculating electrode and cell potentials, differentiate between pHmetry, potentiometric and conductometric titrations, explain the theory of construction of batteryandfuel cells, solveproblems based on cellpotential.
- Apply Schrodinger wave equation to hydrogen and particle in a box, illustrate the molecularorbital energy level diagram of different molecular species, semiconductors and insulators discussthemagneticbehavior and colour ofcomplexes.
- Explain the different types of polymers and their applications, explain the preparation, propertiesand applications of Bakelite, Nylon-66, and carbon fibres, describe the mechanism of conductioninconducting polymers,discuss Buna-Sand Buna-Nelastomers andtheirapplications.
- Explainthedifferenttypesofspectralseriesinelectromagneticspectrum,understandtheprincipl esofdifferentanalyticalinstruments,Explainthedifferentapplicationsofanalyticalinstruments .
- Explainthebandtheoryofsolidsforconductors,semiconductorsandinsulators,explainsupram olecularchemistryandselfassembly,demonstratetheapplicationofRotaxanesandCatenanes as artificial molecular machines

## (19HS0830) ALGEBRAANDCALCULUS

### COURSEOUTCOMES

- Develop the use of matrix algebra techniques that is needed by engineers forpracticalapplications
- Utilizemeanvaluetheoremstoreallifeproblems
- Familiarizewithfunctionsofseveralvariableswhichisusefulinoptimization
- Students will also learn important tools of calculus in higher dimensions. Students will becomefamiliarwith 2-dimensional coordinatesystems
- Students will become familiar with 3- dimensional coordinate systems and also learn theutilizationof specialfunctions.

## (19HS0810) COMMUNICATIVE ENGLISH

### COURSEOUTCOMES

- To understand social or transactional dialogues spoken by native speakers of English and identifythecontext, topic, and pieces of specific information.
- To employ suitable strategies for skimming and scanning to get the general idea of a text andlocatespecificinformation.
- ToParticipatein informaldiscussionsand speakclearlyonaspecific topicor ingeneral.
- To Comprehend, discuss and respond to academic texts and use appropriate language fordescriptionand interpretation in writing
- Toform sentencesusing propergrammatical structures andcorrect wordforms

## ( 19ME0361) THERMAL & FLUID ENGINEERING

**COURSE OUTCOMES**

OnsuccessfulCompletion ofthis coursethe studentwill beableto

- Demonstratethe different types of electricpowerstations.
- Describethevariousproperties thermodynamicsystem
- Haveabroadknowledgeondifferent typesofcycles.
- Knows the different typesof fluid flows.
- Thedifferentdevices usedformeasurement offluidflow.

## (19HS0803) APPLIED CHEMISTRY LAB

**COURSEOUTCOMES**

- Determinethecellconstant andconductanceofsolutions .
- Prepareadvancedpolymermaterials.
- EstimatetheIronandCalciumin cement.
- Calculatethehardnessof water.
- DeterminationofconductivityofanAcid.

## (19HS0811)COMMUNICATIVEENGLISHLAB

**COURSEOUTCOMES**

- RememberandunderstandthedifferentaspectsoftheEnglishlanguageproficiencywithemphasis on LSRWskills.
- Applycommunicationskills throughvariouslanguagelearningactivities.
- Analyze the English speech sounds, stress, rhythm, intonation and syllable division for betterlisteningand speaking comprehension.
- Evaluateandexhibitacceptable etiquetteessentialinsocialandprofessionalSettings.
- Create awareness on mother tongue influence and neutralize it in order to improve fluency inspokenEnglish.

## (19ME0301)WORKSHOPPRACTICELAB

## PARTA-ENGINEERINGWORKSHOP

**COURSEOUTCOMES**

- Applywoodworkingskillsinrealworldapplications.
- Builddifferentpartswithmetalsheets inrealworldapplications
- Applyfittingoperationinvariousapplications
- Applydifferenttypesofbasicelectriccircuitconnections
- Demonstratesolderingandbrazing.

## PARTB -ITWORKSHOP

### COURSEOUTCOMES

- After Completion of thisCourse theStudent would be ableto
- Identifythebasic computerperipherals.
- Gainsufficient knowledgeon assemblingand disassembling aPC.
- Learntheinstallation procedureofWindowsand LinuxOS.
- Acquireknowledgeonbasicnetworkinginfrastructure.
- Learnproductivitytoolslike Word,Excel andPowerpoint.
- Acquireknowledgeonbasicsof internetand worldwideweb.

**IB.Tech–IISem.**

### (19HS0849) APPLIED PHYSICS

### COURSEOUTCOMES

Aftercompletingthiscoursestudents willbe ableto

- Explainvarious terms related to waves andOscillations.
- ExplaintheDualnatureofmatter andphysicalsignificanceofWavefunction.
- Recognizeimportanceof freeelectronstheory andsemiconductors.
- Apply concepts oflasers andoptical Fiberslight invarious applications.
- Applythe basicpropertiesof nanomaterials invarious engineeringbranches.

### ( 19HS0831) DIFFERENTIAL EQUATIONS AND VECTOR CALCULUS

### COURSEOUTCOMES

- Solvethe differential equations relatedto various engineeringfields
- Identify solution methods for partial differential equations that model physicalprocesses
- Interpretthephysical meaningofdifferentoperatorssuchasgradient,curlanddivergence
- Estimatethe workdoneagainst afield, circulation usingvectorcalculus
- Studentswill becomefamiliar with applicationsofsurfaceandvolumeintegrals

### (19ME0302)ENGINEERINGGRAPHICS

### COURSEOUTCOMES

- Graphicallyconstructandunderstandtheimportanceofmathematicalcurvesinengineeringapplications
- Abletodraw thebasicviews relatedtoprojections ofPoints,Lines andPlanes
- Abletodraw theprojections ofgeometrical solidsand sectionalviewofsolids
- Understandthe conceptofprojectionandacquirevisualizationskills,developmentofsurfacesand interpenetrations of solids

- Todrawmultivieworthographicand otherprojectionsincludingisometric

## (19CS0501)PYTHONPROGRAMMING

**COURSEOUTCOMES**

Attheendof thecourse,the studentwill beableto

- MakingSoftware easilyright outof thebox
- Solvethe 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.
- Estimatewavelengthof laserand particlessizeusinglaser.
- Plot the intensity of the magnetic field of induction along the axis of circular coil carryingcurrentwith distance.
- Evaluatethe 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)INDIANCONSTITUTION

### COURSEOUTCOMES

Studentswill beableto:

- Explainthekeyconceptsofpoliticaleconomy
- Analysethe significantdevelopments inthe politicalideologies
- Describethesalient featuresofthe constitutionof Indiainterpret,integrate andcritically
- Analyse the political economy of Indian international relations and gain knowledgeinJudiciarysystem
- Applytheirknowledgeandskillsacquired towritecivil serviceexaminations

**II-B.Tech.–ISem.**

## (19HS0832)PROBABILITY,NUMERICALMETHODSANDTRANSFORMS

### COURSEOUTCOMES(COs)

UponCompletionofthecoursethestudentwillbeable

- Agoodunderstandingofthelawsofprobabilityandtheuseof Baye'stheorem.
- Todevelopthemathematicalskillsofthestudentsintheareasofnumericalmethods.
- Applynumericalmethodstofindoursolutionofalgebraicequationsusingdifferent methodsunderdifferentconditions,andnumericalsolutionofsystemofalgebraicequations.
- Workoutnumericaldifferentiationandintegrationwheneverandwhereverroutinemethodsare notapplicable.
- Calculatethe Laplace transformofstandardfunctionsbothfromthe definitionandbyusingtables.
- Abilityto computez-transformand inverse z- transform.

## (19EC0402) ELECTRONIC DEVICES AND CIRCUITS

### COURSEOUTCOMES(COs)

Onsuccessfulcompletionof thiscourse,thestudentwillbe ableto

- Demonstratethe characteristicsofPNJunctionDiode,Rectifiers, Filters,BJT,JFET,MOSFETand special purpose electronic devices.
- AnalyzenumericalandanalyticalproblemsinRectifiers,Filters,Transistorbiasingcircuitsand Transistoramplifiers.
- DesignanddevelopelectroniccircuitssuchasRectifierswithandwithoutfilters,Transistorbiasi ngcircuitsandTransistoramplifiers.
- Solveengineeringproblemsandarriveatsolutionsrelatingtoelectronicdevicesandcircuits.
- Identifyasuitable semiconductordevice andtransistor forany givenspecification.
- Selectsuitabletechniquefortransistormodelling.

## (19EE0202)ELECTRICALCIRCUITS-II

## COURSEOUTCOMES(COs)

Onsuccessfulcompletionof thiscourse,thestudentwillbe ableto

- UnderstandandEvaluatethreephasecircuits
- Analyzethe transientbehaviourof electricalnetworksforvariousexcitations.3.AnalyzetheElectricalCircuitswiththeconceptofNetworktopology.
- AnalyzethethreephasecircuitswithStar&Deltaconnectedbalancedandunbalancedloads.
- Obtainthe variousnetworkparametersforthe giventwoportnetworks.6.Representthetransfer functionfor thegivennetwork.

