R18

B.Tech. –EEE

Under Graduate (B.Tech.)

Department of Electrical and Electronics Engineering (EEE)

I Year 1st Semester

S. No.	Subject Code	Name of the Course / Laboratory	No. of Periods per week			No. of Credits
			L	T	Lab/ Practice	
1	18HS0830	Mathematics I	3	-	-	3
2	18HS0849	Physics	3	1	-	4
3	18CS0501	Programming for problem solving	3	-	-	3
4	18ME0348	Thermal and Fluid Engineering	3	-	-	3
5	18ME0301	Workshop practice Lab	-	-	4	2
6	18HS0852	Physics Lab	-	-	3	1.5
7	18CS0503	Programming for problem solving Lab	-	-	3	1.5
8		Induction Program (3 weeks)	-	-	-	
			12	1	10	
Total			**Total/week 23**			**18**

I Year 2nd Semester

S. No.	Subject Code	Name of the Course / Laboratory	No. of Periods per week			No. of Credits
			L	T	Lab/ Practice	
1	18HS0810	English	3	-	-	3
2	18HS0831	Mathematics II	3	1	-	4
3	18HS0801	Chemistry	3	1	-	4
4	18EE0201	Electrical circuits -I	3	-	-	3
5	18ME0302	Engineering Graphics & Design	1	-	4	3
6	18HS0811	English Lab	-	-	3	1.5
7	18HS0802	Chemistry Lab	-	-	3	1.5
Non Credit course						
8	18HS0816	Indian Constitution	3	-	-	0
			16	2	10	
Total			**Total/week 28**			**20**

R18

B.Tech. –EEE

II Year 1st Semester

S. No.	Subject Code	Name of the Course / Laboratory	No. of Periods per week			No. of Credits
			L	T	Lab/ Practice	
1	18HS0803	Biology for Engineers	2	1	-	3
2	18EE0202	Electrical circuits-II	3	-	-	3
3	18EC0443	Analog Electronic Circuits	3	-	-	3
4	18EE0203	Electromagnetic Fields	3	-	-	3
5	18EE0204	Electrical Machines -I	3	1	-	4
6	18EC0445	Analog Electronic Circuits lab	-	-	3	1.5
7	18ME0349	Thermal &Fluid Engineering Lab	-	-	3	1.5
8	18EE0205	Electrical circuits lab	-	-	2	1
Non Credit course						
9	18HS0804	Environmental Sciences	3	-	-	0
			17	2	8	
Total			**Total/week 27**			**20**

II Year 2nd Semester

S. No.	Subject Code	Name of the Course / Laboratory	No. of Periods per week			No. of Credits
			L	T	Lab/ Practice	
1	18EC0444	Digital Electronics	3	-	-	3
2	18HS0833	Probability &Statistics, Numerical Methods	3	1	-	4
3	18EE0206	Power Electronics	3	-	-	3
4	18EE0207	Electrical Machines II	3	-	-	3
5	18EC0403	Signals & Systems	3	-	-	3
6	18EE0208	Electrical Circuits Simulation Lab	-	-	3	1.5
7	18EE0209	Electrical Machines-I Lab	-	-	3	1.5
Credit course						
8	COE-I	Comprehensive Online Exam-I	-	-	-	1
Non Credit course						
9	18HS0817	Essence of Indian Traditional Knowledge	3	-	-	0
			18	1	6	
Total			**Total/week 25**			**20**

R18

B.Tech. –EEE

III Year 1st Semester

S. No.	Subject Code	Name of the Course / Laboratory	No. of Periods per week			No. of Credits
			L	T	Lab/ Practice	
1	18HS0812	Managerial Economics and Financial Analysis	3	-	-	3
2	18EC0414	Digital signal processing	3	-	-	3
3	18EE0210	Power Systems-I	3	-	-	3
4	18EE0211	Control Systems	3	-	-	3
5	18EE0212	Electrical Measurements	3	-	-	3
6	18EE0213	Electrical Machines –II Lab	-	-	4	2
7	18EE0214	Control Systems Lab	-	-	3	1.5
8	18EE0215	Electrical Measurements Lab	-	-	3	1.5
Noncredit course						
9	18HS0842	Aptitude practices	3	-	-	-
			18	0	10	
Total			**Total/week**		**28**	**20**

III Year 2nd Semester

S. No.	Subject Code	Name of the Course / Laboratory	No. of Periods per week			No. of Credits
			L	T	Lab/ Practice	
1	18HS0813	Management Science	3	-	-	3
2	18EC0420	Microprocessors and Microcontrollers	3	-	-	3
3	18EE0216	Power Systems – II	3	-	-	3
Professional Elective Course(PEO)-I						
4	18EE0221	Electrical Machine Design	3	-	-	3
	18EE0222	Digital Control Systems				
	18EE0223	Modern Control Theory				
Open Elective-I						
5	18CE0127	Elements of Road Traffic Safety	3	-	-	3
	18ME0307	Non-Conventional Energy Resources				
	18EC0449	Introduction to IOT				
	18CS0517	Python Programming				
	18HS0814	Intellectual Property Rights				
Credit Course						
6	COE-II	Comprehensive Online Examination-II	-	-	-	1
7	18EE0243	Internship (60 Hours)	-	-	-	2
8	18EE0217	Power Electronics and Drives Lab	-	-	2	1
9	18EE0218	Power Systems Lab	-	-	2	1
Non Credit course						
10	18HS0859	English for Corporate Communication Skills Lab	3	-	-	0
			18	0	4	
Total			**Total/week 22**			**20**

IV Year 1st Semester

S. No.	Subject Code	Name of the Course / Laboratory	No. of Periods per week			No. of Credits
			L	T	Lab/ Practice	
1	18EE0219	Electrical Distribution Systems	3	-	-	3
2	18EE0220	Utilization of Electrical Energy	3	-	-	3
Professional Elective Course(PEC)- II						
3	18EE0224 18EE0225 18EE0226	Power System Protection Electrical and Hybrid Vehicles Electrical Energy Conservation and Auditing	3	-	-	3
Professional Elective Course (PEC)- III						
4	18EE0227 18EE0228 18EE0229	Power Quality High Voltage Engineering Wind and Solar Energy Systems	3	-	-	3
Professional Elective Course (PEC)- IV						
5	18EE0230 18EE0231 18EE0232	HVDC and FACTS Neural Networks and Fuzzy Logic Advanced Electrical Drives	3	-	-	3
	Open Elective-II					
6	18CE0146	Project Planning and Control	3	-	-	3
	18ME0353	Computer Aided Process Planning				
	18EC0450	MATLAB Programming				
	18CS0544	Software Development and Testing				
	18HS0815	Entrepreneurship Development				
7	18EC0422	Microcontroller and Applications Lab	-	-	2	1
8	18EE0233	Substation Automation Lab (Virtual Lab)	-	-	4	2
9	18EE0234	Project Phase-I	-	-	4	2
			18	-	10	
Total:			**Total/week: 28**			**23**

IV Year 2nd Semester

S. No.	Subject Code	Name of the Course / Laboratory	No. of Periods per week			No. of Credits
			L	T	Lab/ Practice	
1		MOOC-I	3	-	-	3
2		MOOC-II	3	-	-	3
3	18EE0235	Project Phase-II	-	-	22	11
4	18EE0237	Comprehensive Viva Voce	-	-	-	2
			6	-	22	
Total:			**Total/week 28**			**19**

Note: L – Lecture hours, T – Tutorial, P – Practical, Drg. – Drawing, C – Credits

Year	I Year		II Year		III Year		IV Year		Total
Semester	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	I Sem	II Sem	
Credits	18	20	20	20	20	20	23	19	160

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(18HS0830) MATHEMATICS-I

B.Tech, I Year 1st semester **L T P C**
3 0 0 3

Course Objectives:

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines. More precisely, the objectives are:

To introduce the idea of applying differential and integral calculus to notions of curvature and to improper integrals. Apart from some applications it gives a basic introduction on Beta and Gamma functions.

analysis to Engineering problems.

To develop the tool of power series and Fourier series for learning advanced Engineering Mathematics.

To familiarize the student with functions of several variables that is essential in most branches of engineering.

To develop the essential tool of matrices and linear algebra in a comprehensive manner.

Course Outcomes:

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariate analysis and linear algebra. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

UNIT - I

MATRICES

Inverse and rank of a matrix; System of linear equations; Symmetric,skew-symmetric and orthogonal matrices; Eigen values and eigen vectors; Diagonalization of matrices; CayleyHamilton Theorem, and Orthogonal transformation.

UNIT - II

CALCULUS

Evaluation of definite and improper integrals; Applications of definite integrals to evaluate surface areas and volumes of revolutions; Beta and Gamma functions and their properties.

UNIT - III

MULTIVARIABLE CALCULUS

Limit, continuity and partial derivatives, total derivative; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, directional derivatives, curl and divergence.

UNIT - IV

SEQUENCES AND SERIES

Convergence of sequence and series, tests for convergence (Geometric test, P- test, limit ; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions.

UNIT-V

FOURIER SERIES

Determination of Fourier coefficients- Fourier series- Even and odd functions, Fourier Series in an arbitrary interval, Periodic function, Half range sine and cosine series,

TEXT BOOKS:

1. "Higher Engineering Mathematics ", B.S.Grewal, Khanna publishers-42nd Edition(2012)
2. "Engineering Mathematics" Volume-I, by T.K.V. Iyengar, S.Chand publication-12thEdition

REFERENCES:

1. Ramana B.V. "Higher Engineering Mathematics ", Tata McGraw Hill New Delhi,11thReprint, 2010.
2. "Engineering mathematics ", volume-I&II, E.Rukmangadachari & E.Keshava Reddy Pearson Publishers.
3. D. Poole, "Linear Algebra: A Modern Introduction ," 2nd Edition, Brooks/Cole, 2005.
4. N.P. Bali and Manish Goyal," A text book of Engineering Mathematics , LaxmiPublications, Reprint, 2008.
5. Bhavanari Satyanarayana, T.V.Pradeepkumar&D.Srinivasulu "Linear Algebra & Vector *Calculus*", Studera Press, New Delhi.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0849) PHYSICS

B.Tech, I Year 1st semester **L T P C**
3 1 0 4

Objectives:

- Will recognize the various basic terms related to Oscillations.
- The basic concepts related properties of Lasers.
- Will understand the dual nature of Matter.
- Recognize importance of free electrons theory and semiconductors. To
- understand the fundamentals Nano materials.

Course outcomes:

Studies will be familiar with

- Various basic terms related to waves and Oscillations.
- Some of the basic concepts related properties of Lasers.
- Able to explain Dual nature of matter.
- Recognize importance of free electrons theory and semiconductors.
- Understand the importance of Nanotechnology.

UNIT - I

WAVES & OSCILLATIONS

Mechanical and electrical simple harmonic oscillators - damped harmonic oscillator - forced mechanical and electrical oscillators - impedance, steady state motion of forced damped harmonic oscillator.

UNIT - II

LASERS

Properties of laser beams: mono-chromaticity, coherence, directionality and brightness Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion, different types of lasers: gas lasers (He-Ne), solid-state lasers (Neodymium) , applications of lasers in science, engineering and medicine.

UNIT - III

INTRODUCTION TO QUANTUM MECHANICS & SOLUTION OF WAVE EQUATION

Wavenature ofParticles – de Broglie hypothesis,Heisenberg's Uncertainty principle.Time-dependent and time - independent Schrodinger equation for wave function – physical significance of wave function - Solution of stationary-state Schrodinger equation for one dimensional problems-particle in a box.

UNIT - IV

INTRODUCTION TO SOLIDS & SEMICONDUCTORS

Free electron theory of metals - and origin of energy bands. Types of electronic materials: metals, semiconductors, and insulators. Intrinsic and extrinsic semiconductors, Fermi

level _ effect of temperature - diffusion and drift —Einstein Relationapplication.—Hall effect and it's

UNIT-V

PHYSICS OF NANOMATERIALS

Introduction, significance of nano scale _ surface area and quantum confinement- Quantum dot, Quantum well ,Quantum wire -Synthesis of nanomaterials- Top Down Process- Ball Milling ; Bottom Up Process: Sol-Gel method—CNT-Properties of Graphene-Applications.

TEXT BOOKS:

1. H. J. Pain, "The physics of vibrations and waves ", Wiley, 2006.
2. E. Hecht, "Optics ", Pearson Education, 2008.

REFERENCES:

1. O. Svelto, "Principles of Lasers ", Springer Science & Business Media, 2010.
2. D. J. Griffiths, "Quantum mechanics ", Pearson Education, 2014.
3. D. A. Neamen, "Semiconductor Physics and Devices ", Times Mirror High Education Group, Chicago, 1997.
4. B.E.A. Saleh and M.C, Tech, "Fundamentals of photonics ", John Wiley & Sons.
5. "Engineering Physics " _ K.Thyagarajan, MCGrawHill Education Private Ltd, New Delhi.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18CS0501) PROGRAMMING FOR PROBLEM SOLVING

B.Tech, I Year 1st semester **L T P C**
3 0 0 3

Course Objectives:

- To understand the core aspects of computer problem solving techniques
- To understand the programming language constructs
- To understand the programming paradigms

Course Outcomes:

- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs
- Able to write C programs for real world problems using simple and compound data types.

UNIT I

OVERVIEW OF COMPUTERS AND C-PROGRAMMING

Description of Computer Hardware &Software.

INTRODUCTION TO C

overview of C, executing a 'c' program, c-character set, constants, variables, data types, declaration of variables, assigning values to variables, managing input & output operations, operators and expressions, basics of algorithm and flow chart

UNIT II

DECISION&LOOPCONTROL STATEMENTS

Introduction, If Statement, If-else Statement, Nested- If-else Statement, Else if Ladder, Switch case – break – continue – go to Statement ,for loop, nested for loop, while loop, do-while, dowhile statement with while loop

UNIT III

ARRAYS

Introduction, one-dimensional (1D)-Arrays, declaration and initialization of one-dimensional (1D)-Arrays, Two- dimensional (2D)-Arrays, initialization of Two-dimensional(2D)-Arrays, Multi-dimensional Arrays

FUNCTIONS

Introduction, need for user-defined functions, a multi function program, elements of user-defined functions, definition of functions, return values and types, category of functions, recursion, scope and life time of variables, preprocessor commands:#define, #include, multi file programs

UNIT IV

POINTERS

Introduction, understanding pointers, accessing address of a variable, declaring and initialization of pointer variables, accessing variable through pointers, chain of pointers, pointer expressions, pointer increment and scale factor, pointers and arrays, passing arrays to functions, array of pointers, pointers as function arguments, functions returning pointers.

STRINGS

Introduction, declaring and initializing string variables, reading and writing strings, arithmetic operations on characters, putting strings together, comparison of two strings, string handling functions, table of strings(array of strings)

UNIT V

STRUCTURES

Introduction , defining a structure , declaring structure variables ,accessing structure members, structure initialization, copying and comparing structure variables, operations on individual members , arrays of structures ,arrays within structures, structures within structures, structures and functions, unions, typedef, enum

FILE MANAGEMENT IN C

Introduction, Types of Files, Defining and Opening a File,
Closing a File, Input / Output Operations on Files, Error handling during IO Operations, Random access to files, Command line arguments.

TEXT BOOKS:

1. "C and Data Structures ",Ashok Kamthane Pearson education.
2. "Programming in C and Data Structures ",E Balagurusamy - Mc GrawHill.

REFERENCES:

1. "Computer Fundamentals and C Programming", Dr. P. Chenna Reddy, ISBN: 9789351045885, Publisher: Pothi.com.
2. "Programming in C ", Second Edition - Pradip Dey, Manas Ghosh, Oxford University Press.
3. "C from Theory to Practice", George S. Tselikis- Nikolaos D. Tselikas- CRC Press.
4. "Programming with C ",R S Bichkar- University Press.
5. "Programming in C and Data Structures ", J.R.Hanly, Ashok N. Kamthane and A.Ananda Rao, Pearson Education.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(18ME0348) THERMAL &FLUID ENGINEERING

B.Tech, I Year 1st semester **L T P C**
3 0 0 3

Course Objectives:

- To understand the applied thermodynamic concepts, the construction and the working principles of various engineering devices such as steam generators, steam nozzles, steam turbine.
- Fluid properties and their engineering significance. Students able to study the methods of fluid pressure measurement and basic idea about the fundamentals of fluid flow and its description. The student is exposed to the fundamental equations, used in the analysis of fluid flow problems.
- Know the different types of pipe flow and the conditions governing them. Equations related to different flows are derived and the student gets to understand the working of the different devices used for measurement of fluid flow under different conditions.

Course Outcomes:

- Understands the applied thermodynamic concepts, the construction and the working principles of various engineering devices such as steam generators, steam nozzles, steam turbine.
- Knows the different types of pipe flow and the conditions governing them. Equations related to different flows are derived and the student gets to understand the working of the different devices used for measurement of fluid flow under different conditions.

UNIT-I

THERMAL POWER PLANT

Layout of a Thermal Power Plant, Water cooling, Feed water treatment, Coal, handling, Coal storage, Chimney

HYDROELECTRIC POWER STATIONS

Elements of hydroelectric power station types- concept of pumped storage plants-storage requirements.

UNIT-II

BASIC CONCEPTS

Definitions of system, boundary, surrounding control volume. Types of thermodynamic systems, Properties of system, definitions for properties like pressure, volume, temperature, enthalpy, internal energy, density, with their units.State, Property, Process and Cycle, Quasi Static Process, Thermodynamic Equilibrium.

WORK & HEAT TRANSFER

Work transfer, Types of work transfers, Point and Path Functions, Heat transfer, Comparison of Work and Heat transfers. Law of Thermodynamics: Zeroth Law of Thermodynamics, First Law of Thermodynamics and Second Law of Thermodynamics

UNIT-III

PURE SUBSTANCES

P-V, P-T, T-S diagrams of Pure Substances, Mollier Diagram, Dryness Fraction, Enthalpy and Entropy of Steam using Steam Tables with Problems. Thermodynamic Cycles**:** Carnot Cycle & Rankine Cycle with simple problems.

STEAM BOILERS

Classifications of Boilers, Fire Tube boiler- Cochran boiler, Water Tube boiler- Babcock and Wilcox Boiler, Modern High Pressure Boilers - Lamont, Benson Boilers.

BOILER MOUNTINGS AND ACCESSORIES

Pressuregauge, water level indicator, fusible plug, blow down cock, stop valve, safety valve feedpump, economiser, super heater and air pre-heater. Problems on Performance of Boilerand Heat balance sheet.

UNIT-IV

FLUID STATICS

Dimensions and units: physical properties of fluids – specific gravity, porosity surface tension vapor pressure and their influence on fluid motion – atmospheric gauge and vacuum pressure measurement of pressure - Piezometer, U-tube differential manometers.

FLUID KINEMATICS

Stream line, path line and streak lines and steam tube, classification of flows-steady & unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows-equation of continuity for one dimensional flow.

UNIT–V

FLUID DYNAMICS

Surface and body forces – Euler"s and Bernoulli"s equations for flowing stream line, momentum equation and its application on force on pipe bend.

CONDUIT FLOW

Reynold"s experiment – Darcy Weisbach equation - Minor losses in pipes - pipes in series and pipes in parallel - total energy line-hydraulic gradient line.

Measurement of flow: Pitot tube, Venturimeter and orificemeter, Flow nozzle.

TEXT BOOKS:

1. "Thermal Engineering ", Rajput, R. K., Laxmi Publications, 6th Edition, New Delhi, 2010.
2. "A Course in Thermal Engineering ", Domkundwar,A., DhanpatRai& Co., New Delhi, 2003.

REFERENCES:

1. "Fluid Mechanics, Hydraulic and Hydraulic Machines ",Modi & Seth, Standard book house.
2. "A Text of Fluid Mechanics and Hydraulic Machines ",Dr.R.K.Bansal – Laxmi Publications (P) Ltd., New Delhi.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(18ME0301) WORKSHOP PRACTICE LAB

B.Tech, I Year 1st semester **L T P C**
0 0 4 2

Course Objectives:

- The course provides hands-on training in the trades of Carpentry, Fitting, House-wiring, Tin Smithy, and Foundry. Overview of metal cutting processes, plumbing and welding is provided through live demonstrations.

Course Outcomes:

After completion of this course, a successful student will be able to:

- Utilize workshop tools for engineering practice.
- Employ skills for the production a component for real time applications.
- Appreciate the hard work and intuitive knowledge of the manual workers.

LIST OF EXPERIMENTS

1. TRADES FOR EXERCISES

a. Carpentry shop: Two joints (exercises) involving tenon and mortising, groove and tongue: Making middle lap T joint, Cross lap joint, Mortise and tenon T joint, Bridle T joint from soft wood stock.

b. Fitting shop: Two joints (exercises) from: Square joint, V joint, Half round joint or Dovetail joint out of 100 x 50 x 5 mm M.S. stock.

c. **Sheet metal shop**: Two jobs (exercises) from: Tray, Cylinder, Hopper or Funnel from out of 22 or 20 gauge G.I. sheet.

d. **House-wiring**: Two jobs (exercises) from: Wiring for ceiling rose and two lamps (bulbs)with independent switch, two way switch, controls with or without looping, wiring for stair case lamp, wiring for water pump with single phase starter.

e. **Foundry**: Preparation of two moulds (exercises): for a single pattern and a double pattern.

f. **Welding**: Preparation of two welds (exercises): Single V butt joint, Lap joint, Double V butt joint or T fillet joint.