### (19EE0203) ELECTRICAL MACHINES –I

## COURSEOUTCOMES(COs)

Onsuccessfulcompletionof thiscourse,thestudentwillbe ableto

- Calculate thee.m.f.generatedonopencircuitandfindterminalvoltageonload.
- DiagonisethefailureofDCgeneratortobuildupvoltage.
- Identifysuitable method and conditionsforobtaining the required speedofDC motor.
- Computetheloadsharedbyeachgeneratorwhenseveralgeneratorsoperateinparallel.
- Conduct O.C,S.Ctestsandpredeterminethe regulation andefficiencyoftransformer.
- Computetheloadsharedbyeachtransformerwhenseveraltransformersoperateinparallel

### (19CE0136)WATERTECHNOLOGY

## COURSEOUTCOMES

Onsuccessfulcompletionof thiscourse,thestudentwillbe ableto

- Underlinetheimportanceof wateranddescribe themechanismof hydrologicalcycle
- Describevariouselementsassociatewithpublicwatersupply
- Describewaterqualitycriteriaandstandards,andtheirrelationtopublichealth
- Recognize the cause of water pollution and influence of climatic changes on waterresources
- Summarizevariouswaterconservationtechniquesinpractice
- ExplainneedforwatershedmanagementandimplementvariousPlansforwatershedmanagement

### (19ME0349) FUNDAMENTALS OF MECHANICAL ENGINEERING

## COURSEOUTCOMES

Attheendof thecourse,the studentwill beableto

- ListthetypesofEngineeringmaterialsandalsodescribealloying,HeattreatmentProcesses.
- RecognizetheimportanceofICEnginesinautomobilesandtheclassificationofaircompressors
- Distinguishvarioustypes ofair conditioningsystems forhouse andIndustrial applications
- Explicatetheworkingof variousPower plantslikenuclear, Hydro&thermalpower plants
- Classifyvarioustypesmodernmachiningprocessesanddeterminethebestsuitableprocesstoma

chine a component.

- ApplytheworkingprinciplesofCAD,CAMandCIMintheoperationofRoboticmanufacturinga nd qualitycontrol systems

## (19EC0448)INTRODUCTIONTOCOMMUNICATIONSYSTEMS

### COURSEOUTCOMES(COs)

Onsuccessfulcompletionof thiscourse,thestudentwillbe ableto

- DemonstrateknowledgeinelementsofAnalogDigitalandWirelessCommunicationSystems.
- Analyzetheanalogmodulatedanddemodulatedsystems.
- Understandtheprincipleinvolvedindifferentmodulationtechniques
- Understandthebasicprinciplesofbasebandandpassbanddigitalmodulationschemes
- Analyzeprobabilityoferrorperformanceofdigitalsystemsandareabletodesigndigitalcommun ications.
- ImplementvariousKeyingandaccessingtechniquesinrealtimewirelesscommunicationsyste ms

## (19CS0550)RELATIONALDATABASEMANAGEMENTSYSTEM

### COURSEOUTCOMES(COs)

Onsuccessfulcompletionofthiscourse, thestudentwillbeableto

- Developrelationalalgebraexpressionsfor queriesandoptimizethem.
- DesignthedatabasesusingE_R methodforagiven specificationofrequirements.
- ApplyNormalizationtechniquesongivendatabase.
- Determinethetransactionatomicity,consistency,isolation,anddurabilityforagiventransactio n-processingsystem.
- Implement the isolation property, including locking, time stamping based onconcurrencycontrol andSerializability of scheduling.
- UnderstandPhysicalStorageMediaandRAIDconcepts.

## (19HS0813)MANAGEMENTSCIENCE

### COURSEOUTCOMES:

- Utilizeappropriatetheoreticalframeworkstoreallifebusinessandmanagerialproblems
- Identifyappropriateoperationalrisksanddevelopappropriateresponsestothem
- Applyhuman resource principlestorecruit,selectandmanage employeestoachieveorganizationalgoals
- Enactstrategy,includingcontingentplansfortheeffectivemanagementoftheorganization
- Identify,plan,andimplementtheprojectsandevaluatethe performanceofthe projects
- Analyzeeffectiveapplicationoflatestdevelopmentstodiagnoseandsolveorganizationalproble ms

## (19EC0405) ELECTRONICDEVICESANDCIRCUITSLAB

### COURSEOUTCOMES(COs)

Onsuccessfulcompletion ofthis coursethestudentswill beable to

- Demonstrateknowledgeindifferentelectronicdevicesandanalogcircuits.
- Analyzethecharacteristicsofdifferentelectronicdevicesandcircuitslike Diodes-PNJunctionDiode,ZenerDiodeandTransistors-BJT,FET.
- Designanddevelopelectroniccircuitslikerectifiers,clippers,clampers,BJTandFETAmplifiers.
- SolveengineeringproblemswithbetterElectroniccircuits.
- Functioneffectivelyasanindividualandasamemberinagroupintheareaofelectronicdevicesandcircuits.
- Developskillstocommunicateverballyandinwrittenformintheareaofelectronicdevicesandcircuits.

## (19EE0204)ELECTRICALMACHINES-ILAB

**COURSEOUTCOMES:**

Thestudentshouldbeableto dothefollowing:

- Conduct experimentstoobtainthenoload andloadcharacteristics of D.C.Generators.
- ConducttestsonD.C.motorsforpredeterminationofefficiency.
- ConducttestsonD.C.motorsfordeterminationofefficiency.
- Controlthespeed ofD.C.motor ina givenrangeusing appropriate method .
- Identifythereasonasto whyD.C.Generatorisnotbuildingupvoltage.
- IdentifytheSeparationofLossesinDCShuntMotor

## (19EE0205)ELECTRICALCIRCUITSLAB

### COURSEOUTCOMES(COs)

Aftercompletingthe course, the studentshould beableto dothefollowing:

- Correctly measure and successfully troubleshoot circuits by taking accurate dataandinterpret results.
- Studydifferent metersandinstrumentsformeasurementofelectricalquantities
- Experimentallyverifythebasiccircuittheorems.
- Understand 3 phase balanced, star and delta connected supply and load and to measurepowerin 3 phase circuits
- DeterminetheresonantFrequency, quality factor&bandwidth oftheRLCcircuits
- Drawthelocus diagrams of RLCcircuits.
- Findthevariousparameters of twoport network.
- Recordanddocumentresults oflabworkusingtextandgraphs.

## (19HS0805)ENVIRONMENTALSCIENCE

### COURSEOUTCOMES

- Recognize the physical,chemical and biological components of the earth's systems and showhow theyfunction.
- Characterizeand analyzehumanimpactsontheenvironment.
- Integrate facts,concepts and methods from multiple disciplines and apply to

environmentalProblems.

- Create informed opinions about how to interact with the environment on both a personalanda social level.
- Performindependentresearchonhumaninteractionswiththeenvironment.
- Recognizethe ecological basisforregional andglobal environmentalissues

**IIB.Tech.–IISem.**

**(19EC0401)SWITCHINGTHEORYANDLOGICDESIGN**

**COURSEOUTCOMES**

Onsuccessfulcompletionof thiscourse,thestudentwillbe ableto

- Define different Number systems, Binary Codes and perform Number baseconversions.
- SimplifytheBooleanfunctions, designand implementusing Logicgates.
- Understandthemethodsforgate-levelminimizationtechniques.
- DesignandimplementSequentialandCombinationalcircuits.
- Applythestatereductionmethods indesign ofFSMs.
- Understandand designmemorysystemslikeRAM, ROM,PLA,PAL.

**(19EC0446)ANALOGELECTRONICCIRCUITS**

**COURSEOUTCOMES**

Onsuccessfulcompletionofthecourse,thestudentwillbeableto

- Demonstrateknowledge inFeedback amplifiers,OscillatorsandOperationalAmplifiers.
- Performanalysisofanalogelectroniccircuitsformeetingdefinedspecifications.
- Designanddevelopanalogelectroniccircuitssuchas FeedbackAmplifiers,Oscillatorsandvariousapplicationsofoperationalamplifierwithgivenspecifications.
- Solveproblemsrelatingtoanalogelectroniccircuitdesign.
- SelectanAmplifiercircuitsuitableforaspecificelectronicsubsystem.
- Applycourseknowledgetoassesssocietalissuesandunderstandtheconsequentresponsibilities relevanttotheprofessionalengineeringpractice usinganalogelectroniccircuits.

**(19EE0207) ELECTROMAGNETIC FIELDS**

**COURSEOUTCOMES(COs)**

Onsuccessfulcompletionof thiscourse,thestudentwillbe ableto

- Acquiresmathematicalfoundationonvectorcalculus
- Analyse andestimateElectricfield quantitieswith chargedistribution
- Studythebehaviourofelectricfieldsinconductoranddielectricmaterials
- Estimatethemagneticfield strengths dueto different current carrying elements
- Evaluatethemagneticforcesgeneratedduetointeractionofelectricandmagneticfields
- Understandtheelectromagneticwavepropagationinfreespace

**(19EE0208)ELECTRICALMACHINES-II**

**COURSEOUTCOMES(COs)**

Onsuccessfulcompletionof thiscourse,thestudentwillbe ableto

- Understandconstructionof3phaseinductionmotorandtoqueparametercalculation.
- ConductNo-loadandBlockedrotortestson3phaseinductionmotors
- Understandvarioustypesspeedcontrol methodsof 3phaseinduction motors
- Understandconstructionofsynchronousgeneratorandparalleloperation
- Understandmethodsofstartingofsynchronousmotorsandequivalentcircuit
- Understandvariationofcurrentandpowerfactorwithexcitation

## (19CE0143)FUNDAMENTALSOFURBANPLANNING

**COURSEOUTCOMES(COs)**

Onsuccessfulcompletionof thiscourse,thestudentwillbe ableto

- Recognizeissuesrelatedtotownplanninganddiscusstheobjectives,necessityandstagesoftown planning
- Summarizeimportanceofzoning,canclassifyvarioustownplanningpracticesandcanconducts urveysfortownplanning
- Classifytheresidentialbuilding,listtheagenciesinvolvedinimprovinghouseandreviewthepro blemsassociatedwithresidentialhousing
- Discusstheissuesassociatedwithslumsandrecognizethemethodstoimproveconditionofslums
- Interpretnormslaiddownforpublicandindustrialbuildingandcansummarizebuildingbye-laws
- Listanddiscussvariousurbanroadsandtheconceptsoftrafficmanagementinatown

## (19ME0350)MECHANICALMEASUREMENTS&CONTROLSYSTEMS

### COURSEOUTCOMES

Onsuccessfulcompletionof thiscourse,thestudentwillbe ableto:

- Statethebasicprinciplesofmeasurementsystemsandexplainitsperformancecharacteristics
- Distinguish the types of various temperature and pressure measurement instrumentsandfindsthebestonefortheindustrialapplications
- ExplicatetheprincipleofmeasurementofSpeed,AccelerationandVibrationinstrumentsand describeitsworking
- IllustratetheoperationofFuellevel,measurementofFlowandHumidityMeasurementinstrume ntsandalsostatetheapplicationsofvariouscontrolsystems
- Identify the appropriate device for the measurement of temperature, pressure, speed,stress, humidity, flow velocity etc., and justify its use through characteristics andperformance.
- Classify the various types of control systems for the measurement of temperature,speedandposition

## (19EC0449)ELEMENTS OFEMBEDDEDSYSTEMS

### COURSEOUTCOMES

Onsuccessfulcompletionofthiscourse, studentswillbeableto

- Differentiatebetweengeneralcomputingsystemandtheembeddedsystem,alsorecognizethecl assificationofembeddedsystems.
- Enumerateanddescribethecomponentsofanembeddedsystem.

- Learnaboutopensourceelectronicsplatform.
- Programanembeddedsystembyinterfacingsensors&actuators.
- IdentifythebasicbuildingblocksofInternetofThingsandcharacteristics.
- Implementtheirownideasinvariousapplicationareasof EmbeddedsystemsandIoT.

## (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,thestudentwillbe ableto

- 1.Verifythe operationofLogicgates, combinationalandSequentialcircuits
- 2.Constructbasiccombinationalcircuitsandverifytheirfunctionalities.
- 3.Applythedesignprocedures indesigning basicsequentialcircuits.
- 4.Understandthefunctionalityof counters.
- UnderstandthesequencingofShift registers.
- Constructvariousdigitalcircuitsandverifytheiroperation.

## (19EC0447)ANALOGELECTRONIC CIRCUITS LAB

### COURSEOUTCOMES

Onsuccessfulcompletionofthecourse,students willbeableto

- Demonstratebasicknowledgeandperformanalysisofanalogelectroniccircuitsformeetingdefinedspecifications.
- Designandidentifytheapplicationsoffeedbackamplifiers,sinusoidaloscillatorsandapplicationsofoperationalamplifiersindifferentelectroniccircuits.
- Developanalogelectroniccircuitsforvariousapplicationswithgivenspecifications.
- Findsuitableanalogtodigitalanddigitaltoconvertersusingoperationalamplifierstoapplyforrealtimeapplications.
- Functioneffectivelyasanindividualandasamemberinagroupinthearea ofelectronicdevicesandcircuits.
- Develop skills to communicate verbally and in written form in the area of electronicdevicesandcircuits

## (19EE0209) ELECTRICALMACHINES-IILAB

### COURSEOUTCOMES:

- Identifydifferentparts oftransformersand inductionmotors andspecifytheir functions.
- Determinationoflossesandefficiencyoftransformer.
- Understandtheoperationoftransformersandinductionmotors.
- Carryoutdifferenttestingmethodsandassesstheperformanceoftransformers.andinductionmotors
- Startandcontroltheinductionmotor
- Determinationofregulation ofsynchronous machine

## (19HS0817) ESSENCEOFINDIANTRADITIONALKNOWLEDGE

### COURSEOUTCOMES(COs)

- Onsuccessfulcompletionofthiscourse, thestudentwillbeableto
- Connectup thebasicprinciples ofthought process.
- UnderstandHolisticlifestyle ofyogicscienceandwisdomcapsulesin Sanskritliterature.
- Analyzethe societyand naturethrough sustainability.
- ExplainIndianknowledgesystemandIndian perspectiveof modernscience.
- Usethe basicprinciples ofYoga andholistic healthcare system.
- Applytheholistichealthcaresystem.

**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 sin 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 &strengthing 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 defection of beam and calculate the slope and defection 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 it's 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 bye-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 ofcomplexes.
- 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 analyticalinstruments.

- 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 molecularmachines

## (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 lifeproblems..
- 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 coordinatesystems.
- Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of specialfunctions.

## (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 engineeringapplications.
2. Able to draw the basic views related to projections of Points, Lines andPlanes.
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 ofsolids.
5. To draw multi view orthographic and other projections includingisometric.

## (19CS0501) PYTHON PROGRAMMING

**Course Outcomes:**

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

- Develop Software easily right out of thebox.
- Solve the problems using control structures, input and outputstatements.
- Summarize the features of lists, tuples, dictionaries, strings andfiles.
- Experience the usage of standard libraries, objects, andmodules.

- To build the software for realneeds.

## (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 Calciumincement.
- Calculate the hardness ofwater.
- 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 worldapplications.
- Build different parts with metal sheets in real worldapplications
- Apply fitting operation in variousapplications
- Apply different types of basic electric circuitconnections
- Demonstrate soldering andbrazing.

## PART A – ENGINEERING WORKSHOP

**Course outcomes:**

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

- Apply wood working skills in real worldapplications.
- Build different parts with metal sheets in real worldapplications
- Apply fitting operation in variousapplications
- Apply different types of basic electric circuitconnections
- Demonstrate soldering andbrazing.

## PART B - IT WORKSHOP

**Course outcomes:**

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

1. Identify the basic computerperipherals.
2. Gain sufficient knowledge on assembling and disassembling aPC.
3. Learn the installation procedure of Windows and LinuxOS.
4. Acquire knowledge on basic networkinginfrastructure.
5. Learn productivity tools like Word, Excel and Powerpoint.

6. Acquire knowledge on basics of internet and worldwideweb.

## (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 andtheir operations
3. Ability to work on objectoriented programming
4. Ability to handle exceptional handling and plotting ofgraphical entities.
5. Ability to develop any realworld 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 specificinformation.
- To employ suitable strategies for skimming and scanning to get the general idea of a text and locate specificinformation.
- To Participate in informal discussions and speak clearly on a specific topic or ingeneral.
- 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 wordforms.

## (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 vectorcalculus.

## (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 insolids.
- Identify the applications of semiconductors in electronicdevices.
- Explain the applications of magneticmaterials.
- Evaluate the Maxwell equations and asses 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 acrossany element
- Apply the networktheorems suitably.
- Analyze the operating principles ofelectrical machines.
- Analyze the operating principlesof 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 minimizationtechniques.
- Design and implement Sequential and Combinationalcircuits.
- 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 variousoptical instruments.
- Estimate wavelength of laser and particles sizeusing laser.
- Plot the intensity of the magnetic field of induction along the axis of circular coil carrying currentwith distance.
- Evaluate the acceptance angle of an optical fiber andnumerical aperture.

Determine energy loss byB-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 thoughtprocess.
- To understand Holistic life style of yogic science and wisdom capsules in Sanskrit literature.
- To analyze the society and nature throughsustainability.
- To explain Indian knowledge system and Indian perspective of modernscience.
- To use the basic principles of Yoga and holistic health caresystem.

**(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 numericalmethods.
- Apply numerical methods to find our solution of algebraic equations using different methods under different conditions, and numerical solution of system of algebraicequations.
- Work out numerical differentiation and integration whenever and wherever routine

methods are notapplicable.

- Calculate the Laplace transform of standard functions both from the definition and by using tables.
- Students will be able to comprehend basic systems properties andsignals.
- Students will be able to apply Fourier analysis to periodic and aperiodicsignals

## (19EE0242) NETWORK THEORY

**Course Outcomes:**

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

- Understand basics electrical circuits with nodal and meshanalysis.
- Solve the given circuit with various theorems andmethods.
- Determine the transient response of R-L, R-C, R-L-C circuits for d.c and a.cexcitations.
- Apply Fourier transforms to electrical circuits excited by non-sinusoidalsources.
- Learn the various parameters and their interrelationship, able to solve numerical with series, cascade, and parallel connection using two portparameters.
- Design different types offilters.

## (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 electronicdevices.
- Analyze numerical and analytical problems in Rectifiers, Filters, Transistor biasing circuits and Transistoramplifiers.
- Design and develop electronic circuits such as Rectifiers with and without filters, Transistor biasing circuits and Transistoramplifiers.
- Solve engineering problems and arrive at solutions relating to electronic devices and circuits.
- Identify a suitable semiconductor device and transistor for any givenspecification.
- Select suitable technique for transistormodelling.