2.TRADES FOR DEMONSTRATION:

a. Plumbing
b. Machine Shop
c. Metal Cutting

Apart from the above the shop rooms should display charts, layouts, figures, circuits, hand tools, hand machines, models of jobs, materials with names such as different woods, wood faults, Plastics, steels, meters, gauges, equipment, CD or DVD displays, First aid, shop safety etc. (though they may not be used for the exercises but they give valuable information to the student). In the class work or in the examination knowledge of all shop practices may be stressed upon rather than skill acquired in making the job.

REFERENCES:

1. Engineering Work shop practice for JNTU, V. Ramesh Babu, VRB Publishers Pvt. Ltd., 2009
2. Work shop Manual, P.Kannaiah & K.L.Narayana, SciTech Publishers.
3. Dictionary of Mechanical Engineering, GHF Nayler, Jaico Publishing House.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(18HS0852) PHYSICS LAB

B.Tech, I Year 1st semester **L T P C**
0 0 3 1.5

Course Description:

Physics practical course is meant for making the students to gain practical knowledge to correlate with the theoretical studies. It covers experiments on principle of Mechanics and Optics, measurement of magnetic field and studying resonance using LCR circuit.

Objectives:

- 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.

Suggested list of experiments from the following: (Perform any EIGHT experiments from the following)

1. Determination of wavelengths of variouscolors of Mercury spectrum using Diffraction Grating - Normal Incidence method.
2. Determination of Dispersive power of prism.
3. Rigidity Modulus - Torsional Pendulum
4. Study of Resonance effect in Series and Parallel LCR circuit.
5. Determination of thickness of thin object by wedge method.
6. Determination of radius of curvature of Plano convex lens – Newton's Rings.
7. Determination of wavelength of a given laser source by using diffraction grating.
8. Determination of particle size using laser source.
9. Determinationof energy gap of a semi conductor using p –n junction diode.
10. B- H curve.
11. Magnetic field along the axis of current carrying coil – Stewart & Gee's Method.
12. Determination of frequency of tuning fork - Melde's Apparatus
13. Determination of Spring constant - Coupled Oscillator.
14. Study of Characteristics of Solar Cell.
15. Determination of Numerical Aperture of an Optical fiber.

REFERENCES:

1. "Engineering Physics practical", NU Age Publishing House, Hyderabad.
2. "Engineering Practical Physics", Cengage Learning, Delhi.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18CS0503) PROGRAMMING FOR PROBLEM SOLVING LAB

B.Tech, I Year 1st semester

L	T	P	C
0	0	3	1.5

Course Objectives:

- To make the student learn C Programming language.
- To make the student solve problems, implement those using C & C++ programming languages.
- To strengthen the ability to identify and apply the suitable data structure for the given real world problem.

Course Outcomes:

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

- Apply problem solving techniques of C to find solution.
- Use C language features effectively to implement solutions.
- Use C++ language features effectively to solve problems.
- Identify and develop apt searching and sorting technique for a given problem.
- Identity, design and develop the appropriate data structure for a given problem or application.

Experiments List:

1. a) Acquainting students to "c" programming environment and DOS commands
   b) calculate sum of three numbers using c-program
2. a) swap(exchange) values of two integer variables using c-program
   b) read an integer, a character and a float values through keyboard and display
   c) check operators precedence and associativity using c-program
   d) write a c-program using all basic data types of c language
3. a) read 3 integer values through keyboard and display largest among them
   b) read marks of 5 subjects obtained by a student through keyboard and display "fail" or "pass" message on console
   c) using switch() statement implement arithmetic operations
4. a) check whether entered number is prime number
   b) display factorial of entered number
   c) display all multiples of an entered number upto given value(n)
5. a) Generate fibonacci series upto entered number(n)
   b) find out sum of the digits of a number
6. a) find the binary equivalent of entered decimal number
   b) generation multiplication table of entered number(n)
7. a) calculate sum of two integer matrices
   b) calculate product of two integer matrices
8. a) create your header file by including 2 user(your) defined functions and include them in a c-program student
   b) find out factorial of a number using recursive function
   c) find square of an entered number using "call by address(reference)" technique
   d) a program that tells us purpose of few predefined functions in "math.h" header file
9. a) check whether entered string is palindrome
   b) write a program to sort the entered set of strings using structure concept
10. a) count number of vowels, consonants, digits, white spaces and special characters in entered string(a line of text)
    b) swap(exchange) values of two integer variables using pointers
11. a) for 3 students with 3 subjects, calculate total marks and grade obtained by each

b) read data from a file(text) and display it on the monitor

12. a) copy contents of one file(text) to other created file
    b) merge contents of two files(text) and store it in another created file

REFERENCES:

1. "How to Solve it by Computer ", R.G. Dromey, Pearson.
2. "The C Programming Language ", Brian W. Kernighan, Dennis M. Ritchie, Pearson.
3. "Let us C ", Yeswant Kanetkar, BPB publications
4. "Pointers in C ", Yeswant Kanetkar, BPB publications.
5. "Programming in C and Data Structures ", J.R.Hanly, Ashok N. Kamthane and A.Ananda Rao, Pearson Education.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0810) ENGLISH

B.Tech, I Year 2nd semester **L T P C**
3 0 0 3

Course Objectives:

- To develop interest in reading English Literature for language learning. To
- improve knowledge and understanding of Grammar.
- To enhance the ability for making use of grammar in writing English. To
- enrich communication skills among the students.
- To develop their insight and positive attitude towards English language. To
- impart LSRW skills and inculcate the habit of learning.
- To build vocabulary.
- To enhance employability skills.

Course Outcomes

Students will be able:

1. To understand the rules of English grammar and their usage in writing English.
2. To use LSRW skills through the prescribed text and develop their ability to communicateeffectively.
3. To get the mastery of language to express ideas, views, feelings and experience.
4. To communicate well among themselves.
5. To inculcate values and ideal characteristic qualities in themselves.

UNIT: 1

Reading:

1. *All the World's a Stage* by William Shakespeare. (Act-II, Scene-VII).
2. After Twenty Years by O. Henry.

Writing: Nature and Style of Sensible Writing: Describing & Defining.

Speaking: Oral Communication (involves interactive practice sessions) Self -introduction and introducing a friend.

Listening: Listening activity (Present tense).

Vocabulary: The concept of word formation & root words from foreign languages.

Grammar: Subject – Verb Agreement. Sentence Structures & use of phrases and clauses in sentences. Identifyin common errors in noun, pronoun and adjectives.

UNIT: 2

Reading:

1. I Have a Dream Martin Luther King jr.
2. Knowledge and Wisdom by Bertrand Russell.

Writing: Importance of proper punctuation and creating coherence- Simple sentences.

Speaking: Expressing apology.

Listening: Listening activity. (Past tense)

Vocabulary: Prefixes and Suffixes.

Grammar: Identifying common errors in Articles, Modifiers and degrees of comparison.

UNIT: 3

Reading:

1) Nelson Mandela (Biography)
2) "The Happy Prince" by Oscar wilde.

Writing: Paragraph writing – letter writing.

Speaking: Situational dialogues.

Listening: Listening activity. (Future tense)
Vocabulary: Synonyms and Antonyms.
Grammar: Identifying common errors in Prepositions and Link words and complex sentences.

UNIT: 4
Reading:
1. Where the Mind is without Fear by RabindraNath Tagore.
2. Cause - Effect and Control Measures of Pollution (Air, Water, Noise) and Nuclear Hazards.

Writing: Essay writing - Organizing principles of essay writing - Introduction and Conclusion.
Speaking: Public speaking dynamics.
Listening: Listening activity. (Active voice and passive voice)
Vocabulary: Abbreviations and Acronyms.
Grammar: Identifying common errors in redundancies and compound sentences.
UNIT-5
Reading:
1. The Road not Taken by Robert Frost.
2. *An Astrologer's Day* by R K Narayan.

Writing: Techniques for writing precisely.
Speaking: Interviews and formal presentations.
Listening: speeches of A P J Abdul Kalam, Steve Jobs and so on.
Vocabulary: One word substitutes.
Grammar: Identifying common errors in clichés.

TEXT BOOKS:
1. "Practical English Usage", Michael Swan. OUP. 1995.
2. "Remedial English Grammar", F.T. Wood. Macmillan. 2007

REFERENCES:
1. "On Writing Well", William Zinsser. Harper Resource Book, 200.
2. "Study Writing", Liz Hamp-Lyons and Ben Heasly. Cambridge University Press, 2006.
3. "Communication Skills", Sanjay Kumar and PushpLata. Oxford University Press, 2011.
4. "Exercises in Spoken English", Parts. I-III. CIEFL, Hyd. Oxford University Press, 2005.
5. "Oscar Wilde", Create Independence Publisher, Kindle Edition, 2017.
6. "The Complete Works", William Shakespeare, Kindle Edition, 2017.
7. G. P. Editors, "The Complete Works of William Shakespeare", Global Classic, 2018. 8. Robert Frost , Robert Frost Collection, Wider Publication, 2011.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0831) MATHEMATICS-II

B.Tech, I Year 2nd semester **L T P C**
3 1 0 4

Course Objectives:

The objective of this course is to familiarize the prospective engineers with techniques in Multivariate integration, ordinary and partial differential equations and complex variables. It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines. More precisely, the objectives are:

- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.
- To introduce effective mathematical tools for the solutions of differential equations that model physical processes.
- To introduce the tools of differentiation and integration of functions of complex variable that are used in various techniques dealing engineering problems.

Course Outcomes:

The objective of this course is to familiarize the prospective engineers with techniques in calculus, multivariable calculus and complex analysis. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of Mathematics and applications that they would find useful in their disciplines.

UNIT-I

FIRST ORDER ORDINARY DIFFERENTIAL EQUATIONS

Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT-II

ORDINARY DIFFERENTIAL EQUATIONS OF HIGHER ORDERS

Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

UNIT-III

MULTIVARIABLE CALCULUS (INTEGRATION)

Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes,
Triple integrals (Cartesian), orthogonal curvilinear coordinates.

UNIT-IV

COMPLEX VARIABLE - DIFFERENTIATION

Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties.

UNIT-V

COMPLEX VARIABLE - INTEGRATION

Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues,

Cauchy Residue theorem (without proof), Evaluation of definite integral involving sine and cosine.

TEXT BOOKS:

1. "Higher Engineering Mathematics", B.S.Grewal, Khanna publishers
2. "Engineering Mathematics Volume-I &III", T.K.V. Iyengar, S.Chand publication

REFERENCES:

1. "Engineering Mathematics volume-I&III", E. Rukmangadachari& E.Keshava Reddy Pearson Publishers
2. Ramana B.V., Higher Engineering Mathematics", Tata McGraw Hill New Delhi, 11thReprint, 2010.
3. "Engineering Mathematics-I & III", T.K.V.Iyengar S.Chand Publications.
4. D. Poole, Linear Algebra: A Modern Introduction", 2nd Edition, Brooks/Cole, 2005.
5. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics", Laxmi Publications, Reprint, 2008.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(18HS0801) CHEMISTRY

B.Tech, I Year 2nd semester **L T P C**
3 1 0 4

Course Objectives:

- Developed in this course will aid in quantification of several concepts in chemistry that have been introduced at the 10+2 levels in schools.
- Technology is being increasingly based on the electronic, atomic and molecular level modifications.
- Quantum theory is more than 100 years old and to understand phenomena at Nanometer levels, one has to base the description of all chemical processes at molecular levels.

Course Outcomes:

- Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
- Able to design the flowchart and algorithm for real world problems
- Able to learn and understand new programming languages
- Able to construct modular and readable programs Rationalise bulk properties and processes using thermodynamic considerations.
- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.

UNIT-I
ATOMIC, MOLECULAR STRUCTURE AND PERIODIC PROPERTIES

Schrodinger wave equation, Molecular orbital's of diatomic molecules. Energy level diagrams of diatomic. Pi-molecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Effective Nuclear charge, variations of s, p, d and f orbital energies of atoms in the periodic table, atomic and ionic sizes, oxidation states, hard soft acids and bases, molecular geometries.

UNIT-II
USES OF FREE ENERGY AND CHEMICAL EQUILIBRIA

Thermodynamic functions: Energy Entropy and free energy, Cell potentials, Nernest equations and Its Applications. Acid base Oxidation, reduction and Solubility Equilibria.

Corrosion: Types of Corrosion, Factors Influencing the rate of Corrosion, Prevention of Corrosion (Sacrificial anodic protection, Impressed Cathodic Protection), Anodic and Cathodic Inhibitors, Electro plating (Copper, Nickel, Chromium) and Electroless Plating.

UNIT-III

WATER TECHNOLOGY

Hardness of water and its units, Estimation of Hardness by EDTA method. Boiler Troubles: Scale & Sludge, Priming and Foaming and Boiler corrosion. Municipal Solid waste water Treatment. Break point chlorination, Water softening methods (Lime-Soda, Zeolite, Ion-Exchange resins). Demineralization of Brackish Water: Reverse Osmosis and Electro Dialysis.

UNIT-IV

ORGANIC REACTIONS AND ORGANIC POLYMERS

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, Synthesis of a commonly used drug molecules (Paracetamol, Penicillin, Prodrugs - Asprin, Sulfa drugs)

Organic polymers types (Thermosetting and Thermoplastics), Preparation, Properties and Engineering Applications of PVC, Teflon, Nylon6,6, Bakelite), Moulding Process and its uses, Conducting polymers (polyacetylene, Polyaniline).

UNIT-V

SPECTROSCOPIC TECHNIQUES AND APPLICATIONS

Principles, selection rules and applications of absorption (UV/Visible, Atomic Absorption, Infrared) and Emission spectroscopy (Flame photometry and Fluorescence and its applications in medicine. Advanced Instrumental Techniques and their Significance: XRD, Scanning Electron microscope (SEM) and Transmission electron microscopy (TEM).

TEXT BOOKS:

1. "University chemistry ", by B. H. Mahan
2. "Chemistry: Principles and Applications ", by M. J. Sienko and R. A. Plane

REFERENCES:

1. "Fundamentals of Molecular Spectroscopy ," by C. N. Banwell
2. "Engineering Chemistry " (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan
3. "Physical Chemistry ", by P. W. Atkins

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(18EE0201) ELECTRICAL CIRCUITS-I

B.Tech, I Year 2nd semester **L T P C**
3 0 0 3

Course Objectives:

- To understand the nature of different circuit elements, fundamental laws and network Theorems.
- To understand about phasor concepts of single phase and Magnetic circuits.
- To understand the concepts of Locus diagrams and Resonance.

Course Outcomes:

After completing the course, the student should be able to do the following:

- Determine the equivalent impedance of given network by using network reduction techniques.
- Determine the real power, reactive power, power factor etc,.for the given network.
- Determine the current through any element and voltage across any element.
- Apply the network theorems suitably.

UNIT-I

INTRODUCTION

Circuit concept R,L,C parameters, Voltage and Current sources, Independent and dependent sources, source transformation, Voltage-current relation.

Kirchhoff's laws, network reduction techniques, series, parallel, series parallel, star-delta or delta-star transformation, Nodal analysis, Mesh analysis, Super node and super mesh for DC excitations.

UNIT-II

AC CIRCUITS

R.M.S, Average values and form factor for different periodic waveforms, phase and phase difference of sinusoidal alternating quantities, steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance, Power triangle, power factor.

UNIT-III

NETWORK THEOREMS

Thevenin's, Norton's, Maximum power transfer and Millman's theorem's for DC and sinusoidal excitations, Tellegen's, superposition, reciprocity and compensation theorem's for DC and Sinusoidal excitations.

UNIT-IV

LOCUS DIAGRAMS AND RESONANCE

Series R-L, R-C, R-L-C and parallel combination with variation of various

Parameters - Locus diagrams, Resonance, series, parallel circuits, concept of bandwidth and Q factor.

UNIT-V

MAGNETIC CIRCUITS

Magnetic circuits, Faraday's laws of electromagnetic induction, concept of self and mutual inductance, dot convention, coefficient of coupling, composite magnetic circuit, Analysis of series and parallel magnetic circuits, Ideal Transformer.

TEXT BOOKS:

1. ‘Circuits and networks ’,A. Sudhakar and Shyammohan SPalli, Tata McGraw, Hill.
2. Alexander and sadiku: ‘Fundamentals of Electric circuits ’, Mc, graw Hill.

REFERENCES:

1. ‘Network analysis ’, M.E Van Valkenberg
2. ‘Engineering circuit analysis ’,William Hayt and Jack E.Kemmerly, McGraw Hill Company, 6th edition.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18ME0302)ENGINEERING GRAPHICS & DESIGN

B.Tech, I Year 2nd semester **L T P C**
1 0 4 3

Course Objectives:

- To familiarize the students in basic concept of conic sections, projections and Development of Objects.
- To develop the imagination and drafting skills of students.

Course Outcomes:

Students undergoing this course are able to

- Frame ideas based on the conceptual modeling and design
- Provide good understanding of the methods involved in preparing various views in Engineering drawings
- Can prepare 2D and 3D diagrams of various objects.

UNIT-I

INTRODUCTION TO ENGINEERING DRAWING

Principles of Engineering Graphics and their significance, usage of Drawing instruments, lettering, Conic sections, Cycloids and Involutes.

UNIT-II

PROJECTIONS OF POINTS

Principles of Orthographic Projections-Conventions - Projections of Points, Traces

PROJECTIONS OF STRAIGHT LINES

Inclined to both the planes - simple problems only, Traces

UNIT-III

PROJECTIONS OF PLANES

Planes (Inclined to single plane only)

PROJECTIONS OF SOLIDS

Introduction—Projections of right regular solids-Prisms, Pyramids in different positions. (Single plane only)

UNIT-IV

SECTIONS OF SOLIDS

Sectional Views of Right regular Solids - Prisms, Pyramids.

DEVELOPMENT OF SURFACES

Development of surfaces of Right Regular Solids - Prisms, Pyramids.

UNIT-V

ORTHOGRAPHIC PROJECTIONS

Principles of Orthographic projection, Conversion of objects from 3D to 2D

ISOMETRIC PROJECTIONS

Principles of Isometric projection - Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids, Conversion of 2D to 3D.

Auto CAD (for Practice only not for External Exam)

INTRODUCTION TO CAD

Applications, commands, Tool bar, modeling of Simple parts, isometric problems.

TEXT BOOKS:

1. "Engineering Drawing ", N.D.Bhatt, Charotar Publishers.
2. "A text Book of Engineering Drawing ", K.L.Narayana, Kannaiah, Scitech Publishers, 2010.

REFERENCES:

1. "Fundamentals of Engineering Drawing", Warren J.Luzadder and Jon. M.Duff Prentice Hall of India, Pvt., Ltd., Eleventh Edition, 2001.
2. "Engineering Graphics, Bhattacharyya ;"S.C.Bera, I.K .International Pvt Ltd. 2009.
3. "A text Book of Engineering Drawing and Graphic", K.Venugopal New Age PublishinNew Delhi, 2008.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(18HS0811) ENGLISH LAB

B.Tech, I Year 2nd semester **L T P C**
0 0 3 1.5

Course Objectives:

To get the job students dream of today largely depends on the way they communicate. Due to globalization, civilization and fast growing technologies, communication has become a very important factor. Good communication skills increase the possibilities of getting good jobs. To meet the requirement of corporate word one has to be capable of expressing oneself.

- To provide Computer Assisted Language Learning facility for the students on selfinstructional method for improving language.
- To improve the correct articulation as English is international language.
- To enhance the communication skills with a variety of activities and practice sessions.

Course Outcomes:

Students will be able:

- To recognize sounds of English language with different classifications.
- To know phonetic transcription and phonemic symbols of English language.
- To understand international accent and utilize the same in their daily conversation.
- To crease confidence for public speaking, for facing interviews, for making effective oral presentations, for having discussions, and for delivering impromptu speeches.

UNIT -1

a) Importance of Phonetics – Introduction, organs of speech, classification of sounds, and Phonetic transcriptions.

UNIT-2

a) Syllable, Syllabification, Word stress, Stress Rules and Intonation.
b) Intonation (Falling, Raising, and fall-raise) - Pitch and Rhythm.
c) Influence of mother tongue (MTI) - Common Indian Variants in pronunciation.
d) Difference between British and American Pronunciation

UNIT- 3

a) Vocabulary building.
b) Functional English; Telephone skills; Giving Directions; Situational dialogues; Role play.
c) JAM, Oral presentation-Prepared and extempore and PPT presentation.

UNIT- 4:

a) Describing people, places, things and situations- Body language-- listening some

UNIT- 5

a) Preparation of resume (C.V) & Cover Letter.
b) Interview Skills - mock interviews.
c) Group Discussion, Debate and Dress code.

Minimum requirement for ELCS LAB

1. Computer Assisted Language Learning (CALL) Lab: The Computer Aided Language Lab for 60 Students with 60 systems one Master Console, LAN facility and English Language Software for self-study by learners.
2. The Communication Skills Lab with movable chairs and audio visual aids with a P. A. system, Projector, a Digital stereo audio & video system and Camcorder etc.
   System Requirement (Hardware component):
   Computer network with: LAN with minimum 60 multimedia systems with the following.
   Specifications:

i) P- IV Processor
   a) Speed 2.8 GHZ
   b) RAM – 512 MB Minimum
   c) Hard Disk – 80 GB
ii) Headphones of High quality.

Suggested Software

1. Clarity pronunciation power--- Part 1(sky pronunciation)
2. Clarity pronunciation power--- Part 2
3. K-Van Advanced Communication Skills.
4. Walden Info tech Software.

TEXT BOOKS:

1. "A Textbook of English Phonetics for Indian Students ", second edition T. Balasubramanian. (Mcmillian) 2012.
2. "A Course in Phonetics and spoken English ", DhamijaSethi, Prentice-hall of India Pvt. Ltd, 2000.