## (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 differenttransforms.
- Investigate the systemstability.
- Understand the concept of convolution of signals.
- Understand and Analyze the Laplace Transform andROC.
    - A student will 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 hydrologicalcycle.
- Describe various elements associate with public watersupply.
- Describe water quality criteria and standards, and their relation to publichealth.
- Recognize the cause of water pollution and influence of climatic changes on waterresources.
- Summarize various water conservation techniques inpractice.
- 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 conversionprocesses.
- Manufacture of Pyrolytic oils andgases
- Manufacture of charcoal, yields andapplications
- Understand various types of gasifiersoperation
- Understand inclined and fluidized bed combustorsoperation
- Understand types of biogas plants and biomass energy programme inIndia

**(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 Industrialapplications
- Explicate the working of various Power plants like nuclear, Hydro & thermal powerplants
- Classify various types modern machining processes and determine the best suitable process to machine acomponent.
- Apply the working principles of CAD, CAM and CIM in the operation of Robotic manufacturing and quality controlsystems

## (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 operatingsystem.
- Implement and execute various shellscripts.
- Work with filters, pipes and user communication, Vi-Editor commands.
- Execute various commands related to regular expressions
- Implement korn shellprogramming
- 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 managerialproblems.
- Identify appropriate operational risks and develop appropriate responses tothem.
- Apply human resource principles to recruit, select and manage employees to achieve organizational goals.
- Enact strategy, including contingent plans for the effective management of theorganization.
- Identify, plan, and implement the projects and evaluate the performance of theprojects.
- 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 Sequentialcircuits
- Construct basic combinational circuits and verify theirfunctionalities.
- Apply the design procedures in designing basic sequentialcircuits.
- Understand the functionality ofcounters.
- Understand the sequencing of Shiftregisters.
- Construct various digital circuits and verify theiroperation.

## (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 analogcircuits.
- 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 Electroniccircuits.
- 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 andcircuits.

## (19EC0406) BASIC SIMULATION LAB

**Course Outcomes:**

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

- Analyze various types of signals andsequences.
- Apply convolution and correlation operations on differentsignals.
- Determine the response of an LTI system to givensignals.
- Plot and analyze the spectrum of a given signal usingMATLAB.
- Verify the Samplingtheorem.
- Compute various statistical properties of a randomnoise.

## (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 andMultivibrators.
- Perform analysis of analog electronic circuits for meeting definedspecifications.
- 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 circuitdesign.
- Select an Amplifier circuit suitable for a specific electronicsubsystem.
- 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 andapplications.
- Analyze generation and detection of FM signal and comparison between amplitude and angle modulationschemes.
- 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 ofnoise.
- Differentiate between different analog pulse modulation and demodulation techniques and signal multiplexing for variousapplications.

- Identify different radio receiver circuits and role of AGC and understand the concept of information andcapacity
- 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 andconverters.
- Able to design the op amp circuits and converters for real timeapplications.
- Understand CMOS and TTL Logic families and theirinterfacing.
- Describe various design style of VHDLprogramming.
- Apply the knowledge of VHDL programming to develop VHDL model for standard combinational and sequential ICstructures.

## (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 residentialhousing
- 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 atown

## (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.
- AnalysetheworkingprinciplesofdifferentSignalAnalyzersandDigitalmeters.
- Understand the operation of several types of transducers.
- ChoosesuitableTransducersforthemeasurementofnon-electricalquantities.

## (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 industrialapplications
- 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 controlsystems
- 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 objectidentity.
- Apply object-oriented design patterns for problem solving.
- Implement Exception handling withsynchronization.
- Execute programs on Multithreading and String handlingconcepts.
- Design applications with an event-driven graphical userinterface.

## (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 IPrights
- 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 intellectualwork
- Able to identify, apply, and assess ownership rights, registration processes for IPrights
- 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 internationallevel

## (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 transistoramplifier.
- 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 electroniccircuits.

- 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 electroniccircuits.
- Develop skills to communicate in verbal and written form in the area of analog electroniccircuits.

## (19EC0412) ANALOG COMMUNICATIONS LAB

**Course Outcomes:**

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

- Technically visualize spectra of different analog modulationschemes
- Analyzepracticalbehaviorofdifferentelementsavailableinanalogcommunicationsystem such as filters, amplifiersetc.
- Measure characteristics of radio receivermeasurements.
- Experience real time behavior of different analog modulationschemes
- Acquire knowledge about pulse modulationsystems
- Observe the modulation and demodulation behavior of various modulationtechniques

## (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 ofop-amp.
- Design and analyze filter circuits usingop-amp.
- Design and analyze oscillators and multivibrators circuits using op-amp(IC741) or IC555
- Design and draw the internal structure of the various digital integratedcircuits.
- Develop VHDL/Verilog HDL source code, perform simulation using relevant simulator and analyze the obtained simulation results using necessarysynthesizer.
- Verify the logical operations of the digital IC‟s (Hardware) in thelaboratory.

## (19HS0805) ENVIRONMNETAL 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 theyfunction.
- Characterize and analyze human impacts on theenvironment.
- 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 sociallevel.
- Perform independent research on human interactions with theenvironment.

- Recognize the ecological basis for regional and global environmentalissues.

**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 treatmentProcesses.
- Recognize the importance of IC Engines in automobiles and the classification of aircompressors
- Distinguish various types of air conditioning systems for house and Industrialapplications
- Explicate the working of various Power plants like nuclear, Hydro & thermal powerplants
- Classify various types modern machining processes and determine the best suitableprocess to machine a component.
- Apply the working principles of CAD, CAM and CIM in the operation of Roboticmanufacturing 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 CommunicationSystems.
- 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 modulationschemes
- Analyze probability of error performance of digital systems and are able to designdigital communications.
- Implement various Keying and accessing techniques in real time wirelesscommunication 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 languageprogramming.
- Develop embedded C language programs for various applications using 8051microcontroller.
- Explore the provided example code and online resources for extending knowledgeabout the capabilities of the 8051 microcontrollers
- Test, debug, and deploy the 8051 microcontroller-based systems
- Design and develop own microprocessor/microcontroller-based solutions for thereal-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, arraysand 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 giventransaction-processing system.
- Implement the isolation property, including locking, time stamping based onconcurrency 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 andcritically.
- Analyse the political economy of Indian international relations and gain knowledge inJudiciary 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 notvalid.
- Demonstrate the ability to write and evaluate a proof or outline the basic structure ofand 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 determinetheir 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 Machinesand appreciate their power and convert Automata to Programs and Functions.
- 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 andCFGs.
- 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 abstractionfunctions.
- 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 intheir management policies and algorithms.
- Understand the process management policies and scheduling of processes by CPU.
- Analyze the requirement for process synchronization and coordination handled byoperating system.
- Describe and analyze the memory management and its allocation policies.
- Categorize the storage management policies with respect to different storagemanagement 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 andstages of town planning
- Summarize importance of zoning, can classify various town planning practices andcan conduct surveys for town planning
- Classify the residential building, list the agencies involved in improving house andreview the problems associated with residential housing
- Discuss the issues associated with slums and recognize the methods to improvecondition of slums
- Interpret norms laid down for public and industrial building and can summarizebuilding 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 performancecharacteristics
- Distinguish the types of various temperature and pressure measurement instrumentsand finds the best one for the industrial applications
- Explicate the principle of measurement of Speed, Acceleration and Vibrationinstruments 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 andperformance.
- Classify the various types of control systems for the measurement of temperature,speed and position

## (19EC0449) ELEMENTS OF EMBEDDED SYSYTEMS

**COURSE OUTCOMES (COs)**

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

- Differentiate between general computing system and the embedded system, alsorecognize 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 andinternational organizations involved in sanctioning IP rights
- Identify different types of intellectual properties, ownership rights and the scope of theprotection
- Get an adequate knowledge on patents, trademarks, copy rights and to get propertyrights 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 intellectualproperty audits
- Demonstrate knowledge and understanding on unfair competition and latestdevelopments 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 simpleobject-oriented Java programs
- Read and make elementary modifications to Java programs that solve real-worldproblems
- 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 systemusing system calls
- Use modern operating system calls and synchronization libraries in software/hardware interfaces
- Understand the benefits of thread over process and implement synchronized programsusing multithreading concepts
- Analyze and simulate CPU Scheduling Algorithms like FCFS, Round Robin, SJF, andPriority
- Implement memory management schemes and page replacement schemes
- Understand the concepts of deadlock in operating systems and implement them inmultiprogramming 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 implementationdiagrams) 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 orientedsoftware
- 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 toEnvironmental Problems.
- Create informed opinions about how to interact with the environment on both apersonaland 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**
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**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 reallife 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 ofmotion.
2. Apply the principles of acoustics in designing ofbuildings.
3. Explains the applications of ultrasonics in various engineeringfields.
4. Explains various terms related to waves andOscillations.
5. Explains the importance of various mechanical properties ofmaterials.
6. Apply the basic properties of nano materials in various engineeringbranches.

## (19HS0830) ALGEBRA AND CALCULUS

### COURSE OUTCOMES

1. Develop the use of matrix algebra techniques that is needed by engineers for Practicalapplications
2. Utilize mean value theorems to real life problems
3. Familiarize with functions of several variables which is useful inoptimization
4. Students will also learn important tools of calculus in higher dimensions. Students will become familiar with 2- dimensional coordinatesystems
5. Students will become familiar with 3- dimensional coordinate systems and also learn the utilization of specialfunctions.

## (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 specificinformation.
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 appropriatelanguage for description and interpretation inwriting.
5. To form sentences using proper grammatical structures and correct word forms.

## (19CE0101) ENGINEERINGMECHANICS

### 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 siz eusing 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 LSRWskills.
2. Apply communication skills through various language learningactivities.
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

## COURSEOUTCOMES

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)ENGINEERINGCHEMISTRY

## COURSE OUTCOMES

1. List the differences between temporary and permanent hardness of water, explain the principles of reverse osmosis and electrodialysis. Compare quality of drinking water with BIS and WHOstandards.
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 ofoils.
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 concreteformation.
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 andcatalysis

## (19HS0831) DIFFERENTIAL EQUATIONS AND VECTORCALCULUS

### COURSE OUTCOMES

1. Solve the differential equations related to various engineeringfields
2. Identify solution methods for partial differential equations that modelphysical 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 vectorcalculus
5. Students will become familiar with applications of surface and volumeintegrals

## (19EE0240) BASIC ELECTRICAL AND ELECTRONICSENGINEERING

### 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 acrossany element
3. Apply the network theoremssuitably.
4. Analyze the operating principles of motor andtransformer.
5. Analyze the operating principles of major electronic devices, its characteristics and applications.
6. Design and analyze the DC bias circuitry of BJT andFET.

## (19CS0501) PYTHON PROGRAMMING

### COURSE OUTCOMES

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

1. Making Software easily right out of thebox
2. Solve the problems using control structures, input and outputstatements
3. Summarize the features of lists, tuples, dictionaries, strings andfiles

4. Experience the usage of standard libraries, objects, andmodules
5. To build the software for realneeds.

## (19ME0302) ENGINEERING GRAPHICS

### COURSE OUTCOMES

1. Graphically construct and understand the importance of mathematical curves in engineeringapplications
2. Able to draw the basic views related to projections of Points, Lines andPlanes
3. Able to draw the projections of geometrical solidsand sectional view ofsolids
4. Understand the concept of projection and acquire visualization skills, development of surfaces and interpenetrations ofsolids
5. To draw multi view orthographic and other projections includingisometric

## (19HS0806) ENGINEERING CHEMISTRYLAB

### COURSE OUTCOMES

1.Determine the cell constant and conductance of solutions 2.Prepare advanced polymermaterials 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, controlstructures.
2. Ability to implement data structures and theiroperations
3. Ability to work on object orientedprogramming
4. Ability to handle exceptional handling and plotting of graphicalentities.
5. Ability to develop any real worldproblem

## (19HS0816) INDIAN CONSTITUTION

### COURSE OUTCOMES

1. Explain the key concepts of politicaleconomy
2. Analyse the significant developments in the politicalideologies
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 theirapplications.
3. Interpret the Concepts of enthalpy, entropy and other thermodynamic properties of ideal gasProcess
4. Analyze different Thermodynamic cycles and efficiencies relatedproblems
5. understanding the behavior of pure substances, usage of steam tables and Mollier chart in solving steam relatedproblems
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 axialmembers
2. Draw shear force and bending moment diagrams under different loadingconditions
3. Study the theories related to the bending stress, shear stress distribution and torsional stress for beams of different cross sections and theirapplications
4. Describe the slope and defection of beam and calculate the slope and defection for statically determinate beams by using differentmethods
5. Classify different type of column and derive Euler's equation for long columns with different endconditions
6. Analyze the pressure vessels subject to internal and external fluidpressure

**(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 itsprinciples
2. **Use** the principles of Chain and Compass survey to **construct** traverse and **correct** the error of chain and tape while measuringdistances
3. **Prepare** LS & CS profiles and counter map using levellinginstrument
4. To **measure** horizontal and vertical angles **using** theodolite and tacheometric surveying and their by **compute** the horizontal and verticaldistances
5. To **calculate**, **design** and **set** various types of horizontalcurves
6. To **describe** the working principles of EDM and totalstation

## (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 existinggreenhouse.
2. Students will learn the different systems for climate control in greenhouse and their management.
3. Familiar with the techniques of light management and $CO_2$ enrichment used forincreasing and control cropproduction.
4. Learn the site selection and structural design ofgreenhouse
5. Understand the different types of material used ingreenhouse
6. Learn about the economy of greenhouseconstruction

## (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 hydrologicalcycle
2. Describe various elements associate with public watersupply
3. Describe water quality criteria and standards, and their relation to publichealth
4. Recognize the cause of water pollution and influence of climatic changes on water resources
5. Summarize various water conservation techniques inpractice
6. Explain need for watershed management and implement various Plans for watershed management

## (19EE0238) GENERTION 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 conversionprocesses.
2. Manufacture of Pyrolytic oils andgases
3. Manufacture of charcoal, yields andapplications
4. Understand various types of gasifiersoperation
5. Understand inclined and fluidized bed combustorsoperation
6. Understand types of biogas plants and biomass energy programme inIndia

### (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 controlsystems

### (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 demodulatedsystems.
3. Understand the principle involved in different modulationtechniques
4. Understand the basic principles of baseband and pass band digital modulationschemes
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 communicationsystems

## (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 optimizethem.
2. Design the databases using E_R method for a given specification ofrequirements.
3. Apply Normalization techniques on givendatabase.
4. Determine the transaction atomicity, consistency, isolation, and durability for a given transaction-processingsystem.
5. Implement the isolation property, including locking, time stamping based on concurrency control and Serializability ofscheduling.
6. Understand Physical Storage Media and RAIDconcepts.

## (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 tothem
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 theprojects
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 straincurve

2. **Conduct** compression test on wood, brick and concrete and can **calculate** their compressiontest
3. **Conduct** impact test on metalspecimens
4. **Find** hardness of differentmaterials
5. **Determine** modulus of elasticity of given material of beam by studying deflection for differentloads
6. **Determine** tensile and torsional strength of mild steel bars and **find** stiffness of a helicalspring

**(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 tablesurveying
2. **Determine** the elevation of various points **using** levelinginstruments
3. **Compute** the angles, distance and height by compass, theodolite, tacheometry and total station
4. **Setting out** the curve by theodolite andtacheometry
5. **Describe** the concept of foundationmarking
6. **Use** total station for carrying basicoperations

**(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 ofsoftware.
2. Design various threadprofiles.
3. Explain the step to draw Machine elements such as Bolt, Nut andKeys.
4. Preparation of the part or assembly drawings as per theconventions
5. Interpret the machine drawings that in turn in the preparation of the partdrawings
6. Identify the importance of linking the functional and visualization aspects in the preparation of assemblydrawings.

**(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 theyfunction.

2. Characterize and analyze human impacts on theenvironment.
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 sociallevel.
5. Perform independent research on human interactions with theenvironment.
6. Recognize the ecological basis for regional and global environmentalissues

**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 numericalmethods.
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 notapplicable.
4. A good understanding of the laws of probability axioms andrules.
5. Understanding of moments of discrete and continuous random variables as well as be familiar with common named discrete and continuous randomvariables.
6. Calculate and interpret the correlation and Regression between twovariables.

**(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 calculatefluid properties
2. Define Pascal's Law and apply it for measuringpressure 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 developvelocity triangle
5. Discuss operation principals of hydroelectricpower plant
6. Explain the principals of pumpsand 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 inagriculture?
2. Classify the types of tillage and tillagetools.
3. Determine the various forces acting on tillagetools
4. Distinguish the various methods involved in sowing, inter cultivation and plant protectionoperation.
5. Categorize the various types of sowing, inter cultivation and plant protectionequipment.
6. Utilize the transplanting concepts in agriculturefield.

### (19AG0703) PRINCIPLES OF AGRONOMY & SOIL SCIENCE

## COURSE OUTCOMES (COs)

1. Knowledge about Indian Agriculture and importance, present status, scope and futureprospect.
2. Identification of Soil formation, classification, physical, chemical properties and important crops and cropseeds.
3. Comprehensive knowledge on rocks and minerals, their composition and the types of soils formed from different parentmaterials.
4. Understand the role of soil forming factors and processes in soilformation
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 andmanagement

### (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 townplanning
3. Classify the residential building, list the agencies involved in improving house and review the problems associated with residentialhousing
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 atown

## (19EE0233) INDUSTRIAL INSTRUMENTATION
## (OpenElective-II)

### COURSE OUTCOMES (COs)

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

1. Identifyandexplainthetypesoferrorsoccuringinmeasurementsystems.
2. Differentiateamongthetypesofdatatransmissionandmodulationtechniques.
3. Apply digital techniques to measure voltage, frequency and speed.
4. Analyse the working principles of different Signal Analyzers and Digitalmeters.
5. Understand the operation of several types oftransducers.
6. ChoosesuitableTransducersforthemeasurementofnon-electricalquantities.

## (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 finds the best one for the industrialapplications
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 controlsystems
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
## (OpenElective-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 embeddedsystems.
2. Enumerate and describe the components of an embeddedsystem.
3. Learnabout open source electronicsplatform.