REFERENCES:

1. "Speaking English Effectively ", second Edition Krishna Mohan & NP Singh 2011 (Mcmillian).
2. "A Hand Book of English Laboratories ", E.Sureshkumar ,P.Sreehari, Foundation books, 2011.
3. "Spring Board Success ", SharadaKoshik, BinduBajwa, Orient Black Swan, Hyderabad, 2010.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0802) CHEMISTRY LABORATORY

B.Tech, I Year 2nd semester **L T P C**
0 0 3 1.5

Choice of 10-12 experiments from the following:

1. Estimation of copper by EDTA method
2. Determination of chloride content of water
3. Determination of acidity of water sample.
4. Determination of alkalinity of water sample
5. Potentiometric determination of Fe^{2+} by potassium permanganate.
6. Determination of Viscosity of an oil by Redwood Viscometer
7. Determination of dissolved oxygen in a water sample by Winkler's method
8. Conductometric titrations of strong acid against strong base.
9. Chemical analysis of a salt
10. Synthesis of a polymer/drug

Laboratory Outcomes

The chemistry laboratory course will consist of experiments illustrating the principles of chemistry relevant to the study of science and engineering. The students will learn to:

- Estimate rate constants of reactions from concentration of reactants/products as a function of time.
- Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
- Synthesize a small drug molecule and analyse a salt sample.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0816) INDIAN CONSTITUTION

B.Tech, I Year 2nd semester

L	T	P	C
3	0	0	0

Course Objectives:

Students will be able to:

1. Understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
2. To address the growth of Indian opinion regarding modern Indian intellectuals 'constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.
3. To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.

UNIT-I

- Meaning of the Constitution Law

UNIT-II

- Historical Perspective of the Constitution of India
- Salient features and characteristics of the Constitution of India

UNIT-III

- Scheme of the fundamental rights
- The scheme of the Fundamental Duties and its legal status
- The Directive Principles of State Policy - Its importance and implementation
- Federal structure and distribution of legislative and financial powers between the Union and the States

UNIT-IV

- Parliamentary Form of Government in India – The constitution powers and status of the President of India.
- Amendment of the Constitutional Powers and Procedure.
- The historical perspectives of the constitutional amendments in India.
- Emergency Provisions : National Emergency, President Rule, Financial Emergency

UNIT-V

- Local Self Government – Constitutional Scheme in India.
- Scheme of the Fundamental Right to Equality.
- Scheme of the Fundamental Right to certain Freedom under Article 19

- Scope of the Right to Life and Personal Liberty under Article 21

TEXT BOOKS:

1. "The Constitution of India", 1950 (Bare Act), Government Publication.

2. Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution", 1st Edition, 2015

REFERENCES

1. M. P. Jain, "Indian Constitution Law", 7th Edn., Lexis Nexis, 2014.

2. D.D. Basu, "Introduction to the Constitution of India", Lexis Nexis, 2015.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0803) BIOLOGY FOR ENGINEERS

B.Tech, II Year 1st semester **L T P C**
2 1 0 3

Course Objectives

- Describe how biological observations of 18th Century that lead to major discoveries.
- Convey that classification per se is not what biology is all about but highlight the underlying criteria, such as morphological, biochemical and ecological
- Highlight the concepts of recessiveness and dominance during the passage of genetic material from parent to offspring
- Convey that all forms of life have the same building blocks and yet the manifestations are as diverse as one can imagine

Course Outcomes

- Classify enzymes and distinguish between different mechanisms of enzyme action.
- Identify DNA as a genetic material in the molecular basis of information transfer.
- Analyse biological processes at the reductionistic level
- Apply thermodynamic principles to biological systems.
- Identify and classify microorganisms.

UNIT I

INTRODUCTION & CLASSIFICATIONS OF ORGANISMS

Introduction - classification based on (a) cellularity- Unicellular or multicellular (b) ultrastructure- prokaryotes or eucaryotes. (c) energy and Carbon utilisation -Autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricoteliec, ureotelic (e) Habitata- acquatic or terrestrial (e) Molecular taxonomy- three major kingdoms of life. Model organisms - study of different groups - E.coli, S.cerevisiae, D. Melanogaster, C. elegance, A. Thaliana, M. musculus.

UNIT II

GENETICS PURPOSE

Concept of allele. Gene mapping, Gene interaction, Epistasis. Meiosis- Concepts of recessiveness and dominance - Concept of mapping of phenotype to genes - single gene disorders in humans - Complementation in human genetics.

UNIT III

BIOMOLECULES PURPOSE & ENZYMES PURPOSE

Building blocks of Molecules of life & it's types. Introduction & Concepts- Monomer units and polymeric structures, Sugars, starch, cellulose, Amino acids, proteins, Nucleotides, DNA/RNA, Two carbon units and lipids.

Role of catalysis life in existed on earth Enzymology: Enzyme classification. Mechanism of enzyme action. Enzyme kinetics and kinetic parameters related to Biology. RNA catalysis. Classifications and Procedure for Enzyme catalysed reactions with two examples.

UNIT IV

INFORMATION TRANSFER PURPOSE & MACROMOLECULAR ANALYSIS PURPOSE

Molecular basis of coding and decoding genetic information is universal Molecular basis of information transfer. Genetic material of DNA, Hierarchy of DNA structure- from single stranded to double helix to nucleosomes. Introduction and Explanation of genetic code and degeneracy of genetic code. Gene - complementation and recombination.

Biological processes at the reductionist level Proteins - structure and function. Hierarch in protein structure. Primary secondary, tertiary and quaternary structure. Proteins as enzymes, transporters, receptors and structural elements.

UNIT V

METABOLISM PURPOSE

The principles of energy transactions - in physical and biological world. Thermodynamics as applied to biological systems. Exothermic and endothermic versus endergonic and exergoinc reactions. Concept of Keq and its relation to standard free energy. Spontaneity. ATP as an energy currency- including breakdown of glucose to CO2 + H2O (Glycolysis and Krebs cycle) and synthesis of glucose from CO2 and H2O (Photosynthesis). Energy yielding and energy consuming reactions.

Microbiology -single celled organisms -species and strains. Identification and classification of microorganisms. Microscopy. Ecological aspects of single celled organisms. Sterilization and media compositions. Growth kinetics.

TEXT BOOKS:

1. "Biology: A global approach" Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd

2. "Outlines of Biochemistry, Conn, E.E", Stumpf, P.K; Bruening, G; Doi, R.H. John Wiley and Sons

REFERENCES:

1. "Principles of Biochemistry (V Edition) ", By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company

2. "Molecular Genetics (Second edition) ", Stent, G. S.; and Calender, R. W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher

3. "Microbiology, Prescott ", L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(18EE0202) ELECTRICAL CIRCUITS-II

B.Tech, II Year 1st semester **L T P C**
3 0 0 3

Course Objectives:

- To understand Magnetic Circuits, Network Topology and Three phase circuits. To
- analyze transients in Electrical systems.
- To evaluate Network parameters of given Electrical network.

Course Outcomes:
At the end of this course, students will demonstrate the ability to

- Analyze the transient behavior of electrical networks for various excitations.
- Analyze the Electrical Circuits with the concept of Network topology.
- Analyze the three phase circuits with Star & Delta connected balanced and unbalanced loads.
- Obtain the various network parameters for the given two port networks.
- Represent the transfer function for the given network.

UNIT-I
THREE PHASE CIRCUITS
Three phase circuits: phase sequence, star and delta connection, relation between line and phase Voltages and currents in balanced systems, analysis of balanced and unbalanced three phase circuits measurement of active and reactive power.
UNIT-II
TRANSIENT ANALYSIS
Transient response of R-L, R-C, and R-L-C Series circuits for d.c.excitation, initial conditions, solution method using differential equations and Laplace transforms response of R-L and R-C networks to pulse excitation.
Transient response of R-L, R-C, and R-L-C Series circuits for sinusoidal excitations, initial conditions, solution method using differential equations.
UNIT-III
NETWORK TOPOLOGY
Definitions, graph, tree, basic cut set and basic tie set matrices for planar networks, loop and nodal methods of analysis of networks with dependent and independent voltage and current sources, duality and dual networks.
UNIT-IV
TWO PORT NETWORKS
Two port network parameters Z, Y, ABCD and hybrid parameters and their relations,
Concept of transformed network, two port network parameters using transformed variables, cascaded networks.

UNIT-V

ELECTRICAL CIRCUIT ANALYSIS USING LAPLACE TRANSFORMS

Laplace Transform, Analysis of electrical circuits using Laplace Transform for standard inputs, Circuit elements in s-domain, Transfer function and convolution integral, inverse Laplace transform, Transfer function representation-Poles and Zeros.

TEXT BOOKS:

1. "Circuits and networks", A.Sudhakar and Shyamohan S.Palli, Tata McGraw, Hill
2. Alexander and sadiku: "Fundamentals of Electric circuits", Mc, graw Hill.

REFERENCES:

1. "Network analysis", M.E.Van Valkenberg, prantice hall India, 3rd edition.
2. "Electric circuit analysis", C.L.Wadhwa, new age international.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC0443) ANALOG ELECTRONIC CIRCUITS

B.Tech, II Year 1st semester **L T P C**
3 0 0 3

Course Objectives:
The objectives of this course is to
- Discuss the principle and operation of Diode Circuits, BJT and FET.
- Introduce the basic building blocks of linear integrated circuits.

Course Outcomes:
Upon completion of this course, student will be able to:
- Understand Diode Circuits, BJT and FET amplifiers.
- Become familiar with the basic building blocks of linear integrated circuits.

UNIT I

DIODE CIRCUITS

P-N junction diode, V-I characteristics of a diode; Half-wave and Full-wave Rectifiers, filters, Zener diode, clipping and clamping circuits.

UNIT II

BJT CIRCUITS

Construction, Operation NPN transistor, Transistor Configuration: CB, CE and CC, Transistor Characteristics, BJT as an Amplifier, Transistor Biasing Circuits, h-parameter model for low frequency

UNIT III

FET CIRCUITS

FET Classification, FET configurations : CG, CS and CD, JFET- Construction, Operation, Characteristics and Parameters, MOSFET- N-channel Enhancement and Depletion MOSFETs: Construction, Working and Characteristics; Comparison of BJT and FET, Biasing of FET, FET small signal model, FET amplifiers – CS amplifier, CD amplifier, CG amplifier, High frequency model of FET.

UNIT IV

OPERATIONAL AMPLIFIER

Basic Information of Op-Amp, Ideal Op-Amp, Inverting Amplifier, Non Inverting Amplifier, Voltage Follower, Differential Amplifier, Difference and Common Mode gains, Operational Amplifier Internal Circuit, CMRR, DC Characteristics – Input Bias Current, Input Offset Current, Input and Output Offset Voltage, Thermal Drift, AC Characteristics – Frequency Response, Frequency Compensation, Slew rate.

UNIT V

APPLICATIONS OF OP-AMP

Scale Changer, Summing Amplifier, Subtractor, Instrumentation Amplifier, Differentiator, Integrator, Fixed Voltage Series Regulator, IC 723 General purpose Regulator, Active filters: Low pass, High pass, Band pass and Band stop, DAC – Weighted Resistor DAC, R-2R ladder DAC, Inverted R-2R Ladder DAC, ADC—Flash Type ADC, Successive Approximation ADC, Dual Slope ADC, DAC/ADC Specifications.

TEXT BOOKS:

1. "Electronic Devices and Circuits ", Salivahanan, N.Suresh Kumar, McGraw Hill Education, Third Edition.
2. "Linear Integrated Circuits ", D.Roy Choudhury, Shail B.Jain, New Age International Publishers, Fourth Edition, 2010.

REFERENCES:

1. "Micro Electronic Circuits", Sedra A.S. and K.C. Smith, Oxford University Press, 4th Edition.
2. "Electronic Devices and Circuits ",Jacob Millman, Christos C.Halkias, Tata McGraw Hill Edition, 1991.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EE0203) ELECTRO MAGNETIC FIELDS

B.Tech, II Year 1st semester **L T P C**
3 0 0 3

Course Objectives:

To make the student learn about:

- The laws concerning static electric fields: Coulomb's law, Gauss law; the laws concerning static magnetic fields: Biot, savart law, Ampere circuital law
- The equations concerned with static electric fields
- The equations concerned with static magnetic fields
- The difference between the behaviors of conductors and dielectrics in electric fields
- The energy stored and energy density in (i) static electric field (ii) magnetic field Electric dipole and dipole moment, magnetic dipole and dipole moment

Course Outcomes:

- After going through this course the student acquires:
- Knowledge on basic principles, concepts and fundamental laws of electromagnetic fields.
- The knowledge to understand 3, dimensional coordinate systems, electrostatics, magneto statics, time, varying fields and interaction between electricity and magnetism.

UNIT-I

INTRODUCTION TO VECTOR CALCULUS

Vectoralgebra-addition,subtraction, components of vectors,scalar and vectormultiplications, tripleproducts,Three orthogonal coordinatesystems (rectangular, cylindrical and spherical). Vectorcalculus-differentiation, partial differentiation, integration, vector operatordel,gradient,divergence a nd curl;integral theorems of vectors. Conversion of avector from onecoordinate system to another.

UNIT-II

STATIC ELECTRIC FIELD

Coulo mb's law, Electric field intensity, Electrical field due to point charges. Line, Surface and Volume charge distributions. Gauss law and its applications. Absolute Electric potential, Potential difference, Calculation of potential differences for different configurations. Electric dipole, Electrostatic Energy and Energy density.

UNIT-III

CONDUCTORS, DIELECTRICS AND CAPACITANCE

Current and current density, Ohms Law in Point form, Continuity of current, Boundary conditions of perfect dielectric materials. Permittivity of dielectric materials, Capacitance, Capacitance of a two wire line, Poisson s equation, Lap lace's equation, Solution of Laplace and Poisson's equation, Applicat ion of Laplace's and Poisson's equat ions.

UNIT-IV

STATIC MAGNETIC FIELDS

Biot-Savart Law, Ampere Law, Magnetic flux and magnetic flux density, Scalar and Vector Magnetic potentials. Steady magnetic fields produced by current carrying conductors.

MAGNETIC FORCES, MATERIALS AND INDUCTANCE

Force on a moving charge, Force on a differential current element, Force between differential current elements, Nature of magnetic materials, Magnetization and permeability, Magnetic boundary conditions, Magnetic circuits, inductances and mutual inductances.

UNIT-V

TIME VARYING FIELDS AND MAXWELL'S EQUATIONS

Faraday's law for Electromagnetic induction, Displacement current, Point form of Maxwell's equation, Integral form of Maxwell's equations, Motional Electromotive forces. Boundary Conditions.

TEXT BOOKS:

1. M. N. O. Sadiku, "Elements of Electromagnetics", Oxford University Publication, 2014.
2. A. Pramanik, "Electromagnetism - Theory and applications ", PHI Learning Pvt. Ltd, New Delhi, 2009.

REFERENCES:

1. A. Pramanik, "Electromagnetism-Problems with solution ", Prentice Hall India, 2012.
2. G. W. Carter, "The electromagnetic field in its engineering aspects ", Longmans, 1954.
3. W. J. Duffin, "Electricity and Magnetism ", McGraw Hill Publication, 1980.
4. W. J. Duffin, "Advanced Electricity and Magnetism ", McGraw Hill, 1968.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EE0204) ELECTRICAL MACHINES-I

B.Tech, II Year 1st semester **L T P C**
3 1 0 4

Course Objectives:

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

- Understand the operation of dc machines.
- Analyse the differences in operation of different dc machine configurations.
- Analyse single phase transformers circuits.

Course Outcomes:

After completing the course, the student should be able to do the following:

- Calculate the e.m.f. generated on open circuit and find terminal voltage on load.
- Diagonise the failure of DC generator to build up voltage.
- Compute the load shared by each generator when several generators operate in parallel.
- Draw the equivalent circuit of transformer
- Conduct O.C, S.C tests and predetermine the regulation and efficiency of transformer

UNIT-I
DC GENERATORS

Constructional details of dc machine, armature windings and its types, Emf equation,armature reaction, demagnetizing and cross magnetizing ampere turns, compensating windings, commutation, emf induced in a coil undergoing commutation, methods of improving commutation, OCC and load characteristics of different types of generators.

UNIT-II
DC MOTORS

Force on conductor carrying current, Torque and power developed by armature, speed control of dc motors, starting of dc motors: constructional details of 3-point and 4-point starters, load characteristics of dc motors Losses in dc machine, condition for maximum efficiency

UNIT-III
PARALLEL OPERATION OF DC GENERATORS

Dc shunt and series generators in parallel, equalizing connections

TESTING OF DC MACHINES

Brake test, Swinburne's test, Hopkinson's test, Fields test, Retardation test, Separation of iron and frictional losses

UNIT-IV
SINGLE PHASE TRANSFORMERS

Constructional details, Principle of transformer, emf equation, ideal transformer, leakage flux, and phasor diagram of transformer, equivalent circuit, determination of parameters of

equivalent circuit, losses and efficiency, Auto transformer, principle, saving of copper as compared to two winding transformer.

UNIT-V

TESTING OF TRANSFORMERS

Predetermination of performance from OC and SC tests

SINGLE PHASE INDUCTION MOTORS

Principle of operation: double revolving field theory, cross field theory, equivalent circuit and determination of parameters, stepper motors.

STARTING METHODS

split phase starting, shaded pole starting, Repulsion starting, Universal motor .

TEXT BOOKS:

1. I.J.Nagrath ,D.P.Kothari, "Electric Machines", New Age International Ltd.
2. P.S.Bimbhra, "Electrical machinery ", Khannna Publishers, 2011.

REFERENCES:

1. B.R.Gupta, Vandana Singhal, "Fundamentals of Electrical Machines", New Age International Ltd.
2. Puchstein , Lloyd, Conrad , "Alternating current Machines".

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EC0445) ANALOG ELECTRONIC CIRCUITS LAB

B.Tech, II Year 1st semester **L T P C**
0 0 3 1.5

Course Objectives:
- To understand the student about various semiconductor devices and to plot its characteristics.
- To obtain the frequency response characteristics of BJT and FET amplifiers.

Course Outcomes:
Upon completion of this course, student will be able to:
- Understand about various semiconductor devices and its characteristics.
- Find the Frequency response characteristics of BJT and FET amplifiers and to determin e bandwidth.

Electronic workshop practice (for 3 Lab sessions)
Identification, Specifications and Testing of passive & active components
Study the working of the electronic equipment used in the lab

List of Experiments
(Minimum of **TEN** experiments to be completed)

CYCLE-I

1. Forward and Reverse bias characteristics of PN Junction diode
2. Zener diode Reverse characteristics
3. Diode Clipper Characteristics
4. Half Wave Rectifier With and without filter.
5. Full wave Rectifier With and without filter.
6. Input and Output characteristics of Transistor in CE Configuration.
7. Drain and Transfer Characteristics of n-channel JFET.

CYCLE -II

8. Frequency response of CE Amplifier.
9. Frequency response of Common Source FET Amplifier.
10. Differential Amplifier using BJT
11. Inverting and Non Inverting Amplifier using OpAmp
12. Integrator and Differentiator using OpAmp
13. Active Lowpass and Highpass filters using OpAmp
14. Schmitt Trigger using OpAmp.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18ME0349) THERMAL & FLUID ENGINEERING LAB

B.Tech, II Year 1st semester

L	T	P	C
0	0	3	1.5

List of Experiments:

1. Study of Boilers.
2. Study of Water Tube Boilers.
3. Study of Fire Tube Boilers.
4. Verification of Bernoulli's Theorem
5. Venturimeter
6. Orifice meter
7. Turbine Flow Meter
8. Estimation of friction factor for a given pipe line.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(18EE0205) ELECTRICAL CIRCUITS LAB

B.Tech, II Year 1st semester **L T P C**
0 0 2 1

Course Objectives:
To make the student learn about:

- To introduce the students to the basic electrical equipments in the lab.
- Experimental verification of theorems.

Course Outcomes:
After completing the course, the student should be able to do the following:

- Correctly measure and successfully troubleshoot circuits by taking accurate data and interpret results.
- Apply suitable theorems for circuit analysis and verify the results theoretically.

List of Experiments:

1. Verification of KCL & KVL for any network.
2. Verification of Superposition & Reciprocity theorems with analysis.
3. Verification of Thevenin's & Norton`s theorems with analysis.
4. Verification of Millmann's theorem with analysis.
5. Verification of Maximum power transfer theorem with analysis.
6. Verification of compensation theorem with analysis.
7. Determination of self, Mutual inductance & Coefficient of coupling of pair of coils.
8. Series & Parallel Resonance.
9. Locus diagrams of RL and RC series circuits.
10. Determination of Z & Y parameters of two port network.
11. Determination of Transmission and Hybrid parameters.
12. Measurement of Active Power and Reactive power for Star and Delta Connected Balanced Loads.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0804) ENVIRONMENTAL SCIENCES

B.Tech, II Year 1st semester **L T P C**
3 0 0 0

Course Objectives:

- Students have got an idea about the importance of pollution free air, water, soil and food.
- They know about global environmental problems like Acid Rains, Global Warming, Green House Effects, Ozone layer depletion.
- To understand the impacts of developmental activities and mitigation measures along with the environmental policies and regulations.
- To recognize major concepts in environmental studies and demonstrate in-depth understanding the environment.

Course Outcomes:

- Based on this course, the Engineering Student will be able to understand/evaluate/develop technologies on the basis of Ecological principles and environmental regulations along with Legislation, Laws and Policies which in turn help in sustainable development.
- Take preventive measures to reduce air, water, soil pollutions and contaminants in food.
- Effectively carry out waste disposal at individual level.
- Involve in preservation of natural resources.

UNIT- I

INTRODUCTION

Definition, Scope and Importance-Need for Public Awareness

NATURAL RESOURCES

Classification of resources-Forest resources: Use and over-exploitation, deforestation- Mining, dams and their effects on forests and tribal people - Water resources - Use and over utilization of surface and ground water- Floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources -Energy resources: Renewable and Non- Renewable sources of energy- Solar energy, Hydro electrical energy, Wind energy, Nuclear energy, etc.