4. Program an embedded system by interfacing sensors &actuators.
5. Identify the basic building blocks of Internet of Things andcharacteristics.
6. Implement their own ideas in various application areas of Embedded systems andIoT.

## (19CS0551) JAVA PROGRAMMING
## (OpenElective-II)

### COURSE OUTCOMES (COs)

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

1. Implement simple abstract data types and design abstractionfunctions.
2. Recognize features of object-oriented design such as encapsulation, polymorphism, inheritance, and composition of systems based on objectidentity.
3. Apply object-oriented design patterns for problemsolving.
4. Implement Exception handling withsynchronization.
5. Execute programs on Multithreading and String handlingconcepts.
6. Design applications with an event-driven graphical userinterface.

## (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 IPrights
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 intellectualwork
4. Able to identify, apply, and assess ownership rights, registration processes for IPrights
5. To discern the approaches for intellectual property management and intellectual propertyaudits
6. Demonstrate knowledge and understanding on unfair competition and latest developments in IP rights at internationallevel

## (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 differentpumps
4. **Study** the performance of differentturbines
5. **Study** importance of liquid properties and its methods ofdetermination
6. **Calculate** forces and pressure due to fluid action under differentconditions

## (19AG0704) FARM MACHINERY & EQUIPMENT-I LAB

### COURSE OUTCOMES (COs)

Studies will be familiar with

1. List out the various types of sowing, inter cultivation and plant protectionequipment.
2. Classify the types of sprayer andduster.
3. Determine the performance of MB plough, disc plough, disc harrow andcultivator
4. Compare the different types of seeddrills.
5. Categorize the various types of sowing, inter cultivation and plant protectionequipment.
6. Measure the nozzle discharge and field capacity of sprayer andduster.

## (19AG0705) PRINCIPLES OF AGRONOMY & SOIL SCIENCE LAB

### COURSE OUTCOMES (COs)

Studies 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 localclimate.
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 macronutrientlevels:
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 precautious 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 boarders
- 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 identifythe context, topic, and pieces of specific information.
2. To employ suitable strategies for skimming and scanning to get the general idea of at extand 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 inwriting
5. To form sentences using proper grammaticalstructuresand correctword 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. Ale 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)DATASTRUCTURES

**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 PROGRAMMINGLAB

**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 conepts 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 themself 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 andobjectives 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 tointellectual 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 FibreReinforced 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 bucklingof rectangular cross-sectional beams and plates

## (19CE1011) STRUCTURAL HEALTH MONITORING

**COURSE OUTCOMES:**

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

1. Diagnosis 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 loadingconditions.
2. Analyses design and detail the RC and Steel Chimney.
3. Analyses design and detail the tall buildings subjected to different loading conditions usingrelevant codes.
4. Analysis and design of dynamic approach OF STRUCTURAL DESIGN USING is Codeprovisions.

## (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 ofloading and subsoil characteristics.
3. Prepare comprehensive design oriented computer programs for interaction problems basedon theory of sub grade reaction such as beams, footings, rafts etc.
4. Analyze different types of frame structure founded on stratified natural deposits with linearand 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, integrateand critically
4. Analyse the political economy of Indian international relations and gain knowledgein Judiciary system
5. Apply their knowledge and skills acquired to write various competitiveexaminations

**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 defection*
*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 connectionsby 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 theunderlying business processes of an organization.
2. Design alternatives to solve business problems utilizing quantitative analysis, critical thinking andsound 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 decisiontree
5. Elaborate the importance of scheduled preventive maintenance of mechanical and electricalequipment.
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 matrixcomposites
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

**SIDDHARTHINSTITUTEOF ENGINEERING& TECHNOLOGY**

**(AUTONOMOUS)**

**Control Systems (M .Tech)**

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

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

## (19HS0823) RESEARCH METHODOLOGY AND INTELLECTUAL PROPERTYRIGHTS

### COURSEOUTCOMES

1. Recognize appropriate research problem, errors in selecting a research problem, Scope andobjectivesof researchproblem.
2. Criticallyassessresearchmethodspertinenttotechnologyinnovationresearch.
3. Identify,explain, compare,and preparethekey elements ofa research proposal/report.
4. Skilltounderstand theneed ofintellectual propertyrights,IPRprotection toinventors.
5. DevelopsproceduralknowledgetoLegalSystemandsolvingtheproblemrelat*ingto*intell ectualpropertyrights for further researchwork andinvestmentin R&D.

## (19EE2001)MATHEMATICALMETHODSINCONTROLSYSTEMS

### COURSEOUTCOMES

Studentswillbeableto

1. Applymatrixproperties and functions to a givenproblem
2. Useeigenvaluesandeigenvectors
3. Findoutresponsesof linearsystemstoanygiveninputsignal

## (19EE2002)NON-LINEARSYSTEMS

### COURSEOUTCOMES

Studentswill beableto

1. Explore tools for stability analysis and response evaluation of control problemswithsignificant nonlinearities
2. Identifythedesignproblemanddistinguishbetweenthecontrolsstrategies
3. Correlatebetweendesignparametersandthesystemperformance

## (19EE2003)ROBOTICSANDAUTOMATION

### COURSEOUTCOMES

Studentswill beable to

1. Obtainforward,reversekinematicsand dynamicsmodelofthe industrialrobotarm

2. Proposeand synthesizecontrol lawfor agiven application
3. Classifyrobotsanddecidespecificationsdependingontheapplications

## (19EE2004)DIGITALCONTROLSYSTEMS

### COURSEOUTCOMES

Studentswill be able to

1. Modeldigitalfiltersandsystems
2. Analysedigitalsystemsintimedomainandfrequencydomain
3. Modelandanalysedigitalsystemsinstatespacerepresentation
4. Designcontrollersfordigitalsystemsinstatespacerepresentation

## (19EE2005)NON-LINEARCONTROL SYSTEMS

### COURSEOUTCOMES

Studentswill be ableto

1. Application of deeper ideas from mathematics and specifically from geometry toengineeringproblems
2. Analyzeanddesignnonlinearcontrollerswiththeaidofsoftwaretools

## (19EE2006)SYSTEMSBIOLOGY

### COURSEOUTCOMES

Studentswill beableto

1. Understandandapply mathematical modelstodesign aparticularsystem
2. Applyfeed-forwardloopstodesignabiologicalcontrolsystem

## (19EE2122)SCADASYSTEMANDAPPLICATIONS

### COURSEOUTCOMES

1. Can ableto work withPLC
2. Can ableto work withPLC
3. CanUnderstand howPLCand SCADAhelp in powersystemautomation
4. AbletounderstandthefunctioningOf differenthardwarecomponentinSCADA
5. Canableto understandthe applicationsof SCADAin differentindustries

## (19EE2007)DESIGNASPECTSINCONTROLSYSTEMS

### COURSEOUTCOMES

Studentswill beableto

1. Modelacontrolsystemgivenitsparameters
2. Decidegainsofthe controllerslikePI,PID ina givencontrolsystem

## (19HS0818)ENGLISHFORRESEARCH PAPERWRITING

### COURSEOUTCOMES

1. Torecognizeand demonstratethestyle andconventionsofresearchwriting.
2. Toimprovetheclarityandcoherenceof theirwritten proposal.
3. Ableto useavarietyof sentencepatterns.
4. Toenhancetheir revisionand proofreading skills.
5. Touseeffectivestrategiesand techniques toconstruct their academicprojects.

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## IM.Tech –IISem.

## (19EE2010)OPTIMALCONTROLTHEORY

### COURSEOUTCOMES

Studentswill beableto

1. Combine the mathematical methods used in optimal control to derive the solution to variationsofthe problems studied in thecourse
2. Use the standard algorithms for numerical solution of optimal control problems and use Matlabtosolvefairlysimplebut realisticproblems
3. Integratethetoolslearnt duringthe courseand applythemto morecomplexproblems

## (19EE2011)INDUSTRIALAUTOMATION

### COURSEOUTCOMES

Studentswill beable

1. Toidentifypotentialareasforautomationandjustifyneedforautomation
2. Toselectsuitablemajorcontrolcomponentsrequiredtoautomateaprocessorana ctivity
3. To translate and simulate a real time activity using modern tools and discuss thebenefitsofautomation.
4. Toidentifysuitableautomationhardwarefor thegivenapplication.
5. Torecommendappropriatemodelingandsimulationtoolforthegiv enmanufacturingapplication.

## (19EE2012)ADVANCEDCONTROLSYSTEMS

### COURSEOUTCOMES

Studentswill beableto

1. Applythe concepts oflinear algebra and their applications tocontrol system
2. Analyzethe systemdynamics and Lyapunovstabilitytheory
3. Designlinearquadraticcontroller

## (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 OFINDIA

### COURSEOUTCOMES

1. Explainthekeyconceptsofpolitical economy
2. Analysethesignificantdevelopmentsinthepolitical ideologies
3. Describethesalientfeaturesoftheconstitutionof India interpret,integrateandcritically
4. Analyse the political economy of Indian international relations and gain knowledge in Judiciarysystem
5. Applytheirknowledgeandskillsacquired towritevarious competitiveexaminations

## M.Tech,IIYear1st Semester

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## (19EE2021)MACHINE LEARNINGTECHNIQUES

**CourseOutcomes**

Studentswill beableto

1. Distinguishbetween, supervised,unsupervised andsemisupervisedlearning
2. Applytheappropriate machine learningstrategyfor anygiven problem
3. Suggest supervised, unsupervised or semi-supervised learning algorithmsforanygiven problem
4. Designsystemsthatusestheappropriategraphmodelsofmachinelearning
5. Modifyexistingmachinelearningalgorithmstoimproveclassificationefficiency

## (19EE2022)STOCHASTICCONTROL

**CourseOutcomes**

Studentswill beableto

1. Applydesign Schotastic models for agiven system
2. DesignStochastic Stabilityproblems
3. Designlinearandnon-linearfilteringsystems

## (19EE2023)COMPUTATIONALMETHODS

**CourseOutcomes**

Studentswill beableto

1. Knowtheconceptandstepsofproblemsolving-mathematicalmodelling,solutionand implementation
2. Knowledgeand understandingof,and the abilityto use,mathematical techniques

3. Understandandapplymathematical reasoning

## (19HS0824)BUSINESSANALYTICS

**CourseOutcomes:**

Studentswill beable to:

- Design,device,andqueryrelationaldatabasesforoperativedata.
- Design,implement,populateandquerydatawarehousesforinformationaldata.
- Tointegrateverylargedatasetstomakebusinessdecisions.
- Evaluate the use of data from acquisition through cleansing, warehousing, analytics, andvisualizationto the ultimate businessdecision.
- Evaluatethekeyconceptsofbusinessanalytics.
- Determinewhentoimplementrelationalversusdocumentorienteddatabasestructures.

## (19ME3121)INDUSTRIALSAFETY

**COURSEOUTCOMES:**

Studentsundergoing this courseareable to

1. Understandthe pointsof factoriesact 1948for healthand safety.
2. Understandthecost&itsrelationwithreplacementeconomy.
3. UnderstandtheconceptsofWearandCorrosionPrevention
4. Understandtheconceptsofsequenceoffaultfinding activities
5. UnderstandthePrograndscheduleofpreventivemaintenanceofmechanicalandel ectricalequipment.
6. UnderstandthePeriodic MaintenanceofEquipments

## (19ME3021)ADVANCESINOPERATIONSRESEARCH

## COURSEOUTCOMES

OnsuccessfulCompletion ofthis coursethe studentwill beableto

1. Createmathematicalmodelsofthe realtimesituations.
2. ImplementTransportationand Assignmentproblems tosolvein realtimeindustry

3choosethe best strategyof Gameand capableof identifying the suitablequeuingtheory

4. Enumeratefundamental techniquesand apply itto solvevariousoptimization areas
5. Investigate,study,ApplyknowledgeinReplacementmodelsand
6. UnderstandtheInventorycontrolModels

## (19CE1028)COSTMANAGEMENTOFENGINEERINGPROJECTS

## CourseOutcomes:

Studentcan access thepresent valueandfuturevalue formoney

- Studentcanapplytheprincipals ofBenefit&Cost Analysisand
- Break-Evencomparison

- Student can calculate the depreciation cost for construction equipment and can estimate thecostforconstruction equipment
- Canprepareprofitand loss,balancesheetsetc

## (19ME3022)COMPOSITEMATERIALS

### COURSEOUTCOMES

Uponcompletion ofthis course,the studentswill havean overview of

1. Fundamentalconcept of compositematerials.
2. Differenttypesofcompositematerials.
3. Fabricationandprocessingof compositematerials.
4. MMC&CMC
5. Mechanicalbehaviorofcompositematerials.
6. Applicationofcomposite materials.

## (19EE2128)WASTETOENERGY

### CourseOutcomes:

Studentswill beable to:

- Tostudyfundamentals ofindustrial waste conversion devices
- TounderstandManufactureofpyrolyticoilsandgases,yieldsandapplications
- Tounderstandthe Equilibriumand kineticconsiderationin gasifieroperation
- TounderstandtheThermochemicalconversion

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY**
**(AUTONOMOUS)**
**Masters of Technology**

**Power Electronics (M .Tech)**
**Department of Electrical and Electronics Engineering (EEE)**

**IM.Tech-ISem.**

**(19HS0823)RESEARCHMETHODOLOGYANDINTELLECTUALPROPERTYRIGHTS**

**COURSEOUTCOMES**

1. Recognizeappropriateresearchproblem,errorsinselectingaresearch problem,Scopeandobjectivesof research problem.
2. Criticallyassessresearchmethodspertinenttotechnologyinnovationresearch.
3. Identify,explain,compare,andpreparethe keyelementsofaresearchproposal/report.
4. Skilltounderstandtheneedofintellectual propertyrights,IPRprotectiontoinventors.
5. Develops procedural knowledge to Legal System and solving the problem relating tointellectualpropertyrightsforfurther researchwork andinvestment inR&D.

**(19EE2101)ELECTRICDRIVESSYSTEMS**

**COURSEOUTCOMES:**

Studentswill beableto:

1. Modelandsimulateelectricdrivesystems
2. Designmodulationstrategiesofpowerelectronicsconverters,fordrivesapplication
3. Designappropriatecurrent/voltageregulatorsforelectricdrives
4. SelectandimplementthedrivesforIndustrialProcess
5. ImplementvariousvariablespeeddrivesinElectrical EnergyConversionSystem

**(19EE2102) MODELING AND ANALYSIS OF ELECTRICALMACHINES**

**COURSEOUTCOMES:**

Studentswillbeableto:

1. Knowledgeaboutthedynamicbehaviorrotatingmachines.
2. Abletounderstandequivalentcircuitofsynchronousmachines.
3. Tounderstandvariouspracticalissuesofdifferentmachines.

**(19EE2103)ADVANCEDPOWERELECTRONICCIRCUITS**

**COURSEOUTCOMES:**

Studentswill beable to:

1. Knowledge about analysis and design of Load Commutated CSI and PWM CSILearnanalysis and design of series Inverters.
2. Acquire knowledge about analysis and design of Switched ModeRectifiers,APFC,
3. DC-DCconverters&Resonantconverters

**(19EE2104)OPTIMALANDADAPTIVECONTROL**

**COURSEOUTCOMES:**

Students will be ableto:

1. Knowledgeinthemathematicalareaofcalculusofvariationsoastoapplythesameforsolving optimalcontrolproblems.
2. Problemformulation,performancemeasureandmathematicaltreatmentofoptimalControl problems.
3. Acquireknowledgeonsolvingoptimalcontroldesignproblemsbytakinginto
4. Considerationthephysicalconstraints on practicalcontrolsystems.
5. To obtainoptimalsolutions tocontrollerdesignproblemstakingintoconsiderationtheLimitation on control energyin thereal practical world.

**(19EE2105)POWERQUALITY**

**COURSEOUTCOMES:**

Studentswill beableto:

1. Acquireknowledgeabouttheharmonics,harmonicintroducingdevicesandeffectofharmonicson systemequipment and loads
2. Developanalyticalmodelingskillsneededformodelingandanalysisofharmonicsin networksandcomponents
3. Introducethestudenttoactivepowerfactorcorrectionbasedonstatic VARcompensatorsandits control techniques
4. Introducethestudent toseries andshunt active power filteringtechniques forharmonics

**(19EE2107) STATIC VAR CONTROLLER AND HARMONICFILTERING**

**COURSEOUTCOMES**

Studentswill be ableto:

1. Acquire knowledge about the fundamental principles of Passive and Active Reactive PowerCompensation
2. SchemesatTransmissionandDistributionlevelinPowerSystems.
3. To introduce the student to various single phase and three-phase Static VAR Compensationschemesand theircontrols
4. Todevelopanalyticalmodelingskillsneededfor modelingandanalysisofsuchStaticVAR

## (19EE2108)PWMCONVERTERSANDAPPLICATIONS

**COURSEOUTCOMES:**

Studentswill be ableto:

1. Knowledge concepts and basic operation of PWM converters, including basic circuitOperationand design
2. Learn the steady-state and dynamic analysis of PWM converters along with the applicationslikesolid state drives and power quality
3. Able to recognize and use the following concepts and ideas:Steady-State and transientmodellingand analysis ofpower converterswith various PWMtechniques.

## (19EE2109)ENERGYMANAGEMENT

**COURSEOUTCOMES**

Studentswill beable to:

1. Acquirethebackgroundrequiredforengineers tomeettheroleofenergymanagersandtoacquire theskills andtechniques required to implementenergymanagement.
2. Identifyand quantifythe energy intensivebusiness activities inan organization.
3. Knowledge about standard methodologies for measuring energy in the workplace and energyauditinstruments.
4. Knowledgeaboutenergyefficient motors,loadmatchingand selectionofmotors.
5. Acquireknowledgeaboutreactivepowermanagement,capacitorsizinganddegreeo fcompensation.

## (19HS0818)ENGLISHFORRESEARCH PAPERWRITING

**COURSEOUTCOMES**

1. Torecognizeand demonstratethestyle andconventionsofresearchwriting.
2. Toimprovethe clarity and coherenceof theirwritten proposal.
3. Ableto useavarietyof sentencepatterns.
4. Toenhancetheir revisionand proofreading skills.
5. Touseeffectivestrategies andtechniquestoconstruct theiracademicprojects.