UNIT-II

ECOSYSTEMS

Concept of an ecosystem—structural features of ecosystem- Producers, Consumers and Decomposers -Biogeochemical cycles- Ecological succession-Food chains, food webs and ecological pyramids - Energy flow in the ecosystem-Types of ecosystems (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems.

UNIT-III

BIODIVERSITY AND ITS CONSERVATION

Introduction, Definition, genetic, species and ecosystem diversity, Bio-geographical classification of India, India as a Mega-diversity Nation, Hot spots of biodiversity, Value of

biodiversity, threats to biodiversity, endemic, endangered and extinct species of India, In-Situ and Ex-situ conservation of biodiversity.

UNIT-IV

ENVIRONMENTAL POLLUTION AND GLOBAL ENVIRONMENTAL ISSUES

Natural Disasters: Droughts, Floods, Cyclone, Landslides, Earthquake,

Pollution episodes: Air pollution, Water pollution, Land pollution, Noise pollution, Automobile pollution and Nuclear pollution -Effects-Global warming, Acid Rain and Ozone layer depletion and controlling measures.
Global Environmental Issues: Population Growth, Urbanizations, Land Management, Water and Waste Water Management. Climate change and impacts on human environment
Solid Waste Management: causes, effects and control measures of Municipal solid wastes - E-waste and management, Role of an individual in prevention of pollution – pollution case studies.

UNIT-V

ENVIRONMENTAL LEGISLATION, LAWS, POLICIES FOR SUSTAINABLE DEVELOPMENT

Environmental Legislation, Environmental Protection act _ Air Prevention and Control of Pollution act—Water Prevention and control of Pollution act—Wildlife protection act – Forest conservation act - Municipal Solid Waste management, International conventions/Protocols : Earth summit, Kyoto protocol and Montreal Protocol. From Unsustainable to sustainable development, Role of NGO's for Sustainable development, Concepts of Green belt development, Role of IT in Environment-Remote Sensing and GIS methods for Sustainable development.

FIELD WORK

visit to a local area to document environmental assets-river forest grassland/hill, mountain and polluted sites (urban/rural/industrial/Agriculture)- study simple ecosystems (pond/river/hill slopes)

TEXT BOOKS:

1. A.Kaushik and C.P.Kaushik, Environmental Sciences , " 5th edition, New age international publishers, 2015.
2. Text Book of Environmental Science and Technology ", M.Anji Reddy, BS Publications.

REFERENCES:

1. Anil Kumar and Arnab Kumar De, "Environmental Studies", New Age International Publishers, New Delhi, 3rd Edition 2015.
2. R.K. Trivedi, "Handbook of Environmental Laws, Rules, Guidelines, Compliances *andStandards",* Vol.I and II, Enviro Media.
3. "Environmental Studies "Dr.K.Mukkanthi, S.Chand Publishers.
4. Rajagopalan.R, "Environmental Studies-From Crisis to Cure ", Oxford University Press, 2005.
5. ErachBharucha, 2010 "Text Book of Environmental Studies ", University Grants Commission, University Press (India) Pvt.Ltd., Hyderabad **E-**

learning resources:

1. http://nptel.ac.in/courses.php
2. http://jntuk-coeerd.in/

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(18EC0444) DIGITAL ELECTRONICS

B.Tech, II Year 2nd semester **L T P C**
3 0 0 3

Course Objectives:
The Objective of this course is to
- Familiarize the student with fundamental principles of digital design.
- Acquire the skills to manipulate and examine Boolean algebraic expressions, logical operations, Boolean functions and their simplifications.
- Acquaint with classical hardware design for both combinational and sequential logic circuits

Course Outcomes:
At the end of the Course, the students will demonstrate the ability to
- Define different Number system and perform Number base conversions.
- Design and analyze Combinational Logic Circuits
- Design and analyze modular Combinational Circuits with MUX / DEMUX, Decoder / Encoder
- Design and analyze synchronous sequential logic circuits

UNIT-I
BINARY SYSTEMS
Binary Numbers, Octaland Hexadecimal Numbers, Number Base Conversions, Complements, Signed Binary Numbers, Binary Codes.
LOGIC SIMPLIFICATION: Review of Boolean algebra and De Morgan's Theorem, SOP & POS forms, Canonical forms
UNIT-II
GATE-LEVELMINIMIZATION AND COMBINATIONALLOGIC
Karnaugh maps up to 5 variables, Tabular Minimization method, Combinational Circuits, Analysis Procedure, Design Procedure, BinaryAdder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, D e coders,Encoders,Multiplexers,De-Multiplexers.
UNIT-III
SEQUENTIAL LOGIC DESIGN
Building blocks like S-R, JK and Master-Slave JK FF, Edge triggered FF, Ripple and Synchronous counters, Shift registers, Pseudorandom Binary Sequence generator.
UNIT-IV
LOGIC FAMILIES
TTL NAND gate, Specifications, Noise margin, Propagation delay, fan-in, fan-out, Tristate TTL, ECL, CMOS families and their interfacing.
UNIT-V
SEMICONDUCTOR MEMORIES AND PROGRAMMABLE LOGIC DEVICES
Memory organization and operation, expanding memory size, classificationandcharacteristicsof memories, sequential memory, read only memory (ROM), read andwrite memory(RAM), content addressable memory (CAM), charge de coupled devicememory (CCD), commonly used memory chips, ROM as a PLD, Programmable logicarray, Programmable array logic.
TEXT BOOKS:
1. "Switching & Finite Automata theory" _ ZviKohavi, TMH, 2nd Edition.
2. "Digital Design" _ Morris Mano, PHI, 3rd Edition, 2006.

REFERENCES:

1. "An Engineering Approach to Digital Design " – Fletcher, PHI.
2. "Fundamentals of Logic Design "– Charles H. Roth, 5th Edition, 2004, Thomson Publications.
3. "Digital Logic Applications and Design " – John M. Yarbrough, 2006, Thomson Publication.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0833) PROBABILITY &STATISTICS, NUMERICAL METHODS

B.Tech, II Year 2nd semester **L T P C**
3 1 0 4

Course Objectives:

The objective of this course is to familiarize the prospective engineers with techniques in Probability& Statistics and Numerical Methods, It aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines. More precisely, the objectives are:

- To introduce the tools of differentiation and integration of functions of numerical methods that is used in various techniques dealing engineering problems.
- To develop the essential tool of Probability & Statisticsin a comprehensivemanner.

Course Outcomes:

The objective of this course is to familiarize the prospective engineers with techniques in Probability& Statistics and Numerical Methods. It aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their disciplines.

UNIT I

BASIC PROBABILITY

Probability spaces, Addition theorem, conditional probability, independence, Baye's rule.

RANDOM VARIABLES:

Discrete and Continuous random variables- distribution functions, densities and their properties. Expectation of Discrete and Continuous Random Variables, Moments

UNIT II

Probability DISTRIBUTIONS

Binomial, Poisson and Normal - evaluation of statistical parameters for these three distributions.

UNIT III

BASIC STATISTICS

Measures of Central tendency: Moments, skewness and Kurtosis.Correlation and regression Rank correlation.

UNIT IV

NUMERICAL METHOD-I

Solution of polynomial and transcendental equations: Bisection method, Newton-Raphson method and Regula- Falsi method. Finite differences, Interpolation using Newton's forward and backward difference formulae.

NUMERICAL INTEGRATION

Trapezoidal rule and Simpson's 1/3rd and 3/8rules.

UNIT- V

ORDINARY DIFFERENTIAL EQUATIONS

Taylor's series, Euler and Runge-Kutta method of fourth order for solving first and second order equations.

PARTIAL DIFFERENTIAL EQUATIONS

Finite difference solution two dimensional Laplace equation.

TEXT BOOKS:

1. B.S. Grewal, "Higher Engineering Mathematics", Khanna Publishers, 2000
2. "Statistical methods", S.P. Gupta, S.Chand publications.

REFERENCES:

1. E.Rukmangadachari&E.Keshava Reddy "Engineering mathematics", volume-III, Pearson Publishers
2. Ramana B.V., "Higher Engineering Mathematics", Tata McGraw Hill New Delhi, 11th Reprint, 2010.
3. "Engineering Mathematics-III", T.K.V.Iyengar S.Chand Publications.
4. N.P. Bali and Manish Goyal, "A text book of Engineering Mathematics", Laxmi Publications, Reprint, 2008.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(18EE0206) POWER ELECTRONICS

B.Tech, II Year 2nd semester **L T P C**
3 0 0 3

Course Objectives:
- To provide the students a deep insight in to the working of different switching devices with respect to their characteristics.
- To analyze different converters and control with their applications.
- To study advanced converters and switching techniques implemented in recent technology

Course Outcomes:
- Design of power electronic converters in power control applications.
- Ability to express characteristics of SCR, BJT, MOSFET and IGBT.
- Ability design AC voltage controller and Cyclo Converter.
- Ability to design Chopper circuits.

UNIT-I
POWER SWITCHING DEVICES
Diode, Thyristor, MOSFET, IGBT: I-V Characteristics; Firing circuit for thyristor; Voltage and current commutation of a thyristor; Gate drive circuits for MOSFET and IGBT.

UNIT-II
THYRISTOR RECTIFIERS
Single-phase half-wave and full-wave rectifiers, Single-phase full-bridge thyristor rectifier with R-load and highly inductive load; Three-phase full-bridge thyristor rectifier with R-load and highly inductive load; Input current wave shape and power factor.

UNIT-III
CHOPPERS
DC-DC Buck converter
Elementary chopper with an active switch and diode, concepts of duty ratio and average voltage, power circuit of a buck converter, analysis and waveforms at steady state, duty ratio control of output voltage.

DC-DC Boost converter
Power circuit of a boost converter, analysis and waveforms at steady state, relation between duty ratio and average output voltage.

UNIT-IV
SINGLE-PHASE VOLTAGE SOURCE INVERTER
Power circuit of single-phase voltage source inverter, switch states and instantaneous output voltage, square wave operation of the inverter, concept of average voltage over a switching cycle, bipolar sinusoidal modulation and unipolar sinusoidal modulation, modulation index and output voltage

UNIT -V
THREE-PHASE VOLTAGE SOURCE INVERTER
Power circuit of a three-phase voltage source inverter, switch states, instantaneous output voltages, average output voltages over a sub-cycle, three-phase sinusoidal modulation

TEXT BOOKS:

1. M. H. Rashid, "Power electronics: circuits, devices, and applications", Pearson Education India, 2009.
2. N. Mohan and T. M. Undeland, "Power Electronics: Converters, Applications and Design", John Wiley & Sons, 2007.

REFERENCES :

1. R. W. Erickson and D.Maksimovic, "Fundamentals of Power Electronics", s pringer Science & Business Media, 2007.
2. L. Umanand, "Power Electronics: Essentials and Applications ,"Wiley India,2009

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(18EE0207) ELECTRICAL MACHINES-II

B.Tech, II Year 2nd semester **L T P C**
3 0 0 3

Course Objectives:
To make the student learn about:
- Parallel operation of transformers.
- Constructional details, principle of operation and the importance of slip in Induction motor operation
- The slip, torque characteristics and torque calculations of Induction motor
- Methods of starting and speed control of Induction motor

Course Outcomes:
After completing the course, the student should be able to do the following:
- Compute the load shared by each transformer when several transformers operate in parallel.
- Draw the circle diagram of a three phase Induction motor and predetermine the performance characteristics.
- Determine the starting torque, maximum torque, slip at maximum torque using given data.

UNIT-I
3-PHASE TRANSFORMERS
Sumpner's test, separation of hysterisis and eddy current losses. Parallel operation of transformer, load sharing.
Types of connections, Scott connection, open delta operation of 3-phase transformers.

UNIT-II
3-PHASE INDUCTION MOTORS
Constructional details , 3-phase armature/stator windings, types of 3-phase induction motors, production of rotating magnetic field, principle of operation, torque equation , starting torque, maximum torque, torque slip characteristics, Phasor diagram, parameters of equivalent circuit.

UNIT-III
TESTING OF 3-PHASE INDUCTION MOTORS
Brake test, predetermination of performance from no load and blocked rotor tests, circle diagram.Methods of starting: star-delta starter, auto transformer starter, Rotor resistance starter.
SPEED CONTROL OF 3-PHASE INDUCTION MOTORS
Pole changing, Cascade connection, injection of emf in to rotor circuit, introduction to V/f control of 3-phase induction motor

UNIT-IV
SYNCHRONOUS MACHINES-I
Constructional details of synchronous machines, emf equation, synchronous reactance, equivalent circuit ,Phasor diagram, voltage regulation, determination of regulation by synchronous impedance method, mmf method.
Theory of salient pole machines, phasor diagram, determination of X_d and X_q from Slip test.

UNIT-V
SYNCHRONOUS MACHINES-II
Parallel operation of Synchronous generators:
Conditions for parallel operation, Synchronizing , load sharing , operation of alternator with infinite busbars.

SYNCHRONOUS MOTORS

Principle of operation, methods of starting , Phasor diagram of synchronous motor, variation of current and power factor with excitation , Predetermination of V and inverted V curves, Hunting and use of damper bars, Synchronous condenser and power factor correction.

TEXT BOOKS:

1. I.J.Nagrath ,D.P.Kothari, "Electric Machines", New Age International Ltd.
2. P.S.Bimbhra, "Electrical machinery", Khannna Publishers, 2011.

REFERENCES :

1. B.R.Gupta, Vandana Singhal, "Fundamentals of Electrical Machines", New Age International Ltd.
2. M.G.Say, "Performance and desigh of AC Machines ",CBS Publishers , 2002.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
(18EC0403) SIGNALS & SYSTEMS

B.Tech, II Year 2nd semester

L	T	P	C
3	0	0	3

Course Objectives:
The Objective of this course is to
- Study about signals and systems.
- Do the analysis of signals & systems (continuous and discrete) using time domain & frequency domain methods.
- Understand the stability of systems through the concept of ROC.
- Know various transform techniques in the analysis of signals and systems.

Course Outcomes:
At the end of this course students will demonstrate the ability to
- Analyze different types of signals.
- Represent continuous and discrete systems in time and frequency domain using different transforms.
- Investigate the system stability.
- Sampling and reconstruction of a signal.

UNIT-I
INTRODUCTION TO SIGNALS AND SYSTEMS
Classification of signals - Energy and Power signals, Continuous and Discrete time signals, Continuous and Discrete amplitude signals, Periodic and Aperiodic, Deterministic and Random, Complex exponential and Sinusoidal signals, Elementary Signals, Operations on signals,Systems: Definition and Classification, Illustrative examples.

UNIT-II
FOURIER SERIES
Representation of Fourier series, Properties of Fourier series, Dirichlet's conditions, Trignometric Fourier Series and Exponential Fourier series, Discrete Time Fourier Seriesproperties, Illustrative examples.

FOURIER TRANSFORM
Deriving Fourier Transform from Fourier Series, Fourier Transform of standard signals, Magnitude and Phase response, Properties of Fourier Transform,Fourier Transform of Periodic signals, Discrete Time Fourier Transform-properties, Illustrative examples.

UNIT-III
SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS
Linear system, Impulse response, Step response, Response of a Linear system, Linear TimeInvariant (LTI) system, Linear Time Variant (LTV) system, Linear Shift-Invariant (LSI) systems, LTI System properties,Characterization of Causality and Stability of linear ShiftInvariant Systems, Transfer function of a LTI system, Filter characteristics of Linear systems,Relation between Continuous and Discrete time systems.

SAMPLING
The Sampling Theorem, Spectra of sampled signals, Impulse sampling, Reconstruction of signal from its samples-Ideal reconstruction filter, Aliasing effect.

UNIT-IV

CONVOLUTION AND CORRELATION OF SIGNALS

Concept of Convolution in Time domain and Frequency domain, Graphical representation of Convolution, Convolution property of Fourier Transform, Cross correlation and Auto correlation of functions, Properties of correlation function, Energy Density Spectrum, Parseval's theorem, Power Density Spectrum, Detection of Periodic signals in the presence of noise by correlation, illustrative examples.

UNIT-V

LAPLACE TRANSFORM

The Laplace transform (LT), region of convergence (ROC), Constraints on ROC for various classes of signals, poles and zeros of system, Laplace domain analysis, solution to differential equations, Properties of LT, relation between LT and FT of a signal, illustrative examples.

Z–TRANSFORM

The z-Transform for discrete time systems, Distinction between Laplace, Fourier and z-transforms, Region of convergence in z-transform, constraints on ROC for various classes of signals, Inverse z-transform, properties of z-transforms, illustrative examples.

TEXT BOOKS:

1. "Signals and Systems", A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edition.
2. "Signals, Systems & Communications", B.P. Lathi, 2009, BS Publications.

REFERENCES:

1. "Signals and Systems", A. Anand Kumar, Phi
2. "Signals and Systems Analysis using Transform methods and MATLAB", M. J.Roberts, TMH, 2003.
3. "Linear Systems and Signals", B. P. Lathi, Second Edition, Oxford University press, 2008.
4. "Fundamentals of Signals and Systems", Michel J. Robert, MGH International Edition, 2008.
5. "Signals and Systems", J. Nagrath, S. N. Sharan, R. Ranjan, S. Kumar, TMH.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18EE0208) ELECTRICAL CIRCUITS SIMULATION LAB

B.Tech, II Year 2nd semester

L	T	P	C
0	0	3	1.5

Course Objectives:
- To develop the simulation skills.
- To analyze electrical circuit in simulation environment.

Course Outcomes:
- Analyze networks by various techniques.
- Analyze circuit responses.

List of Experiments

1. Simulation of DC Circuits
2. DC Transient Response
3. Mesh Analysis
4. Nodal Analysis
5. Frequency response of RLC Series Circuits
6. Analysis of RL and RC Series circuits for DC Excitation
7. Analysis of RL and RC Series circuits for AC Excitation
8. Analysis of Three Phase balanced systems
9. Analysis of Three Phase unbalanced systems
10. Verification of the maximum power dissipation (plot the power dissipated versus the load).

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
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(18EE0209) ELECTRICAL MACHINES-I LAB

B.Tech, II Year 2nd semester

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Course Objectives:

The student has to learn about:

- No load and load characteristics of DC generators.
- Various tests on DC motors.
- The speed control techniques of DC motors.

Course Outcomes:

The student should be able to do the following:

- Conduct experiments to obtain the no, load and load characteristics of D.C. Generators.
- Conduct tests on D.C. motors for predetermination of efficiency.
- Conduct tests on D.C. motors for determination of efficiency.
- Control the speed of D.C. motor in a given range using appropriate method .
- Identify the reason as to why D.C. Generator is not building up voltage.

List of Experiments

1. Study of DC machine parts (identification of armature, field windings, brushes, Commutator etc,.) And finding Armature resistance R_a.
2. Load Test on DC Shunt Generator. Determination of Characteristics.
3. Brake Test on DC Shunt Motor. Determination of Performance Curves.
4. Load Test on DC Compound Generator. Determination of Characteristics.
5. Magnetization Characteristics of DC Shunt Generator. Determination of Critical Field Resistance and Critical Speed.
6. Fields Test on DC Series Machines. Determination of Efficiency.
7. Swinburne's Test
8. Brake Test on DC Compound Motor. Determination of Performance Curves.
9. Load Test on DC Series Generator. Determination of Characteristics.
10. Retardation Test on DC Shunt Motor. Determination of Losses at Rated Speed.
11. Separation of Losses in DC Shunt Motor.
12. Speed Control of DC Shunt Motor
13. Hopkinson's Test on DC Shunt Machines. Predetermination of Efficiency.

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)

(18HS0817 ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

B.Tech, II Year 2nd semester **L T P C**
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Course objective
The course aims at imparting basic principles of thought process, reasoning and inference. Sustainability is at the core of Indian Traditional knowledge Systems connecting society and nature. Holistic life style of yogic science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions. The course focuses on introduction to Indian Knowledge Systems, Indian perspective of modern scientific world-view, and basic principles of Yoga and holistic health care system.

UNIT-I

- Basic structure of Indian Knowledge System: Astadash Vidya- 4 ved
- 4 Upaved (Ayurved, Dhanurved, Gandharva Ved & Sthapthya Adi.,)

UNIT-II

- 6 Vedanga (Shisha, Kalppa, Nirukha, VYkaran, Jyothish & Chand)
- 4 Upanga (Dharma Shastra, Meemamsa, Purana & Tharka Shastra)

UNIT-III

- Modern Science and Indian Knowledge System
- Yoga and Holistic Health care
- Case studies

UNIT-IV

- Philosophical Tradition (Sarvadarshan) Nyaya, Vyshepec,Sankhya, Yog, Meemamsa, Vedantha, Chavanka, Jain & Boudh
- Indian Linguistic Tradition (Phonology, morphology, syntax and semantics)

UNIT-V

- Indian Artistic Tradition - Chitra kala, Moorthi kala, Vasthu kala , Sthapthya, Sangeetha, Nruthya Yevam Sahithya
- Case studies

TEXT BOOKS:

1. V. Sivaramakrishnan (Ed.), Cultural Heritage of India-course material, Bharatiya Vidya Bhavan, Mumbai. 5th Edition, 2014
2. Swami Jitatmanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan

REFERENCES:

1. VN Jha (Eng. Trans.), Tarkasangraha of Annam Bhatta, International Chinmay Foundation, Velliarnad, Arnakulam

2. Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkata GN Jha (Eng. Trans.), Ed. RN Jha, Yoga-darshanam with Vyasa Bhashya, Vidyanidhi Prakashan, Delhi 2016
3. RN Jha, Science of Consciousness Psychotherapyand Yoga Practices, Vidyanidhi Prakashan, Delhi 2016
4. P B Sharma (English translation), Shodashang Hridayan
5. V. Sivaramakrishnan (Ed.), Cultural Heritage of India-course material, Bharatiya Vidya Bhavan, Mumbai. 5th Edition, 2014
6. S.C. Chaterjee & D.M. Datta, An Introduction to Indian Philosophy, University of Calcutta, 1984
7. K.S. Subrahmanialyer, Vakyapadiya of Bhartrihari, (Brahma Kanda), Deccan College Pune 1965
8. Panini Shiksha, MotilalBanarasidas
9. V.N. Jha, Language, Thought and Reality, Vasudevasharan AGRAWAL Kala yevam Samskruthi, Shithya Bhavan Elahabad, 1952
10. Pramod Chandra, India Arts, Howard Univ. Press, 1983
11. Krishna Chaitanya, Arts of India, Abhinav Publications, 1987
12. R. Nagaswamy, Foundations of Indian Art, Tamil Arts Academy, 2002

PEDAGOGY: Problem based learning, group discussions, collaborative mini projects.

OUTCOME: Ability to understand, connect up and explain basics of Indian traditional Knowledge in modern scientific perspective.

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

B.Tech., III Year 1st semester

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(18HS0812) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

COURSE OBJECTIVES

The objectives of this course:

1. *To familiarize the students with the concepts of microeconomics and make them understand the concept of demand and supply analysis in business applications*
2. *To understand the pricing and output decisions under different market structures*
3. *To understand the basic financial statements and techniques of financial statement analysis*

COURSE OUTCOMES (COs)

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

1. *Understand the nature of managerial economics and the role of it in business firms*
2. *Identify the determinants of demand and apply cost analysis under different market conditions*
3. *Integrate the concepts of price and output decisions of business firms*
4. *Appreciate the importance of market structures and implement appropriate price and output decisions*
5. *Assess the financial statements of a firm and the financial performance of the firm through the financial statements*
6. *Measure operating, investing and financial performance of a firm*

UNIT- I

INTRODUCTION TO MANAGERIAL ECONOMICS: Managerial EconomicsDefinition, nature and scope - contemporary importance of Managerial Economics- Demand Analysis: Determinants-Law of Demand -Elasticity of Demand. Significance-Types-
measurement of elasticity of demand-Demand forecasting-factors governing demand Forecasting-methods of demand forecasting-Relationship of Managerial Economics with Financial Accounting and Management.

UNIT- II

THEORY OF PRODUCTION AND COST ANALYSIS: Production Function-Short-run and long-run production-Isoquants and Isocosts, MRTS,leastcost Combination of inputsCobb-Douglas production function-laws of returns-Internal and External Economies of scale**Cost Analysis**: Cost concepts -Break-Even Analysis(BEA)-Managerial Significance and limitations of BEA-Determination of Break Even Point(Simple Problems).

UNIT- III

INTRODUCTION TO MARKETS AND NEW ECONOMIC ENVIRONMENT:

Market structures: Types of Markets-Perfect and Imperfect Competition -Features, Oligopoly-Monopolistic competition .Price-Output determination-Pricing Methods and Strategies. New Economic Environment-Economic systems-Economic LiberalizationPrivatization and Globalization.

UNIT- IV

CAPITAL AND CAPITAL BUDGETING: Concept of Capital-Over and under capitalization-Remedial measures-Sources of Short term and Long term capital-Estimating Working Capital requirement-Capital budgeting-Features of Capital Budgeting proposals-Methods and Evaluation of Capital budgeting-Pay Back Method-Accounting Rate of Return(ARR)-Net Present Value(NPV)-Internal Rate Return(IRR)Method(simple problems).

UNIT- V

INTRODUCTION TO FINANCIAL ACCOUNTING AND ANALYSIS:

Financial Accounting-Concept-emerging need and importance-Double-Entry Book Keeping-Journal- Ledger-Trial Balance-Financial Statements—Trading Account-Profit & Loss Account-Balance Sheet(with simple adjustments).Financial Analysis-Ratios-Techniques-Liquidity,Leverage,Profitability,andActivity Ratios(simple problems).

TEXT BOOK

1. Managerial Economics and Financial Analysis Aryasri,4/e,TMH,2009.
2. Managerial Economics,SultanVarshney&Maheswari,Chand,2009

REFERENCES

1. Financial AccountingandAnalysisPremchandBabu,MadanMohan:,Himalaya,2009
2. EconomicsandFinancialAnalysisS.A.SiddiquiandA.S.Siddiqui:Managerial,NewAge International,2009.
3. PrinciplesofBusinessEconomicsJosephG.NellisandDavidParker,Pearson,2/e,NewDeli.
4. ManagerialEconomicsinaGlobalEconomyDomnickSalvatore,Cengage,2009.
5. ManagerialEconomicsH.L.Ahuja,S.Chand,3/e,2009.

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(AUTONOMOUS)

B.Tech, III Year 1st semester

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(18EC0414) DIGITAL SIGNAL PROCESSING

COURSE OBJECTIVES

The objectives of this course:

1. *To perform basic signal processing operations such as Linear Convolution, Circular Convolution, Auto Correlation, Cross Correlation and Frequency analysis in MATLAB.*
2. *To implement FIR and IIR filters in MATLAB and DSP Processor.*
3. *To study the architecture of DSP processor.*
4. *To design a DSP system to demonstrate the Multi-rate signal processing concepts.*

COURSE OUTCOMES (COs)

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

1. Apply DFT & FFT for the analysis of digital signals and systems and Compare its efficiency.
2. Design IIR and FIR filters for the given specifications.
3. Construct different forms of IIR and FIR filter realizations.
4. Distinguish the effects of finite precision representation on digital filters.
5. Evaluate the errors due to Truncation and Rounding in Quantization process.
6. Realize DSP architecture and programming.

UNIT- I

Discrete Fourier Transform(DFT): Discrete Fourier transform-Relationship of the DFT to other transforms, Properties of DFT, Linear filtering based on the DFT- Filtering of long data sequences - overlap save and overlap add method.

Fast Fourier Transform (FFT): Efficient computation of DFT - Radix-2 - Decimation-in-time (DIT), Decimation-in-frequency (DIF) algorithms.

UNIT- II

Infinite Impulse Response Filters: Design of IIR filters from Analog filters - Impulse invariance method, and bilinear transformation. Frequency transformation in the analog domain, Illustrative Problems.

Realization of IIR Filter: Structures for IIR system- Direct-Form, Cascade-Form, and ParallelForm Structures.

UNIT- III

Finite Impulse Response Filters: Design of linear phase FIR filters using Fourier series method - FIR filter design using windows (Rectangular, Hamming and Hanning window), Frequency sampling method, Illustrative Problems.

Realization of FIR Filter: Structures for FIR system-Direct-Form, Cascade-Formand Linear Phase Structure.

UNIT- IV

Finite Word Length Effects: Representation of Numbers-Fixed point Representation of Numbers and Binary Floating point Representation of Numbers - Quantization -Error due to truncation and rounding -Input Quantization Error-Steady State Input and Output Noise Power - Zero limit cycle oscillations, Dead band.

UNIT- V

Introduction to Digital Signal Processors: Overview of DSP Processors- Architecture of TMS320C50-Bus Structure, Central Processing Unit, On-Chip Memory and On-Chip Peripherals-Applications of Programmable Digital Signal Processors (PDSP).

TEXT BOOKS

1. John G. Proakis & Dimitris G.Manolakis, *Digital Signal Processing - Principles, Algorithms & Applications*, 4th Edition, Pearson Education / Prentice Hall, 2007.

REFERENCES

1. Emmanuel C. Ifeachor& Barrie. W. Jervis,*Digital Signal Processing*, 2nd Edition, Pearson Education / Prentice Hall, 2002.
2. A.V. Oppenheim, R.W. Schafer and J.R. Buck, *Discrete-Time Signal Processing*, 8tth Indian Reprint, Pearson, 2004.
3. Sanjit K. Mitra, *Digital Signal Processing - A Computer Based Approach*, Tata Mc Graw Hill, 2007.
4. Andreas Antoniou, *Digital Signal Processing*, Tata Mc Graw Hill, 2006.
5. P.Ramesh Babu, *Digital Signal Processing*, SCITECH, 7th Edition, 2019.

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B.Tech, III Year 1st semester

L	T	P	C
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(18EE0210) POWER SYSTEMS-I

COURSE OBJECTIVES

The objectives of this course include

1. *To know about the principles of power generation. Investigate the line diagram and components in thermal power station, Hydro and Nuclear power stations*
2. *To enable the process involved in solar, wind ,biogas, geothermal and ocean energy generation and To investigate different tariff methods*
3. *The computation of the parameters of a Transmission line and performance of lines*
4. *To understand the types of insulators ,sag and corona*
5. *To understand the construction, types and grading of underground cables*

COURSE OUTCOMES

After completion of the course the student should be able to:

1. *Understand the principles of power generation. Investigate the line diagram and components in thermal power station, Hydro and Nuclear power stations*
2. *understand the process involved in solar, wind ,biogas, geothermal and ocean energy generation*
3. *Investigate different tariff methods*
4. *Compute the transmission line parameters and Estimate the performance of a given transmission line*
5. *Understand the types of insulators ,sag and corona*
6. *Understand the construction, types and grading of underground cables*

UNIT -I
THERMAL, HYDRO AND NUCLEAR POWER PLANTS

Block Diagram of Thermal Power Station (TPS) Hydro Power Plant Layout, Description of Main Components. Nuclear Power Plant Components: Moderators, Control Rods, Reflectors and Coolants. Brief Description of PWR, BWR and FBR.

UNIT -II
POWER FROM RENEWABLE ENERGY

Principle, Construction and working of Wind, Tidal, Solar Photo Voltaic (SPV),Solar Thermal, Geo Thermal, Biogas power systems.

Tariff Methods: Desirable Characteristics of a Tariff Method- Flat Rate, Block-Rate, TwoPart, Three -Part, and Power Factor Tariff Methods and Numerical Problems.

UNIT -III

PERFORMANCE OF TRANSMISSION LINES

Types of Conductors - ACSR, Bundled, Stranded Conductors and Skin effect. Classification of Transmission Lines - Short, Medium and Long Lines and Their Exact Equivalent Circuits- Nominal-T, Nominal-π. Long Transmission Line-Rigorous Solution, Evaluation of A,B,C,D Constants. Ferranti Effect.

UNIT -IV

MECHANICAL DESIGN OF TRANSMISSION LINES

Types of Insulators, String Efficiency and Methods for Improvement. Corona Phenomenon, Power Loss and Radio Interference. Sag and Tension Calculations with Equal and Unequal Heights of Towers, Effect of Wind and Ice on Weight of Conductor.

UNIT -V

CABLES

Construction of Cables, Types of Cables Types of Insulating Materials. Insulation Resistance and Stress in Insulation, Capacitance of Single and 3-Core Belted Cables, Grading of Cables-Capacitance Grading and Inter-Sheath Grading.

TEXT BOOKS:

1. *A Text Book on Power System Engineering by M.L.Soni, P.V.Gupta, U.S.Bhatnagar and A.Chakraborti, DhanpatRai& Co. Pvt. Ltd., 1999.*
2. *Non Conventional Energy Sources by G.D. Rai, Khanna Publishers, 2000*
3. *Electrical power systems - by C.L.Wadhwa, New Age International (P) Limited, Publishers,1998.*

REFERENCES:

1. *Principles of Power Systems by V.K Mehta and Rohit Mehta S.CHAND& COMPANY LTD., New Delhi 2004.*
2. *Wind Electrical Systems by S. N. Bhadra, D. Kastha& S. Banerjee - Oxford University Press, 2013.*
3. *Electric Power Transmission System Engineering: Analysis and Design, Turan Gonen, 2nd Edition, CRC Press, Taylor & Francis group, 2009, 1st Indian Reprint 2010.*

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B.Tech, III Year 1st semester

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(18EE0211) CONTROL SYSTEMS

COURSE OBJECTIVES

The objectives of this course:

1. *The students should learn how to represent system by transfer function and block diagram reduction method and Mason's gain formula.*
2. *The students should able to learn time response analysis and demonstrate their knowledge to frequency response.*
3. *Students can be able to learn stability analysis of system using Root locus, bode plot, polar plot, and Nyquist plot.*

COURSE OUTCOMES (COs)

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

1. *Identify open and closed loop control system.*
2. *Formulate mathematical model for physical systems and simplify representation of complex systems using reduction techniques.*
3. *Use standard test signals to identify performance characteristics of first and second-order systems.*
4. *Apply root locus technique for stability analysis.*
5. *Analyze performance characteristics of system using Frequency response methods.*
6. *Develop and analyze state space models.*

UNIT - I

Control Systems Concepts: Introduction to linear Control Systems, Classification of control systems - Open loop and Closed loop control systems, transfer function, mechanical, electrical systems and electro mechanical systems, electrical analogous systems. Block diagram, signal flow graph,

UNIT- II

Time Response Analysis - Standard test input signals - Time response - Time domain specifications, Transient and steady state response of first and second order systems- Error constants, Steady state error and generalized error constants-- proportional, integral and derivative Controllers.

UNIT-III

Stability Analysis In Control Systems : Concept of stability - Routh's and Hurwitz stability criterion -.Root Locus concept -effects of adding poles and zeros of G(s)H(s) on the root loci.

UNIT-IV

Frequency Response Analysis: Frequency domain specifications, correlation between frequency domain and time domain, Frequency response plots- BIBO stability, Bode Plots, Polar plots, Nyquist Plots, Gain margin and Phase margin - Stability Analysis Lead, Lag and Lag-lead compensators.

UNIT-V

State Space Analysis: state, state variables and state model, diagonalization, solution of state equations - State transition matrix and it's properties. Concept of controllability and observability.

TEXT BOOK

1. *"Control Systems Engineering"* by I. J. Nagrath and M. Gopal. New Age International Limited, Publishers, 2nd edition. 2008.
2. *"Control Systems"* by A. Nagoor Kani, RBA Publications, Second Edition, 2009.

REFERENCES

1. *"Control Systems"* by A. Anand Kumar, Eastern Economy Edition -PHI learning Private Ltd. 2011.
2. Benjamin C. Kuo, *"Automatic Control Systems",* Wiley, 2014.

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B.Tech, III Year 1st semester

L	T	P	C
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(18EE0212) ELECTRICAL MEASUREMENTS

COURSE OBJECTIVES:

The objectives of this course are to make the students learn:

1. *The basic principles of all measuring instruments, different types of torques in measuring instruments.*
2. *How to deal with the measurement of voltage, current, extension of range of ammeters and voltmeters.*
3. *The construction and working of different AC and DC bridges and its applications*
4. *How to measure large currents and voltages, power and energy.*
5. *About magnetic measurements.*

COURSE OUTCOMES:

After successful completion of the course, student will be

1. *Able to develop an understanding of construction and working of different measuring instruments*
2. *Able to develop an understanding of construction and working of different AC and DC bridges and its applications*
3. *Familiar with C.T and P.T and its applications*
4. *Familiar with various measuring instruments used to detect electrical quantities such as power and energy.*
5. *Able to measure magnetic measurements.*
6. *Able to measure Phase, Frequency, Current and Voltage by using CRO.*

UNIT I

Measuring instruments: Classification - Ammeters and Voltmeters - PMMC, Dynamometer type, Moving Iron Type Instruments -Expression for the Deflecting Torque and Control Torque - Errors and Compensations, Range Extension of Ammeters and Voltmeters, Aryton Shunt. Electrostatic instruments- Principle of operation, Quadrant type electrostatic voltmeter, attracted disc type Kelvin absolute Electrometer.

UNIT II

Bridges: DC Bridges: Bridge Balance condition, Methods of Measuring Low, Medium and High Resistance - Sensitivity of Wheatstone Bridge - kelvin and Kelvins double bridge, Loss of Charge Method.

AC Bridges: Measurement of Inductance - Maxwell's Bridge, Anderson Bridge. Measurement of Capacitance and Loss Angle - De Sauty Bridge. Wien's Bridge - Schering Bridge, Problems.

UNIT III

Measurement of Power and Energy: Single Phase Dynamometer Wattmeter, Double Element and Three Element dynamometer type Wattmeter, Expression for Deflecting and Control Torques. Single Phase Induction Type Energy Meter - Driving and Braking Torques - Errors and Compensations. Introduction to Three Phase Energy Meter.

UNIT IV

Instrument Transformers:

Current Transformers & Potential Transformers: Construction, Principle of operation and characteristics.

Potentiometers: Principle and Operation of D.C. Crompton's Potentiometer-Standardization - Measurement of unknown Resistance, Current, Voltage. A.C. Potentiometers-Polar and Coordinate types - Standardization - Applications, Capacitor voltage transformer, CVT.

UNIT V

Magnetic Measurements:

Ballistic Galvanometer - Equation of Motion - Flux Meter - Constructional Details, Comparison with Ballistic Galvanometer. Cathode Ray Oscilloscope- Cathode Ray tube-- Application of CRO -Measurement of Phase, Frequency, Current & Voltage- Lissajous Patterns.

TEXT BOOKS:

1. *Electrical & Electronic Measurement & Instruments* by A.K. Sawhney, Dhanpat Rai & Co. Publications, 2007.
2. *Electrical Measurements and measuring Instruments* by E.W. Golding and F.C. Widdis, 5th Edition, Reem Publications, 2011.

REFERENCES:

1. *Electrical & Electronic Measurement & Instrumentation* by R. K. Rajput, 2nd Edition, S. Chand & Co., 2nd Edition, 2013.
2. *Electrical Measurements and measuring Instruments by J.B.Guptha, S.K Kataria and sons, 2012.*
3. *Electrical Measurements: Fundamentals, Concepts, Applications* by Reissland, M.U, New Age International (P) Limited, 2010.
4. *Electrical Measurements* by Buckingham and Price, Prentice - Hall, 3rd Edition, 1970.

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(AUTONOMOUS)

B.Tech, III Year 1st semester

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(18EE0213)ELECTRICAL MACHINES-II LAB

COURSE OBJECTIVES:

The objectives of this laboratory are to make the students learn about:

1. *To experiment in detail on Transformers and understand their performance characteristics.*
2. *Induction Motors and understand their performance characteristics.*
3. *Alternators and understand their performance characteristics.*
4. *Synchronous Motor, and evaluate their performance characteristics.*

COURSE OUTCOMES:

After going through this laboratory course

1. *The student acquires sufficiently good practical knowledge about the operation, testing, and characteristics of Transformers*
2. *The student acquires sufficiently good practical knowledge about the operation, testing, and characteristics of Induction motors*
3. *The student acquires sufficiently good practical knowledge about the operation, testing, and characteristics of Alternators*
4. *The student should also have acquired the knowledge about the fixation of the rating of transformers, induction motors and synchronous machines.*
5. *The Student will be able calculate the* X_d and X_q of Salient Pole Synchronous Machine
6. *The Student will be able calculate Regulation of Three-Phase Alternator by Z.P.F. and A.S.A Methods*

LIST OF EXPERIMENTS:

1. O.C. & S.C. Tests on Single phase Transformer.
2. Sumpner‘s Test on a Pair of identical Single Phase Transformers
3. Scott Connection of Transformers
4. No-Load & Blocked Rotor Tests on Three Phase Induction Motor
5. Regulation of Three -Phase Alternator by Synchronous Impedance & M.M.F Methods
6. V and Inverted V Curves of 3 Phase Synchronous Motor.
7. Equivalent Circuit of Single Phase Induction Motor
8. Determination of X_d and X_q of Salient Pole Synchronous Machine
9. Separation of Core Losses of Single Phase Transformer
10. Brake Test on Three Phase Induction Motor
11. Regulation of Three-Phase Alternator by Z.P.F. and A.S.A Methods
12. Load Test on Single Phase Transformer

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B.Tech, III Year 1st semester

L	T	P	C
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(18EE0214) CONTROL SYSTEMS LAB

COURSE OBJECTIVES

The objectives of this lab course are to make the student practically learn about

1. *The effects of feedback on system performance*
2. *Determination of transfer functions of DC Machine.*
3. *The design of controllers/compensators to achieve desired specifications.*
4. *The characteristics of servo mechanisms used in automatic control applications.*

COURSE OUTCOMES (COs)

At the end of the course the student should be able to

1. *Design the controllers/compensators to achieve desired specifications.*
2. *Understand the effect of location of poles and zeros on transient and steady state behavior of systems.*
3. *Assess the performance, in terms of time domain specifications, of first and second order systems.*
4. *Understand the effect of P,PD,PI,PID controllers on second order systems.*
5. *Use MATLAB/SIMULINK software for control system analysis and design.*
6. *Use MATLAB/SIMULINK software for state space model.*

LIST OF EXPERIMENTS

Any Eight of the following experiments are to be conducted:

1. Time Response of Second Order System

2. Characteristics of Synchros

3. Programmable Logic Controller - Study and Verification of Truth Tables of Logic Gates, Simple Boolean Expressions and Application of Speed Control of Motor.

4. Effect of Feedback on DC Servo Motor

5. Transfer Function of DC Machine

6. Effect of P, PD, PI, PID Controller on Second Order Systems

7. Lag and Lead Compensation - Magnitude and Phase Plot

8. Temperature Controller Using PID

9. Characteristics of Magnetic Amplifiers

10. Characteristics of AC Servo Motor

Any two simulation experiments are to be conducted:

1. PSPICE Simulation of Op-Amp Based Integrator and Differentiator Circuits.

2. Linear System Analysis (Time Domain Analysis, Error Analysis) Using MATLAB.

3. Stability Analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant System Using MATLAB 4. State Space Model for Classical Transfer Function Using MATLAB -Verification.