**IM.Tech –IISem.**

## (19EE2112)POWERELECTRONICCONVERTERS

**COURSEOUTCOMES:**

Studentswill be ableto:

1. Tounderstandthevariouspowersemiconductordevices.
2. To know the various conversion techniques of power semiconductor devices and itsapplications.

## (19EE2113)DIGITAL CONTROL OFPOWERELECTRONICSAND

## DRIVESSYSTEMS

**COURSEOUTCOMES:**

Studentswill beableto:

1. DesignstaticScherbiusandKramerdrivestoimplement slippowerrecoveryschemes
2. Implementsynchronousmotordriveswithfixedfrequencyandvariablefrequencysources
3. Implement speed control schemes for Brushless D.C. motors and Permanent MagnetSynchronous motors

## (19EE2114)SWITCHEDMODEANDRESONANTCONVERTERS

**COURSEOUTCOMES:**

1. Acquire knowledge about the principles of operation of non-isolated and isolated hard-switchedDC-DC converters
2. Acquireknowledgeon variouslosscomponentsinaswitchedmodeconverterandchoiceofswitchingfrequencyw ith a viewtowards design of such converters

## (19EE2115)INDUSTRIALLOADMODELLINGANDCONTROL

**COURSEOUTCOMES:**

Students will be ableto:

1. Knowledgeaboutloadcontroltechniquesinindustriesandits application.
2. DifferenttypesofindustrialprocessesandoptimizetheprocessusingtoolslikeLI NDOand LINGO.
3. Applyloadmanagement toreducedemandof electricityduring peaktime.
4. Applydifferentenergysavingopportunitiesinindustries

## (19EE2116)ADVANCEDDIGITALSIGNALPROCESSING

**COURSEOUTCOMES :**

Students will be ableto:

1. Knowledgeaboutthetimedomainandfrequencydomainrepresentationsaswellanal ysisof discrete timesignals and systems.
2. Studythedesigntechniques forIIR and FIRfilters andtheir realizationstructures.
3. Acquire knowledge about the finite word length effects in implementation of digitalfilters.
4. Knowledgeaboutthevariouslinearsignalmodelsandestimationofpowerspectrumo fStationaryrandom.

## (19EE2117)ADVANCEDMICRO-CONTROLLERBASEDSYSTEMS

**COURSEOUTCOMES**

Studentswill be ableto:

1. Tolearnhowtoprogramaprocessorinassemblylanguageanddevelopanadvancedprocessorbasedsystem.
2. Tolearnconfiguringandusingdifferent peripheralsinadigitalsystem.
3. Tocompile anddebugaProgram.
4. Togenerate anexecutable fileanduseit.

**(19EE2118)DISTRIBUTEDGENERATION**

**COURSEOUTCOMES**

Students will be ableto:

1. TounderstandtheplanningandoperationalissuesrelatedtoDistributedGeneration.
2. AcquireKnowledgeabout DistributedGenerationLearn Micro-Grids.

**(19EE2119)SMARTGRIDS**

**COURSEOUTCOMES:**

Students will be ableto:

1. Appreciatethedifferencebetweensmart grid&conventionalgrid.
2. Applysmartmeteringconceptstoindustrialandcommercialinstallations.
3. Formulatesolutionsintheareasofsmartsubstations,distributedgenerationandwideareameasurements.
4. Comeup withsmartgridsolutions using moderncommunication technologies.

**(19HS0829)CONSTITUTIONOFINDIA**

**COURSEOUTCOMES**

1. Explainthekey conceptsofpoliticaleconomy
2. Analysethe significantdevelopments in thepolitical ideologies
3. Describethe salientfeatures oftheconstitutionof Indiainterpret, integrateand critically
4. Analyse the political economy of Indian international relations and gain knowledge inJudiciarysystem
5. Applytheirknowledge and skillsacquiredtowritevariouscompetitiveexaminations

**IIM.Tech –ISem.**

**(19EE2123)SCADASYSTEMANDAPPLICATIONS**

**CourseOutcomes**

Studentswill beable to:

- Describe the basic tasks of Supervisory Control Systems (SCADA) aswellastheirtypicalapplications**.**
- Acquire knowledge about SCADA architecture, various advantages anddisadvantagesofeachsystem.
- Knowledgeabout singleunified standardarchitecture IEC 61850.
- TolearnaboutSCADAsystemcomponents:remoteterminalunits,PLCs,intelligentelectronic devices, HMIsystems,SCADAserver.
- Learn and understand about SCADA applications in

transmission anddistributionsector, industries etc.

**(19EE2124)FACTSANDCUSTOMPOWERDEVICES**

**CourseOutcomes:**

Studentswill beable to:

- Acquireknowledgeabout thefundamentalprinciplesofPassiveandActiveReactivePowerCompensationSchemesatTransmissionandDistributionlevelinPowerSystems.
- LearnvariousStaticVARCompensationSchemeslikeThyristor/GTOControlled.
- Reactive Power Systems, PWM Inverter based Reactive Power Systems and theircontrols.
- TodevelopanalyticalmodelingskillsneededformodelingandanalysisofsuchStaticVARSystems

**(19EE2125)HVDCTRANSMISSIONSYSTEMS**

**CourseOutcomes:**

Studentswill beable to:

- Choose intelligently AC and DC transmission systems for the dedicatedapplication(s).
- Identifythesuitabletwo-level/multilevelconfiguration forhighpower converters.
- Selectthesuitableprotectionmethodforvariousconverterfaults.

**(19HS0824)BUSINESSANALYTICS**

**CourseOutcomes:**

Studentswill beable to:

- Design,device,andqueryrelationaldatabasesforoperativedata.
- Design,implement,populateandquerydatawarehousesforinformationaldata.
- Tointegrateverylargedatasetstomakebusinessdecisions.
- Evaluate the use of data from acquisition through cleansing, warehousing, analytics, andvisualizationto the ultimate businessdecision.
- Evaluatethekeyconceptsofbusinessanalytics.
- Determinewhentoimplementrelationalversusdocumentorienteddatabasestructures.

**(19ME3121)INDUSTRIALSAFETY**

**COURSE OUTCOMES:**

Studentsundergoing this courseareable to

1. Understandthe pointsof factoriesact 1948for healthand safety.
2. Understandthecost&itsrelationwithreplacementeconomy.
3. UnderstandtheconceptsofWearandCorrosionPrevention
4. Understandtheconceptsofsequenceoffaultfindingactivities
5. UnderstandthePrograndscheduleofpreventivemaintenanceofmechanicalandelectricalequipment.
6. UnderstandthePeriodic MaintenanceofEquipments

## (19ME3021)ADVANCESINOPERATIONSRESEARCH

**COURSEOUTCOMES**

OnsuccessfulCompletion ofthis coursethe studentwill beableto

1. Createmathematical modelsoftherealtimesituations.
2. ImplementTransportationand Assignmentproblems tosolvein realtimeindustry

3choosethe best strategyof Gameand capableof identifying the suitablequeuingtheory

4. Enumeratefundamentaltechniques andapply itto solvevarious optimizationareas
5. Investigate,study,ApplyknowledgeinReplacementmodelsand
6. UnderstandtheInventorycontrolModels

## (19CE1028)COSTMANAGEMENTOFENGINEERINGPROJECTS

**COURSEOUTCOMES**

Studentcan access thepresent valueandfuturevalue formoney

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- Break-Evencomparison
- Student can calculate the depreciation cost for construction equipment and can estimate thecostforconstructionequipment
- Canprepareprofitand loss,balancesheetsetc

## (19ME3123)COMPOSITEMATERIALS

**COURSEOUTCOMES**

Uponcompletion of thiscourse, the students willhavean overviewof

1. Fundamentalconcept of compositematerials.
2. Differenttypesofcompositematerials.
3. Fabricationandprocessingof compositematerials.
4. MMC&CMC
5. Mechanicalbehaviorofcompositematerials.
6. Applicationofcomposite materials.

## (19EE2128)WASTETOENERGY

**COURSEOUTCOMES:**

Studentswill beable to:

- Tostudyfundamentals ofindustrial waste conversion devices
- TounderstandManufactureofpyrolyticoilsand gases,yieldsandapplications
- Tounderstandthe Equilibriumand kineticconsiderationin gasifieroperation
- TounderstandtheThermochemicalconversion

**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 self-development.

 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-Speednetworks.*

## (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 MachineLearning.*

## (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 devicesand 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. *Analyseagro 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. C*hoose 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. *Analyseand 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 byemploying fault models to the logic circuits.*
3. *Get complete knowledge about different methods of simulation and algorithms associated withtesting.*
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 researchstudy.*

## (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 VLSIdesign knowledge.*
2. *Design full custom/ semicustom/ standard cells for ASIC.*
3. *Implement both hardware and software solutions, formulate hardware/software tradeoffs, andperform 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. *Analyseagro 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. C*hoose 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 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.*

## (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-Qualitynanodevices.*
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. *Toanalyzemodeling and simulation of digital systems.*
3. *Toanalyzelogic synthesis and verification of digital system's*
4. *Toanalyzehigh-level synthesis of digital systems.*
5. *To impartthe 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 Patten 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 byemploying fault models to the logic circuits.*
3. *Get complete knowledge about different methods of simulation and algorithms associated withtesting.*

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. *Analyseagro 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. C*hoose 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 paly 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 analyses 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 DistributedDeadlocks
- 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 RESARCH

**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**