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B.Tech, III Year 1st semester

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(18EE0215) ELECTRICAL MEASUREMENTS LAB

COURSE OBJECTIVES:

The objectives of this course are to make the student learn:

1. *Calibration of various electrical measuring/recording instruments.*
2. *To determine the values of inductance and capacitance using a.c bridges.*
3. *To determine accurately the values of very low resistances.*
4. *Measurement of reactive power in 3-phase circuit using single wattmeter.*
5. *How to determine ratio error and phase angle error of CT.*

COURSE OUTCOMES:

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

1. *Calibrate various electrical measuring/recording instruments.*
2. *Accurately determine the values of inductance and capacitance using a.c bridges.*
3. *Accurately determine the values of very low resistances.*
4. *Measure reactive power in 3-phase circuit using single wattmeter.*
5. *Determine ratio error and phase angle error of CT.*
6. *Measure the power by using 3 Voltmeter Method and 3 Ammeter Method.*

The following experiments are required to be conducted as compulsory experiments:

1. Calibration and Testing of Single Phase Energy Meter.
2. Calibration of Power Factor Meter.
3. Calibration of PMMC meters.
4. Kelvins Double Bridge - Measurement of Resistance.
5. Measurement of % Ratio Error and Phase Angle of Given C.T. by Comparison.
6. Schering Bridge & Anderson Bridge.
7. Measurement of 3 Phase Reactive Power with Single-Phase Wattmeter.
8. Measurement of Power by using 3 Voltmeter Method and 3 Ammeter Method.

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted:

9. Optical Bench - Determination of Polar Curve Measurement of MHCP of Filament Lamps
10. Calibration LPF Wattmeter - by Phantom Testing
11. Measurement of 3 Phase Power with Two Wattmeter Method (Balanced & Unbalanced).
12. Dielectric Oil Testing Using H.T. Testing Kit
13. LVDT and Capacitance Pickup - Characteristics and Calibration
14. Resistance Strain Gauge - Strain Measurements and Calibration
15. Transformer Turns Ratio Measurement Using A.C. Bridge.
16. A.C. Potentiometer - Calibration of AC Voltmeter, Parameters of Choke.

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(18HS0842) APTITUDE PRACTICES

COURSE OBJECTIVES

The objectives of this course:

1. *To evaluate various real life situations by resorting to Analysis of key issues and factors.*
2. *To read between the lines and understand various language structures.*
3. *To demonstrate various principles involved in solving Mathematical problems and thereby reducing the time taken for performing job functions.*

COURSE OUTCOMES (COs)

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

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

UNIT - I

Percentages, Partnership, Ratio and Proportion**,** Time and Distance, Time and Work.

UNIT - II

Clocks, Calendars, Blood relations, Profit and Loss**,** Simple Interest, Compound Interest.

UNIT - III

Permutations and Combinations, Probability**.**

Menstruation: Areas, Volumes of different solids, Problems on Areas, Volumes and Surface Areas, Cubes.

UNIT - IV

Number and letter series:

Difference series, Product series, Squares series, Cubes series, Alternate series, Combination series, miscellaneous series, Place values of letters.

Number and Letter Analogies:

Definition of Analogy, Problems on number analogy.

Odd man out:

Problems on number Odd man out, Problems on letter Odd man out, Problems on verbal Odd man out.

UNIT - V

Coding and decoding, Directions.

Critical Reasoning:

Problems on assumption, Problems on conclusions, Problems on inferences, Problems on strengthening and weakening of arguments, Problems on principle, Problems on paradox.

TEXTBOOKS

1. Barrons GL, *Thorpe's verbal reasoning*, McGraw Hills, LSAT Materials, 2010.
2. Agarwal R S, *A modern approach to Logical reasoning*, S.Chand, 2017.

REFERENCES <<Min:3 Max:5 >>

1. Agarwal R S, *Quantitative Aptitude*, S Chand, 2017.
2. BARRONS G L, *Quantitative Aptitude*, 2010.
3. Abhijit Guha, *Quantitative Aptitude*, *PHI Learning PVT. LTD, 2019.*
4. Tyra, *Magical Book on Quicker Maths*, BSC publishing company, 2018.

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(18HS0813) MANAGEMENT SCIENCE

COURSE OBJECTIVES

The objectives of this course:

1. *To understand the basic concepts, principles and processes of management*
2. *To help the students gain an understanding of the functions, responsibilities of managers*
3. *To get an awareness about the latest developments and contemporary issues in the field of management*

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*

UNIT I

INTRODUCTION TO MANAGEMENT:

Management-Concept and meaning-Nature-Functions-Management as a science and art and both. Schools of management thought-Taylor_s scientific theory-Henry Fayol_s principlesWeber_s Ideal Bureaucracy-Eltan Mayo_s Human relations-Systems theory-Situational or Contingency theory-Social responsibilities of management.

Organizational structure and design: Features of organizational structure-work specialization-Departmentation-Span of control-Centralization and Decentralization. Organisational designs-Line organization-Line & Staff Organization-Functional Organization-Matrix Organization-Project Organization-Committee form of organization.

UNIT II

OPERATIONS MANAGEMENT:

Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study- Statistical Quality Control: C chart, P chart, (simple Problems) Deming's contribution to quality. Material Management: Objectives-Inventory- Functions, types, inventory classification techniques-EOQ-ABC Analysis-Purchase Procedure and Stores Management. Marketing Management: Concept- Meaning - Nature-Functions of Marketing- Marketing Mix- Channels of distribution -Advertisement and sales promotionMarketing Strategies based on Product Life Cycle.

UNIT III

HUMAN RESOURCES MANAGEMENT (HRM):

HRM- Definition and meaning - nature-Managerial and Operative functions-Evolution of HRM-Human Resource Planning(HRP)-Employee Recruitment-sources of recruitment-employee selection- process and tests in employee selection- Employee training and development-On- the- job and Off- the- job training methods-Performance Appraisal systems- Concept-MethodsofPerformanceAppraisal-Placement-EmployeeInduction-WageandSalary Administration-Objectives-Essentials of Wage and Salary Administration-Job Analysis- Process -Job Evaluation-Employee Grievances-techniques of handling Grievances.

UNIT IV

STRATEGIC MANAGEMENT:

Definition& meaning-Setting of Vision- Mission- Goals- Corporate Planning Process-Environmental Scanning-Steps in Strategy Formulation and Implementation-SWOT Analysis. Project Management (PERT/CPM):Network Analysis- Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying Critical Path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (Simple problems).

UNIT V

CONTEMPORARY ISSUES IN MANAGEMENT:

TheconceptofMIS-MaterialsRequirementPlanning(MRP)-Just-In-Time(JIT)System-Total Quality Management (TQM)- Six Sigma Concept- Supply Chain Management-Enterprise Resource Planning (ERP)- Performance Management- Business Process Outsourcing (BPO), Business Process Re-engineering and Bench Marking -Balanced Score CardKnowledge Management.

TEXT BOOK

5. A.R Aryasri: Management Science, TMH,2013
6. Stoner, Freeman, Gilbert, Management, Pearson Education,New Delhi,2012.

REFERENCES

6. Kotler Philip & Keller Kevin Lane: Marketing Mangement ,PHI,2013.
7. Koontz &Weihrich: Essentials of Management, 6/e, TMH,2005.
8. Thomas N.Duening& John M.IvancevichManagementPrinciples and Guidelines,Biztantra.
9. KanishkaBedi, Production and Operations Management, Oxford University Press,2004.
10. Memoria&S.V.Gauker, Personnel Management, Himalaya, 25/e,2005

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(18EC0420) MICROPROCESSORS AND MICROCONTROLLERS

COURSE OBJECTIVES
The objectives of this course:

1. *To understand the basic architecture of computer, evolution, and its applications*
2. *To learn the architectures of Microprocessor and Microcontroller*
3. *To learn the programming of Microprocessors and Microcontrollers using their programming model*
4. *To learn the interfacing of memory, I/O, sensors and actuators to microprocessors and microcontrollers*

COURSE OUTCOMES (COs)
On successful completion of this course, the student will be able to

1. *Understand the evolution of computers, processors, and its applications*
2. *Explain the various software and hardware parts of a microprocessors and computer*
3. *Understand the architectures of 8085 microprocessor and 8051 microcontroller system*
4. *Analyze the programming model of 8085 Microprocessor & 8051 microcontroller development environment.*
5. *Implement the techniques of interfacing memories, various I/O devices, sensors and actuators with microprocessor and microcontrollers*
6. *Design and develop various microprocessor/microcontroller-based systems for the real-life problems*

UNIT - I
Microprocessors, Microcomputers and Assembly Language: Microprocessors - Microprocessor instruction set and computer languages - From large computers to single chip microcontrollers - Application: Microprocessor controlled temperature system (MCTS)
Microprocessor Architecture and Microcomputer Systems: Microprocessor Architecture and its operation - Memory - Input and output devices - Example of a microcomputer system

UNIT - II
8085 Microprocessor Architecture: The 8085 MPU - The 8085 Microprocessor, Microprocessor communication and bus timings, Demultiplexing the bus AD7-AD0, Generating control signals and A detailed look at the 8085 MPU and its architectureInstruction, Data format and Data Storage - Overview of the 8085 Instruction set .

UNIT - III

The 8051 Architecture: Introduction - 8051 microcontroller hardware - Input/output pins, ports and circuits - External memory - Counters and timers - Serial data input/output - Interrupts

UNIT - IV

Programming the 8051: Addressing modes - Moving data - Logical operations - Arithmetic operations - Jump and call instructions

UNIT - V

Applications: Introduction - Keyboards - Displays - D/A and A/D Conversion - Multiple interrupts

TEXT BOOKS

1. Carl Hamacher, Zvonko Vranesic, Safwat Zaky, *Computer Organization,* McGraw Hill Eductaion Pvt. Ltd, 5th Edition, 2017.
2. Ramesh Gaonkar, *Microprocessor Architecture, programming and applications with the 8085,* Penram International Publications Pvt Ltd. 6th Edition, 2015.
3. Kenneth J Ayala, *The 8051 microcontroller,* Penram International Publications Pvt Ltd, 2nd Edition, 1997,

REFERENCES

1. Ray Bhurchandi, *Advanced Microprocessors & Peripheral interfacing*, MC graw hill Publications, 3rd edition, 2012.
2. N.Senthil Kumar, M.Saravanan, S.Jeevanathan, *Microprocessor and Microcontrollers,* Oxford Publishers. 1st Edition, 2015.

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(18EE0216) POWER SYSTEMS - II

COURSE OBJECTIVES

The objectives of the course are to make the students learn about:

1. *Y bus and Z bus of a Power System network*
2. *Per unit system Representation and Different Types of Fault calculations*
3. *Power flow studies by various methods.*
4. *Compare different methods used for obtaining load flow solution*
5. *Concepts of Steady State, Dynamic and Transient Stabilities.*
6. *Equal area criterion and its applications.*

COURSE OUTCOMES (COs)

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

1. *Form the Z Bus and Y Bus of a given power system network.*
2. *Make fault calculations for various types of faults*
3. *Conduct load flow studies on a given system.*
4. *Compare different methods used for obtaining load flow solution*
5. *Understand the Concepts of Steady State, Dynamic and Transient Stabilities.*
6. *Understand the Equal area criterion and its application.*

UNIT- I
POWERSYSTEM NETWORK MATRICES

Representation of Power System Elements, Graph Theory: Definitions, Bus Incidence Matrix, Y bus Formation by Direct and Singular Transformation Methods. Algorithm for the Modification of Z Bus Matrix for Addition Element for the Following Cases: Addition of Element from a New Bus to Reference, Addition of Element from a New Bus to an Old Bus, Addition of Element Between an Old Bus to Reference and Addition of Element Between Two Old Busses(Derivations and Numerical Problems)

UNIT-II
SHORT CIRCUIT ANALYSIS

Per-Unit System of Representation. Per-Unit Equivalent Reactance Network of a Three Phase Power System, Symmetrical Fault Analysis: Short Circuit Current and MVA Calculations, Application of Series Reactors, Symmetrical Component Transformation, Positive, Negative and Zero Sequence Components: Positive, Negative and Zero sequence Networks, Unsymmetrical Fault Analysis: LG, LL, LLG faults with and without Fault Impedance

UNIT-III

POWER FLOW STUDIES-I

Necessity of Power Flow Studies-Data for Power Flow Studies-Derivation of Static Load Flow Equations-Load Flow Solutions using Gauss Seidel Method: Acceleration Factor, Load Flow Solution with and with out P-V Buses, Algorithm and Flow chart. Numerical Load flow Solution for Simple Power Systems(Max.3-Buses)

UNIT-IV

POWER FLOW STUDIES-II

Newton Raphson Method in Rectangular and Polar Co-Ordinates Form: Load Flow Solution with or without PV Buses-Derivation of Jacobian Elements, Algorithm and Flowchart. Decoupled and Fast Decoupled Methods.Comparison of Different Methods-DC Load Flow.

UNIT-V

POWER SYSTEM STABILITY ANALYSIS

Elementary Concepts of Steady State, Dynamic and Transient Stabilities-Description of: Steady State Stability Power Limit, Transfer Reactance, Synchronizing Power Coefficient, Power Angle Curve and Determination of Steady State Stability and Methods to Improve Steady State Stability- Derivation of Swing Equation-Determination of Transient Stability by Equal Area Criterion, Application of Equal Area Criterion, Critical Clearing Angle.

TEXT BOOK

1. *Computer Methods in Power Systems, Stagg El - Abiad& Stags, McGraw-hill Edition.*
2. *Modern Power system Analysis by I.J.Nagrath&D.P.Kothari: Tata McGraw-Hill Publishing*
3. *Company, 2nd edition. Power System Analysis by Nagsarkar and Sukhija, OXFORD University Press*

REFERENCES

1. *Power System Analysis by Grainger and Stevenson, Tata McGraw Hill.*
2. *Computer Techniques in Power System Analysis by M A Pai, Second Edition, TMH.*

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(18EE0221) ELECTRICAL MACHINE DESIGN

COURSE OBJECTIVES

The objectives of this course:

1. *To impart knowledge on principles of design of static and rotating electrical machines.*
2. *To impart design and maintenance of transformers.*
3. *To design the three phase induction motors and synchronous motor.*

COURSE OUTCOMES (COs)

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

1. *The students will be able to Understand the principle of electrical machine design. .*
2. *The students will be able to design transformers.*
3. *The students will be able to design DC Generator*
4. *The students will be able to design DC Motor*
5. *The students will be able to design synchronous machines.*
6. *The students will be able to design three phase induction motors.*

UNIT - I

Principles of electrical machine design - General design considerations - specifications of machines - types of enclosures - types of ventilation - heating - short time rating - overload capacity - temperature rise time curve - hot spot rating. Magnetic circuit calculation - calculation of field ampere turns - air gap mmf - effect of slot and ventilating duct - active iron length - mmf for teeth - real and apparent flux densities - mmf per pole Magnetic Leakage Calculation- Effects of Leakage. Armature Leakage -Components. Unbalanced Magnetic PullPractical aspects of unbalanced magnetic pull

UNIT- II

Design of transformers - single phase and three phase transformers - distribution and power transformers - output equation - core design - window area - window space factor - overall dimensions of core. Windings - no. of turns - current density - conductor section - Cooling of transformers

UNIT-III

Design of DC machines - Output equation - specific loading - choice of speed and no of poles - calculation of main dimensions - choice of type of winding - number of slots - number of conductors per slot-current density - conductor section - slot insulation - 8 15% length of air gap - design of field winding - conductor cross section - height of pole - design of inter pole - flux

density under inter pole - calculation of turns of inter polar winding - design of compensating winding - brushes and commutators.

UNIT-IV

Design of synchronous machines - Specific loading - output equation - main dimensions - types of winding - number of turns - number of slots and slot design - field design for water wheel and turbo alternators - cooling of alternators.

UNIT-V

Design of three phase induction motors - Main dimensions - stator design - squirrel cage and slip ring types - number of stator and rotor slots - rotor bar current - design of rotor bar - end ring current - design of end ring - design of slip ring rotor winding

TEXT BOOK

1. *A K Sawhney, " A Course in Electrical Machine Design", Dhanpat rai and sons, Delhi.*

REFERENCES

1. *M. V. Deshpande, " Design and Testing of Electrical Machines", Wheeler Publishing.*
2. *R. K. Agarwal, " Principles of Electrical Machine Design", Essakay Publications, Delhi.*
3. *M. N. O. Sadiku, " Numerical techniques in Electromagnetics", CRC Press Edition-2001.*

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(18EE0222) POWER SEMICONDCTOR DRIVES

COURSE OBJECTIVES

The objectives of this course:

1. *To learn the basics of power semi cconductor switches*
2. *To understand the working of various types of converters and application of them.*
3. *To understand and design the drive circuits for various Power Semi- conductor Switches.*
4. *To learn to model the converters and semiconductor switches.*
5. *To learn about the control of various power semi conductor switches*

COURSE OUTCOMES (COs)

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

1. *Control DC and AC drives.*
2. *Analyze the operation of the converter, chopper fed dc drive.*
3. *Analyze the operation of both Induction & Synchronous machine drives.*
4. *Design the current and speed controllers for a closed loop solid-state dc motor drive*
5. *Select the drives for any particular application*

UNIT- I

INTRODUCTION TO ELECTRIC DRIVES, CONVERTER FEDDCDRIVES: Electric drive- definition- advantages of electric drives-dynamics control of electric drives-closed loop control. Single and three Phase (semi and fully con- trolled) converter fed DC separately excited and series motors- continuous current operation, output voltage and current waveforms, Speed - Torque expressions & characteristics. Electric Braking: Plugging, Dynamic and Regenerative Braking.

operations

UNIT- II

FOUR QUADRANT OPERATION OF DC DRIVES, CONTROL OFDC MOTORS BY CHOPPERS: Introduction to Four quadrant operation, Motoring and Braking operations, Four quadrant operation of DC motors by dual converters, closed loop operation of DC motor. Single quadrant, Two -quadrant and four quadrant chopper fed DC separately

excited and series motors: Continuous current operation, Output voltage and current waveforms, Speed torque expressions, speed torque characteristics, Problems on Chopper fed DC Motors, Closed Loop operation of chopper fed drives.

UNIT- III

VOLTAGE CONTROL OF INDUCTION MOTORS, FREQUENCYCONTROL OF INDUCTION MOTORS: Variable voltage characteristics of induction motors, Control of Induction Motor by AC Voltage Controllers, speed torque characteristics. Variable frequency characteristics, Variable frequency control of induction motor by Voltage source and current source inverter and cyclo-converters, PWM control, Comparison of VSI and CSI operations, Speed torque characteristics. Closed loop operation of induction motor drive.

UNIT- IV

ROTOR SIDE CONTROL OF INDUCTION MOTOR: Static rotor resistance control, Slip power recovery, Static Scherbius drive, Static Kramer Drive, their performance and speed torque characteristics, advantages , applications , problems.

UNIT- V

CONTROL OF SYNCHRONOUS MOTORS: Separate control &self control of synchronous motors, Operation of self controlled synchronous motors by VSI, CSI and cycloconverters. Load commutated CSI fed Synchronous Motor, Operation, Waveforms, speed torque characteristics, Applications, Advantages and Problems, Closed Loop control of synchronous motor drives.

TEXT BOOK

1. GK Dubey ―Fundamentals of Electric Drives‖, Narosa Publications. 2002
2. MD Singh and K B Kanchandhani ―Power Electronics‖, Tata McGraw-Hill Publishing Company,

REFERENCES

1. M.H.Rashid ―Power Electronic Circuits, Devices and applications‖, PHI.
2. B.K.Bose ―Modern Power Electronics and AC Drives‖, PHI.

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(18EE0223) MODERN CONTROL THEORY

COURSE OBJECTIVES

The objectives of this course:

1. *Concepts of state vector, State transition matrix and solution of state equations.*
2. *Importance of controllability and observability concepts.*
3. *Pole placement, state estimation using observers*
4. *Lyapunov criterion for stability analysis*
5. *Types of non linearities, their effect on system performance.*

COURSE OUTCOMES

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

1. *Model a given dynamic system in state space and obtain the solution for the State equation.*
2. *Test whether a given system is controllable and/or observable*
3. *Design a state feedback controller for pole placement*
4. *Design an observer for state estimation*
5. *Apply Lyapunov criterion and determine stability of a given system*
6. *Analyze non linear systems.*

UNIT-I
STATE VARIABLE DESCRIPTION AND SOLUTION OF STATE EQUATION

Concept of State-Derivation of State Space models for Linear Continuous time Systems from Schematic Models, Differential equations, Transfer functions and block diagrams-Nonuniqueness of state model- State diagrams for continuous time state models-Solution of state equations-State transition matrix. Complete response of continuous time systems.

UNIT-II
CONTROLLABILITY, OBSERVABILITY.

Tests for controllability and observability for continuous time systems-Time varying case, minimum energy control, time invariantcase, Principle of Duality, Controllability and observability of statemodels in Jordan canonical form and other canonical forms. Effect of state feedback on controllability and observability.

UNIT-III
STATEFEED BACK CONTROLLERS AND OBSERVERS

Design of State Feedback Controllers through Pole placement. Full-order observe rand reduced-order observer. State estimation through KalmanFilters.

UNIT-IV
ANALYSIS OF NON LINEAR SYSTEMS

Introduction to nonlinear systems, Types of nonlinearities, Concept of describing

functions, Derivation of describing functions for Deadzone, Saturation, backlash, relay with deadzone and Hysteresis-Jump Resonance. Introduction to phase-plane analysis, Method of Isoclines for Constructing Trajectories, Singular points, Phase-plane analysis of nonlinear control systems.

UNIT-V
STABILITYANALYSIS
Stability in the sense of Lyapunov. Lyapunov‟s stability and Lypanov‟s instability theorems. Direct method of Lypanov for Linear and Nonlinear continuous time autonomous systems.

TEXTBOOKS:

1. KatsuhikoOgata,―ModernControlEngineering‖,PrenticeHall,5thEdition,2010.
2. M.Gopal,‖ModernControlSystemTheory‖,NewAgeInternationalPublishers, Revised2ndedition,2005.

REFERENCEBOOKS:

1. I.J.NagarathandM.Gopal,―ControlSystemsEngineering‖,NewAgeInternational Publishers,5thEdition,2007,Reprint2012.
2. D.RoyChoudhury,―ModernControlEngineering‖,PHILearningPrivateLtd,9th Printing,January2015.

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(18CE0127) ELEMENTS OF ROAD TRAFFIC SAFETY

COURSE OBJECTIVES

The objectives of this course:

1. *To understand the accident statistics globally and in India specifically, its causes and Measures to overcome the situation.*
2. *The traffic regulation, parking problems, understanding of road signs, signals and marking are also taught; so that the student is well informed about all safety measures that a traffic engineer need to understand.*
3. *To understand the various aspects of street lighting.*

COURSE OUTCOMES

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

1. *Identify the causes for road accidents and can implement measures to prevent road accidents*
2. *Describe traffic regulations and implement parking methods*
3. *Classify different traffic signal and can design traffic signal system*
4. *List and illustrate various traffic signs*
5. *List and discuss various road markings*
6. *Discuss importance of street lighting and classify various street lighting system*

UNIT - I

Road Accidents - Causes & Prevention: Road Accidents & Traffic Engineering - Accident Situation in India - International Comparison of Road Accidents - Road & its Effects on Accidents - The Vehicle - The Driven - Skidding - Speed in Relation of Safety - Weather & its Effects on Accidents - Pedestrian Safety -Cyclists - Motor Cycle & Scooter Rider - Parking & Its Influence on Accident - Legislation, Enforcement, Education & Propaganda - Cost of Road Accidents.

UNIT - II

Regulations of Traffic: Basic Principals of Regulation - Regulation of Speed - Regulation of Vehicles - Regulations Concerning the Driver - Regulations Concerning Traffic - Parking Regulations - Enforcement of Regulations.

Parking: Traffic & Parking Problems - Ill-Effects of Parking - Zoning & Parking Space Requirement Standards - Design Standards for On-Street Parking Facilities - Traffic

Regulatory Measures for On-Street Parking - Off-Street Parking Facilities - Peripheral Parking Schemes - Loading & Unloading Facilities - Truck Terminals - Long Distance Bus Terminals.

UNIT - III

Traffic Signs: Importance of Traffic Signs - Need for International Standardization - The Situation in India - General Principals of Traffic Signing - Types of Traffic Signs - Danger Signs (Warning Signs or Cautionary Signs) - Prohibitory Signs - Mandatory Signs - Informatory Sings - Indication Signs - Direction Signs, Advance Direction Signs & Place Identification Signs - Overhead Sings - Route Marker Sings - Location, Height & Maintenance of Traffic Sings.

UNIT - IV

Traffic Signals: Advantages & Disadvantages of Traffic Signals - Signal Indications - Signal Face - Illustration of the Signals - Number & Location of Signals Faces - Amber Period, Red/Amber Period & Inter Green Period - Fixed Time Signals & Vehicle Actuated Signals - Determination of Optimum Cycle Length & Signal Settings for an Intersection with Fixed Time Signals - Warrants for Signals - Co-ordinated Control of Signals - Signal Approach Dimensions - Area Traffic Control - Delay at Signalized Intersection.

UNIT - V

Road Markings: Function - Types of Road Marking - General Principals of Longitudinal Pavement Markings - Material & Color - Centre Lines - Traffic Lane Lines - No Overtaking Zone Markings - Pavement Edge Lines - Carriageway Width Reduction Transition Marking - Obstruction Approach Markings - Stop Lines - Pedestrian Crossings - Cyclist Crossings - Route Direction Arrows - Word Messages - Markings at Approaches to Intersections - Parking Space Limits - Object Markings.

Street Lighting: Need for Street Lighting - Definition of Common Terms - Some Laws of Illumination - Mounting Height - Spacing - Lantern Arrangements - Type of Lamps - Lamp Installation of T‘ Junctions & Cross Roads - Illumination of Traffic Rotaries - Lighting of Bends - Lighting of Dual Carriageways - Lighting of Roads Carrying Only Local Traffic - Lighting Bridges - Tunnel Lighting - Maintenance of Lighting Installation.

TEXT BOOKS

1. L.R.Kadiyali and Lal,Traffic Engineering and Transportation Planning, Khanna Publications,9th edition, 1999.
2. S.K.Khanna&C.E.G.Justo,Highway Engineering,Published by Nemchand& Bros,10th edition, 2012.

REFERENCES

1. L.R.Kadiyali and Lal,*Principles and Practice of Highway Engineering Design*,Khanna Publications, 7th edition, 2013.
2. R.Srinivasa Kumar,*Text book of Highway Engineering*, Universities Press.
3. James H Banks,*Introduction to Transportation Engineering*, Tata McGraw hill Publications, 2nd edition.

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(18ME0307) NON-CONVENTIONAL ENERGY RESOURCES

COURSE OBJECTIVES

To make the students understand

1. *The importance of energy, resources of renewable energy, their usage and impact on environment.*
2. *Solar energy, its harnessing technologies, types of solar collectors, measuring devices. & its applications*
3. *Method of exploiting energy from wind and parameters to be considered for the selection of site for wind turbine installation*
4. *The concept of bio energy and its conversion devices*
5. *Different renewable energies such as tidal energy, geothermal energy, fuel cells etc.*

COURSE OUTCOMES

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

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

UNIT-I

Introduction -world energy use - classification of energy‘s-reserves of energy resourcesenvironmental aspects of energy utilization - need of renewable energy- renewable Energy scenario in Andhra Pradesh, India and around the world.

UNIT-II

Solar thermal conversion - Flat Plate and Concentrating Collectors - Solar direct Thermal Applications- Solar thermal Power Generation

Photo voltaic Conversion: Fundamentals of Solar Photo Voltaic Conversion - Solar Cells - Solar PV Power Generation - Solar PV Applications, Solar Radiation Measurements

UNIT-III

Wind Energy - Types of Wind Energy Systems - Performance - Site Selection - Details of Wind Turbine-Wind Energy Measurements-Safety and Environmental Aspects

UNIT-IV

Bio Energy- Biomass direct combustion - Biomass gasifiers - Biogas plants-Ethanol production - Biodiesel - Cogeneration - Biomass Applications

UNIT-V

Other Sources of Energy - Tidal energy - Wave Energy - Open and Closed OTEC Cycles - Geothermal Energy - Hydrogen and Storage - Fuel Cell Systems - Hybrid Systems.

TEXT BOOKS

1. R.K. Rajput, *Non-conventional Energy Sources and Utilization,* S. Chand Publishers, 2nd Edition, 2014.
2. G. D Rai, *Non-Conventional Energy Sources,* Khanna Publishers, 1st Edition, 2010.
3. Nicholas Jenkins & Janaka Ekanayake*, Renewable Energy Engineering*, Cambridge University Press; 1st Edition, 2017.

REFERENCES

1. Dr. R K Singal*, Non-Conventional Energy Resources*, S.K Kataria & Sons, 4th Edition, 2014.
2. John Twidell & Tony Weir, *Renewable Energy Sources,* Routledge publisher, 3rd Edition, 2015.
3. Sukhatme. S.P*, Solar Energy, Principles of Thermal Collection and Storage,*Tata McGraw Hill Publishing Company Limited, 6th Edition, 1990.

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(18EC0449) INTRODUCTION TO IOT

COURSE OBJECTIVES

The objectives of this course:

1. *To provide an overview on the ICT ecosystem and enabling environment to foster Internet of Things (including technology, standards, system management and applications) deployments.*
2. *Define the infrastructure for supporting IoT deployments.*
3. *To provide an understanding of the technologies and the standardsrelating to the Internet of Things.*
4. *Understand various case studies related to IoT domain.*

COURSE OUTCOMES

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

1. *Understand the technology and standards relating to IoTs.*
2. *Understand where the IoT concept fits within the broader ICT industry and possible future trends.*
3. *Understand the key components that make up an IoT system.*
4. *Differentiate between the levels of the IoT stack and be familiar with the key technologies and protocols employed at each layer of the stack.*
5. *Configure Raspberry Pi, Understand Sensors, Actuators & get started with python on Raspberry Pi.*
6. *Apply the knowledge and skills acquired during the course to design,build and test a complete, working IoT system involving prototyping, programming and data analysis.*

UNIT - I

IoT Introduction & Concepts: Introduction to Internet of Things - Physical Design of IoT - Logical Design of IoT - IoT Enabling Technologies - IoT Levels & Deployment Templates.

UNIT - II

Domain Specific IoTs: Home Automation - Cities - Environment - Energy - Retail - Logistics - Agriculture - Industry - Health & Lifestyle.

UNIT - III

IoT and M2M: Introduction - M2M - Difference between IoT an M2M - Software Defined Networking - Network Function Virtualization for IoT.

Developing Internet of Things: IoT Design Methodology - Motivation for using Python

UNIT - IV

IoT Physical Devices & Endpoints: IoT Device - Raspberry Pi Board - Linux on Raspberry Pi - Raspberry Pi Interfaces - Programming raspberry Pi with Python - Other IoT devices.

UNIT - V

Case Studies Illustrating IoT Design: Home Automation - Cities - Environment - Agriculture - Productivity applications.

TEXT BOOKS

1. Vijay Madisetti - Arshdeep Bahga, Internet of Things a Hands-on Approach, Arshdeep Bahga & Vijay Madisetti ,1st Edition, 2014.
2. Pethuru Raj and Anupama C. Raman, The Internet of Things: Enabling Technologies, Platforms, and Use Cases, CRC Press,1stEdition, 2014

REFERENCES

1. Raj Kamal, Embedded Systems, Tata McGraw-Hill Education, 2ndEdition, 2011.
2. Adrian McEwen & Hakim Cassimally, Designing of Internet of Things, John Wiley and sons Ltd, 1st Edition, 2014,
3. Daniel Kellmereit - Daniel Obodovski, The Silent Intelligence: The Internet of Things,DnD Ventures, 1st Edition,2013.

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B.Tech, III Year IInd semester

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(18CS0517) PYTHON PROGRAMMING

COURSE OBJECTIVES

The objectives of this course:

1. *Introduce Scripting Language*
2. *Exposure to various problem solving approaches of computer science*
3. *Introduce function-oriented programming paradigm*
4. *Exposure to solve the problems using object oriented concepts, exceptional handling*
5. *Exposure to solve the problems using Files, Regular Expressions and, Standard Libraries*

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*

UNIT - I

Introduction: History of Python- Python features- Applications-Programming Using the REPL-Running Python Scripts-Variables - Assignment- Keywords- Input-Output- Indentation.

Data Types: Single-Value data types - int, float, Complex and Boolean.

Multi-Valued Data types - Lists, Tuples, Sets, Dictionaries, Strings- indexing and slicing.

UNIT - II

Operators and Expressions: Operators-Arithmetic Operators, Comparison Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators- Expressions and order of evaluations

Control Flow: Branching- simple if, if-else, if-elif-else, nested if, looping-while and forjumping - break- continue and pass

UNIT - III

Functions: Defining Functions, Calling Functions, Passing Arguments, Keyword Arguments, Default Arguments, Variable-length arguments, Anonymous Functions, Fruitful FunctionsNested functions, Recursive functions- Scope of the Variables in a Function.

Object Oriented Programming in Python: Classes and Objects- self-variable- Methods - Constructor- Inheritance-polymorphism- Method Overloading- Method Overriding.

UNIT - IV

Modules: Creating modules, import statement, from...import statement and name spacing.

Python packages: Introduction to PIP- Installing Packages via PIP (Numpy, Pandas, MatPlotlib etc.,)- Using Python Packages.

Exception Handling: Introduction to Errors and Exceptions, Handing Exceptions, Raising Exceptions, User Defined Exceptions, Regular Expressions-Searching and Matching.

UNIT - V

Functional Programming: Iterators and Generators - Maps and Filters.

Files: Text files- Reading and Writing files- Command line arguments.

Brief Tour of the Standard Library: Dates and Times- Data Compression- Python Runtime Services- Data Management and Object Persistence.

GUI Programming - Turtle Graphics

TEXT BOOKS:

1. Reema Thareja, *Python Programming: Using Problem Solving Approach,* First Edition, Oxford University Press.
2. Vamsi Kurama, *Python Programming: A Modern Approach,* Pearson.

REFERENCES:

1. Mark Lutz , *Learning Python*, O Reily, 4th Edition, 2009.
2. Mark Lutz , *Programming Python* , O Reily, 4th Edition, 2010.
3. Tim Hall and J-P Stacey , *Python 3 for Absolute Beginners*, 2009.
4. Magnus Lie Hetland , *Beginning Python: From Novice to Professional*, 2nd Edition, 2009.
5. Michael T. Goodrich , Roberto Tamassia, Michael H. Goldwasser, *Data Structures and Algorithms in Python,*1st Edition , Kindle.

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(18HS0814) INTELLECTUAL PROPERTY RIGHTS

COURSE OBJECTIVES

The objectives of this course:

1. *To provide an understanding of the concept and significance of intellectual property rights*
2. *To understand the concept of trademarks, copy rights, patents and the need for their protection*
3. *To comprehend the concept of competition, unfair competition and the latest developments in the laws pertaining to intellectual property rights*

COURSE OUTCOMES

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

1. *Become aware of intellectual property rights, concepts, treaties, agencies and international organizations involved in sanctioning IP rights*
2. *Identify different types of intellectual properties, ownership rights and the scope of the protection*
3. *Get an adequate knowledge on patents, trademarks, copy rights and to get property rights for their intellectual work*
4. *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*

UNIT-I

INTRODUCTION TO INTELLECTUAL PROPERTY: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual propertyrights.

UNIT-II

TRADE MARKS: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT-III

LAW OF COPY RIGHTS: Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

LAW OF PATENTS: Foundation of patent law, patent searching process, ownership rights and transfer

UNIT-IV

TRADE SECRETS: Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secretelitigation.

UNFAIR COMPETITION: Misappropriation right of publicity, Falseadvertising.

UNIT-V

NEW DEVELOPMENT OF INTELLECTUAL PROPERTY: New developments in trade mark law; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international - trade mark law, copy right law, international patent law, international development in trade secrets law.

TEXT BOOKS

1. Intellectual property right, Deborah, E. Bouchoux, cengage learning
2. Intellectual property rights: Protection and Management. India, Nityananda KV, Cengage Learning India Private Limited

REFERENCES

1. Intellectual property right - Unleashing the knowledge economy, Prabuddha ganguli, Tata McGraw Hill Publishing CompanyLtd.
2. Law relating to Intellectual Property rights. India. Ahuja VK IN: Lexis Nexis
3. Intellectual Property Rights, India. Neeraj P &Khushdeep D, PHI learning pvt limited.

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(18EE0217) POWER ELECTRONICS AND DRIVES LAB

COURSE OBJECTIVES

The objectives of the course are to make the students learn about:

The objectives of this course:

1. *To analyze various characteristics of power electronic devices with gate firing circuits*
2. *To learn the operation of single-phase half & fully-controlled converters, and inverters with different types of loads*
3. *To understand the operation of single-phase AC Voltage controllers with different loads*
4. *To learn various characteristics of power electronic converters*
5. *To control power electronic components by using dSPACE 1104 kit*

COURSE OUTCOMES (COs)

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

1. *Analyze various power electronic devices and their commutation circuits*
2. *Understand voltage and current characteristics of various converters and inverters at different firing angles*
3. *Analyze different types converters and inverters with different types of loads*
4. *Design current and speed controllers to control dc motor*
5. *Design DC-DC converter and regulated power supply*

LISTOFEXPERIMENTS

Any Eight of the Experiments in Power Electronics Lab

1. Study of Characteristics of SCR, MOSFET & IGBT
2. Gate Firing Circuits for SCR‘s
3. Single Phase AC Voltage Controller with R and RL Loads
4. Single Phase Fully Controlled Bridge Converter with R and RL Loads
5. Single Phase half Controlled Bridge Converter with R and RL Loads
6. Single Phase Inverter with R and RL Loads
7. Single Phase Cycloconverter with R and RL Loads
8. Three Phase Half Controlled Bridge Converter with R-Load
9. Single Phase Dual Converter with RL Loads
10. Design step down DC-DC converter (30V to 5V) using MC34063A IC.

11. Design of 5V regulated DC supply using 7805 IC and bridge converter 1N 4007 diodes.

Any two Experiments using dSPACE 1104 kit

12. Open loop speed control of DC motor using dSPACE 1104 kit
13. Closed loop speed control of DC motor using dSPACE 1104 kit
14. Generation of PWM pulse using dSPACE 1104 kit

TEXT BOOKS:

1. L. Umanand, Power Electronics - Essentials & Applications, Wiley-India
2. Mohan, Undeland, Robbins, Power Electronics, Converters, Applications & Design, Wiley-India
3. Muhammad H. Rashid, Power Electronics Circuits, Devices and Applications, Pearson Education

REFERENCE BOOKS:

1. Simulation of Electric and Electronic circuits using PSPICE - by M.H.Rashid, PHI.
2. PSPICE reference guide - Microsim, USA.
3. Simulation of Power Electronics Circuit, M B Patil, V Ramanarayan and V T Ranganat, Alpha Science International Ltd., 2009.
4. Web Address for SEQUEL http:// www.ee.iitb.ac.in/~sequel

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(18EE0218) POWER SYSTEMS LAB

COURSE OBJECTIVES

The objectives of this course:

1. *Experimental determination (in machines lab) of sequence impedance and Sub transient reactances of synchronous machine*
2. *Conducting experiments to analyze LG, LL, LLG, LLLG faults.*
3. *The equivalent circuit of three winding transformer by conducting a suitable experiment.*
4. *Developing MATLAB program for formation of Y and Z buses.*
5. *Developing MATLAB programs for gauss-seidel and fast decoupled load flow studies.*
6. *Developing the SIMULINK model for single area load frequency control problem*

COURSE OUTCOMES (COs)

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

1. *Experimental determination (in machines lab) of sequence impedance and Sub transient reactances of synchronous machine.*
2. *Conducting experiments to analyze LG, LL, LLG, LLLG faults.*
3. *The equivalent circuit of three winding transformer by conducting a suitable experiment.*
4. *Develop MATLAB program for formation of Y and Z buses.*
5. *Develop MATLAB programs for gauss-seidel and fast decoupled load flow studies.*
6. *Develop the SIMULINK model for single area load frequency control problem.*

LIST OF EXPERIMENTS

1. Determination of Sequence Impedances of Cylindrical Rotor Synchronous Machine.
2. Fault Analysis-I
   i. LG Fault
   ii. LL Fault
3. Fault Analysis- II
   i. LLG Fault
   ii. LLLG Fault
4. Determination of Sub transient reactances of salient pole synchronous machine.
5. Equivalent circuit of three winding transformer.
6. Y formation using MATLAB
7. Z formation using MATLAB
8. Gauss-Seidel load flow analysis using MATLAB
9. Fast decoupled load flow analysis using MATLAB
10. Develop a Simulink model for a single area load frequency control problem.

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(18HS0859) ENGLISH FOR CORPORATE COMMUNICATION SKILLS LAB

Course Objectives

1. To improve the students' fluency in English, through a well-developed vocabulary
2. To enable them listening spoken English at normal conversational speed by English speakers
3. To respond appropriately in different social-cultural and professional contexts
4. To develop drafting skills among the students.
5. To develop Inter-personal and Intra-personal Skills

Course Outcomes

1. Flair in Writing by using cohesion and coherence.
2. prepare effective job application.
3. Presenting Effective Speaking Abilities.
4. Apply various communicative techniques in their professional lives.
5. cope with the employability skills.
6. Use effective communicative approaches by preparing job application, report and other kinds of spoken and written correspondences.

UNIT I

COMMUNICATIVE COMPETENCY

1. Reading Comprehension
2. Listening Comprehension
3. Vocabulary for competitive purpose
4. Spotting Errors

UNIT II

TECHNICAL WRITING

1. Report writing
2. Curriculum vitae
3. Cover Letter
4. E-mail writing

UNIT III

PRESENTATIONAL SKILLS

1. Oral presentation
2. Power point presentation

3. Poster presentation
4. Stage Dynamics

UNIT IV

CORPORATE SKILLS

1. Dress code
2. Telephonic skills
3. Net-etiquettes

UNIT V

GETTING READY FOR JOB

1. Group Discussion
2. Interview skills
3. Psychometric test

Minimum requirements for English for Corporate Communication Skills Lab

1. Computer Assisted Language Learning (CALL) Lab: The Computer Assisted Language Lab for 60 Students with 60 systems one Master Console, LAN facility and English Language Software for self-study by learners.

2. English for Corporate Communication Skills Lab with movable chairs and audio visual aids with a P. A. system, Projector, a Digital stereo audio & video system and Camcorder etc.

System Requirement (Hardware component):

Computer network, LAN with minimum 60 multimedia systems with the following:

Specifications

i) a) Intel (R) core (TM) i3
   b) Speed 3.10 GHZ
   c) RAM - 4 GB
   d) Hard Disk - 320 GB

ii) Headphones with High quality

Software

Walden Info Tech Software

References

1. Effective Tech Communication, Rizvi, Tata McGraw - Hill Education, 2007.
2. Communication skills, Sanjay Kumar &Pushpalatha, Oxford University Press, 2012.
3. Writing Tutor. Advanced English Learners‘ Dictionary, 9th Edition, Oxford University Press, 2015.
4. Powerful Vocabulary Builder, Anjana Agarwal, New Age International Publishers, 2011.
5. Listening Extra, Miles Craven, Cambridge University Press, 2008.

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(18EE0219) ELECTRICAL DISTRIBUTION SYSTEMS

COURSE OBJECTIVES

Students undergoing this course are expected to:

1. *To demonstrate knowledge on different types of loads and distribution feeders, different Parameters and protection schemes for distribution feeders.*
2. *To analyze different feeder configurations, optimal capacitor placement, the criteria for economical power factor and different grounding methods for protection*
3. *To design proper rating of capacitor to improve power factor.*
4. *To demonstrate skills in evaluating the load parameters of different types of loads and Voltage drop, losses and fault currents in distribution system.*

COURSE OUTCOMES (COs)

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

1. *Understand different types of distributions systems and loads.*
2. *Analyse AC and DC distribution systems in ring main and radial configurations*
3. *Understand the concepts of various types of substation design.*
4. *Calculation of power factor and placement of capacitor for p.f. correction*
5. *Analyse automation of distribution systems using SCADA*
6. *Understand the concepts of CIS, GIS and AMR.*

UNIT- I:
INTRODUCTION TO DISTRIBUTION SYSTEMS

Introduction to distribution systems, load modelling and characteristics - coincidence factor, contribution factor, loss factor, relationship between the load and loss factors. Classification of loads (residential, commercial, agricultural and industrial) and their characteristics. Classification of distribution systems - radial, loop, ring main. Comparison of DC Vs AC and under-ground Vs over-head distribution systems.

UNIT-II:
AC AND DC DISTRIBUTION SYSTEMS

Voltage drop calculations and problems in DC distributors – radial DC distributor fed at one end, at both the ends (equal/unequal voltages) and ring main distributor. Voltage drop calculations and problems in AC distributors – power factors referred to receiving end voltage and respective load voltages.

UNIT - III:
SUBSTATIONS

Classification of substations - indoor and outdoor, gas and air insulated substations. Substation layout - different bus bar schemes, location of substations - rating of distribution substations.
service area with 'n' primary feeders. Neutral Grounding - Grounded and ungrounded systems,

UNIT- IV:

POWER FACTOR CORRECTION

Causes of low power factor, methods of improving power factor – power capacitors, series and shunt capacitors (fixed and switched) for power factor correction, most economical power factor for constant KW load and constant KVA type loads, economic justification for capacitors, procedure to determine the optimum capacitor allocation - numerical problems.

UNIT - V:

DISTRIBUTION AUTOMATION

Introduction to Distribution automation-Definitions-Communication Sensors-Supervisory Control and Data Acquisition (SCADA)-Consumer Information Service (CIS)-Geographical Information system (GIS)-Automatic Meter Reading(AMR)-Automation Systems.

TEXT BOOKS:

1. Turan Gonen*, Electric Power Distribution System Engineering*, Mc Graw-Hill Book Company, 2nd edition, 2012
2. V.K.Mehta, Rohit Mehta, *Principles of Power System*, Principles of Power System, S.Chand & Company Ltd, revised edition, 2013.

REFERENCES:

1. C.L.Wadhwa,, *Generation, Distribution and Utilization of Electrical Energy, New Age International, 1993.*
2. A.S.Pabla, *Electric Power Distribution,* Tata Mc Graw-Hill Publishing Company, 4thedition, 1997
3. M.L.Soni, P.V.Gupta, V.S. Bhatnagar, A.Chakravarthy, *Power System Engineering,* Dhanpat Rai and Co Private Limited, 2007.

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(18EE0220) UTILIZATION OF ELECTRICAL ENERGY

COURSE OBJECTIVES:

The objective of the course is

1. *To present the basic concepts on utilization of electrical energy on various applications*
2. *To study the basic principles of light control and types of light schemes.*
3. *To study the concepts of electric heating and welding equipment's used in industries*
4. *To study about the various characteristics of electrical drives and to select the particular electrical drive for the given application*
5. *To provide knowledge on electrical traction*

COURSE OUTCOMES:

After completion of this course the students are able

1. *To understand the basic concepts of illumination engineering and design the various lighting schemes.*
2. *To enumerate the concepts of electric heating and welding equipment's used in industries.*
3. *To demonstrate various characteristics of electrical drives and to select the particular electrical drive for the given application.*
4. *To describe the electrical traction systems and its control.*
5. *To discuss the traction system considering economic and technology upgradation.*
6. *To evaluate the specific energy consumption and tractive effort of the given traction system.*

UNIT – I

ILLUMINATION

Introduction, terms used in illumination, laws of illumination, polar curves, and sources of light, Incandescent Lamp, Sodium Vapour Lamp, Fluorescent Lamp, Requirement of Good Lighting Scheme – Types, Design and Calculation of Illumination, Street Lighting and Factory Lighting.

UNIT-II

Electric heating: Introduction, Advantages of electric heating, Types-resistance heating, induction heating and dielectric heating, Applications.

Electric welding: Introduction, resistance and arc welding, electric welding equipment, comparison between A.C. and D.C. Welding, Electrolysis - Faraday_s Laws, Applications of Electrolysis, Power Supply for Electrolysis.

UNIT – III

ELECTRIC DRIVES

Types of electric drives, choice of motor, starting and running characteristics, speed control,

temperature rise, selection of electric drives for particular applications, types of loads- continuous, intermittent and variable loads, load equalization.

UNIT –IV

ELECTRIC TRACTION – I

Introduction - Systems of electric traction, Comparison between A.C. and D.C. traction, Special features of traction motor- methods of electric braking-plugging rheostat braking and regenerative braking, Mechanics of train movement, Speed-time curves for different services – trapezoidal and quadrilateral speed time curves and problems.

UNIT – V

ELECTRIC TRACTION-II

Calculations of tractive effort, power, specific energy consumption for given run, effect of varying acceleration and braking retardation, adhesive weight and coefficient of adhesion.

TEXT BOOKS:

1. E. Openshaw *Utilization of Electric Energy* Taylor, University press.
2. Partab *Art & Science of Utilization of electrical Energy*, Dhanpat Rai & Sons.

REFERENCES:

1 . C.L. Wadhwa *Generation, Distribution and Utilization of electrical Energy* , New Age International (P) Limited, Publishers, 1997.
2. N.V.Suryanarayana *Utilization of Electrical Power including Electric drives and Electric traction* New Age International (P) Limited, Publishers, 1996

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(18EE0224) POWER SYSTEM PROTECTION

PROFESSIONAL ELECTIVE COURSE(PEC)-II

COURSE OBJECTIVES:

Students undergoing this course are expected to:

1. *The different types of electromagnetic relays and microprocessor-based relays.*
2. *The protection of Generators and Transformers.*
3. *The protection of Feeders, Buses and lines.*
4. *The technical aspects involved in the operation of circuit breakers.*
5. *Generation of over voltages and protection from over voltages.*

COURSE OUTCOMES:

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

1. *Student gains knowledge on different Protective Equipment's or Power Systems.*
2. *Express Oil circuit Breaker, Air Blast circuit Breakers, SF6 Circuit Breakers.*
3. *Discuss the various protective Relays - how it works and where it works?*
4. *Understand Protection of Generators and Transformers.*
5. *Explain Protection of Feeders & Lines*
6. *Illustrate Over voltage and neutral grounding for overall protection.*

UNIT- I

CIRCUIT BREAKERS: Elementary Principles of Arc Interruption, Recovery, Restriking Voltage and Recovery Voltages. Average and Max. RRRV,- Current Chopping and Resistance Switching - CB Ratings and Specifications. Types of Circuit Breakers- Description and Operation -Minimum Oil Circuit Breakers, Air Blast Circuit Breakers, Vacuum and SF6 Circuit Breakers and applications.

UNIT- II

RELAYS: Introduction - Basic Requirements of Relays – Primary and Backup Protection – Construction Details of – Attracted Armature, Balanced Beam, Induction Type and Differential Relays – Universal Torque Equation – Characteristics of Over Current, Directional and Distance Relays. Static Relays – Advantages and Disadvantages – Definite Time, Inverse and IDMT. Block Diagram for Over Current (Definite, Inverse and IDMT) Microprocessor Based Relays, Advantages and Disadvantages and applications.

UNIT -III

PROTECTION OF GENERATORS AND TRANSFORMERS

Protection of Generators against Stator Faults, Rotor Faults, and Abnormal Conditions. Restricted Earth Fault and Inter-Turn Fault Protection, Problems on percentage Winding. **Protection of Transformers**: Percentage Differential Protection, Design of CTs Ratio, Buchholz Relay Protection.

UNIT- IV

PROTECTION OF FEEDERS & LINES

Protection of Feeder (Radial & Ring Main) Using Over Current Relays. Protection of Transmission Line, 3-Zone Protection Using Distance Relays, Carrier Current Protection. Protection of Bus Bars.

UNIT -V

PROTECTION AGAINST OVER VOLTAGES AND GROUNDING

Generation of Over Voltages in Power Systems. -Protection Against Lightning Over Voltages – Valve Type and Zinc-Oxide Lightning Arresters - Insulation Coordination –BIL.Methods of neutral grounding and grounding practices.

TEXT BOOKS:

1. Badri Ram, D.N Vishwakarma*, Power System Protection and Switchgear*, TMH Publications, 2011.
2. Sunil S Rao, *Switchgear and Protection,* Khanna Publishers,1992.
3. Chakrabarti, M.L. Soni, P.V. Gupta, U.S. Bhatnagar, *Power System Engineering* Dhanpat rai & Co. Publishers.

REFERENCES:

1. Bhuvanesh Oza, *Power system protection and switch gear*, TMH,2010.
2. C. Christopoulos and A. Wright, *Electrical power System Protection*, 2nd Edition, Springer International Edition,1999.
3. C.L.Wadhwa, *Electrical Power Systems* New Age international (P) Limited, Publishers,2012.

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(18EE0225) ELECTRIC AND HYBRID VEHICLES

PROFESSIONAL ELECTIVE COURSE(PEC)-II

COURSE OBJECTIVES:

Students undergoing this course are expected to:

1. *To understand the concept of Electric vehicle*
2. *To understand Electric vehicle motors and sensor-less control*
3. *To Learn the methods of Hybrid vehicles*
4. *To analyze the outcome of Energy storage systems*

Course Outcomes:

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

1. *Describe about working principle of electric vehicles.*
2. *Familiarize the construction and working principle of various motors used in electricvehicles.*
3. *Understand about working principle of sensor-less control electronics in electric vehicles*
4. *Knows the different types and working principle of hybrid vehicles.*
5. *Illustrate the various types and working principle of energy storage devices.*
6. *Implement the design and control of Electric and Hybrid Vehicle*

UNIT I
INTRODUCTION TO ELECTRIC VEHICLES

Electric Vehicle – Need – Types -Structures of EV– Cost and Emissions -Economic and Ecology impacts – Electric Vehicle Technology – layouts, cables, components, Controls, Batteries– overview and its types., Block diagram of Battery management system- Battery plug-in and life. Ultra-capacitor, Charging – Methods and Standards. Alternate charging sources – Wireless & Solar.

UNIT II
ELECTRIC PROPULSION SYSTEM

BLDC–Types, Principle, Construction, Control. Power Rating Design, Peak Power Source (PPS); Parallel HEDT (Mechanical Coupling) – Torque Coupling and Speed Coupling. Switched Reluctance Motors (SRM) Drives – Basic structure, Drive Convertor, Design, Case study.

UNIT III
POWER ELECTRONIC CONTROL IN EV

Safety–Risks and Guidance, Precautions, High Voltage safety, Hazard management. Sensors - Autonomous EV cars, Self-Drive Cars, Hacking; Block diagram representation of Sensor less Control methods of SRM- BLDC and FOC of Induction motor -Advanced control methods in EV.

UNIT IV
HYBRID VEHICLES

Hybrid Electric vehicles – Classification – Micro, Mild, Full, Plug-in, EV. Layout and Architecture – Series, Parallel and Series-Parallel Hybrid, Propulsion systems and components. Economy, Vibration and Noise reduction. Hybrid Electric Vehicles System – Analysis and its Types, Controls.

UNIT V
ENERGY STORAGE DEVICES

Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Super Capacitor based energy storage and its analysis, Flywheel based energy storage and its analysis, Hybridization of different energy storage devices.

TEXT BOOKS:

1. Iqbal Husain, "*Electric and Hybrid Electric Vehicles*", CRC Press, 2011. 92
2. Wei Liu, "*Hybrid Electric Vehicle System Modeling and Control*", Second Edition, WILEY, 2017.
3. James Larminie and John Lowry, "*Electric Vehicle Technology Explained*", Second Edition 2012.

REFERENCES:

1. Mehrdad Ehsani, Yimin Gao, Ali Emadi, "*Modern Electric, Hybrid Electric, and Fuel Cell Vehicles: Fundamentals*", CRC Press, 2010.
2. Sandeep Dhameja, "*Electric Vehicle Battery Systems*", Newnes, 2000
3. http://nptel.ac.in/courses/108103009/
4. Christopher D Rahn, Chao-Yang Wang, "*Battery Systems Engineering*", Wiley, 2013

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(18EE0226) ELECTRICAL ENERGY CONSERVATION AND AUDITING

PROFESSIONAL ELECTIVE COURSE(PEC)-II

COURSE OBJECTIVES:

Students undergoing this course are expected to

1. *To understand the energy management concepts*
2. *To understand Energy conservation principles and measures*
3. *To Learn the methods of energy audit and usage of instruments*
4. *To analyze and report the outcome of energy audit*

COURSE OUTCOMES:

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

1. *Identify the energy demand supply gap in the World & India and understand energy*
2. *Illustrate the energy conservation opportunities in different thermal systems*
3. *Describe the energy conservation opportunities in different electrical systems*
4. *Identify and evaluate the common energy conservation opportunities in different energy*
5. *Understand the need for energy audit*
6. *To examine the economic evaluation of energy conservation solutions adopted*

UNIT I

INTRODUCTION TO ENERGY CONSERVATION

Principles - Past and present energy scenario of world – Energy consumption in India – resource availability – Demand supply gap - Environmental aspects–Energy Conservation act – Standards and labeling – designated consumers.

UNIT II

ENERGY CONSERVATION IN THERMAL SYSTEMS

Steam systems – Boilers - blow down control – furnaces – thermic fluid heaters – steam traps – insulators and refractories –cooling tower – air pressure control – waste heat recovery – cogeneration.

UNIT III

ENERGY CONSERVATION IN ELECTRICAL SYSTEMS

Components of EB billing - types of tariff – HT and LT supply – Transformers – cable selection – power factor improvement – capacitors – harmonics – electric motors – efficiency – energy efficient motors – variable speed drives - lighting – types- efficacy – LED

UNIT IV

ENERGY CONSERVATION IN INDUSTRIES

Pumps – fans – blowers – compressed air systems – refrigeration and air conditioning systems – cooling towers – DG sets

UNIT V

ENERGY AUIDT AND ENERGY ECONOMICS

Energy audit -need – types - benefits - methodology and barriers – role of energy managers – instruments for energy auditing; Energy economics – discount rate – depreciation cost - payback period – internal rate of return – net present value – life cycle costing – case study.

TEXT BOOKS:

1. Kennedy, William J., Turner, Wayne C.,& Capehart, Barney L., *Guide to Energy Management*, The Fairmount Press.
2. Callaghan, P.W., *Design and Management for Energy Conservation*, Pergamon Press, Oxford.

REFERENCES:

1. Dryden, I.G.C., *The Efficient Use of Energy*, Butterworths, London.
2. Turner, W.C., *Energy Management Handbook*, Wiley, New York (1982).

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(18EE0227) POWER QUALITY

PROFESSIONAL ELECTIVE COURSE(PEC)-III

COURSE OBJECTIVES:

Students undergoing this course are expected to:

1. *To know about introduction on power quality issues.*
2. *To learn about voltage disturbances and power transients that is occurring in power systems.*
3. *To know the concept of harmonics in the system and their effect on different power system equipment.*
4. *To know about different power quality measuring and monitoring concepts.*

COURSE OUTCOMES:

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

1. *Identify the terminology used in power quality issues and evaluate the power quality issues.*
2. *Identify the different power quality disturbances existing power system.*
3. *Understand power quality monitoring and classification techniques*
4. *To Study the interruptions types and its influence in various components.*
5. *To study various methods of power quality monitoring.*
6. *To understand the different types of custom power devices.*

UNIT I
INTRODUCTION

Definition of Power Quality- Power Quality Terminology –evaluation procedure, Classification of Power Quality Issues Magnitude Versus Duration Plot-Power Quality Standards - Responsibilities of The Suppliers and Users of Electric Power-CBEMA and ITIC Curves.

UNIT II
POWER QUALITY DISTURBANCES

General classes of power quality problems - Impulsive and oscillatory Transients - Sag-Swell-Sustained Interruption - Under Voltage – Over Voltage– Outage. Sources of Different Power Quality Disturbances- Principles of Regulating the Voltage Conventional Devices for Voltage Regulation Estimation of the sag severity Overview of mitigation methods.

UNIT III

FUNDAMENTALS OF HARMONICS & APPLIED HARMONICS

Harmonic Distortion, Voltage Versus Current Distortion, Harmonics Versus Transients, Effect of harmonics – harmonic distortion – voltage and current distortion - harmonic indices - inter harmonics – resonance Power System Qualities Under Non Sinusoidal Conditions, Harmonic Indices, Harmonic Sources From Commercial Loads, Harmonic Sources From Industrial Loads. Applied Harmonics: Effects Of Harmonics, Harmonic Distortion Evaluations, devices for controlling harmonic distortion - passive and active filters.

UNIT IV

POWER QUALITY MONITORING

Power Quality Benchmarking-Monitoring Considerations- Choosing Monitoring Locations-Permanent Power Quality Monitoring Equipment-Historical Perspective of Power Quality Measuring Instruments Power Quality Measurement Equipment-Types of Instruments-Assessment of Power Quality Measurement Data- Power Quality Monitoring Standards.

UNIT V

POWER QUALITY ENHANCEMENT USING CUSTOM POWER DEVICES

Custom Power Devices—introduction Network Reconfiguring Type: Solid State Current Limiter (SSCL) -Solid State Breaker (SSB) -Solid State Transfer Switch (SSTS) - Compensating Type: distribution static compensator (DSTATCOM),Dynamic Voltage Restorer (DVR)-Unified Power Quality Conditioner(UPQC)-Principle of Operation Only.

TEXT BOOKS:

1. Roger. C. Dugan, Mark. F. McGranagham, Surya Santoso, H.Wayne Beaty, *"Electrical Power Systems Quality,"* McGraw Hill,2003.
2. Eswald.F.Fudis and M.A.S. Masoum, *"Power Quality in Power System and Electrica Machines,"* Elseviar Academic Press, 2013.

REFERENCE BOOKS:

1. Math H. J. Bollen*, "Understanding Power quality problems",* IEEE Press, 2007.
2. Arindam Ghosh, Gerard Ledwich*, "Power quality enhancement using custom power devices",* Kluwer academic publishers, 2002.

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(18EE0228) HIGH VOLTAGE ENGINEERING

PROFESSIONAL ELECTIVE COURSE(PEC)-III

COURSE OBJECTIVES:

Students undergoing this course are expected to:

1. *understand various types of over voltages in power system and protection methods*
2. *To know breakdown phenomenon in solid dielectrics.*
3. *To know generation of high voltages and currents*
4. *Understand measurement techniques for high voltages and currents.*
5. *Understand overvoltage phenomenon and insulation coordination in electric power systems.*

COURSE OUTCOMES:

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

1. *Identify the HV technologies and industrial applications of High voltage.*
2. *Know the generation of high voltage AC and DC voltages and impulse voltages*
3. *Identify different high voltage circuits and calculate the regulation, ripple and optimum number of stages for minimum voltage drop*
4. *Measure high voltages by using different techniques like Chubb and Fortescue Method*
5. *Test high voltages by using different techniques and identify factors affecting high voltages.*
6. *Understand non-destructive testing of materials and electric apparatus and high-voltage testing of electric apparatus*

UNIT I
OVER VOLTAGES IN ELECTRICAL POWER SYSTEMS

Causes of over voltages and its efects on power system – Lightning, switching surges and temporary over voltages, Corona and its efects – Bewley latice diagram- Protection against over voltages.

UNIT II
DIELECTRIC BREAKDOWN

Properties of Dielectric materials – Gaseous breakdown in uniform and non-uniform fields – Corona discharges – Vacum breakdown – Conduction and breakdown in pure and commercial liquids, Maintenance of oil Quality – Breakdown mechanisms in solid and composite dielectrics- Aplications of insulating materials in electrical equipments.

UNIT III
GENERATION OF HIGH VOLTAGES AND HIGH CURRENTS

Generation of High DC voltage: Rectifers, voltage multipliers, vandigraf generator: generation of high impulse voltage: single and multistage Marx circuits – generation of high AC voltages: cascaded transformers, resonant transformer and tesla coil- generation of switching surges – generation of impulse curents – Trigering and control of impulse generators.

UNIT IV
MEASUREMENT OF HIGH VOLTAGES AND HIGH CURRENTS

High Resistance with series ammeter – Dividers, Resistance, Capacitance and Mixed dividers – Peak Voltmeter, Generating Voltmeters – Capacitance Voltage Transformers, Electrostatic Voltmeters – Sphere Gaps – High curent shunts- Digital techniques in high voltage measurement.

UNIT V
HIGH VOLTAGE TESTING & INSULATION COORDINATION

High voltage testing of electrical power aparatus as per International and Indian standards – Power frequency, impulse voltage and DC testing of Insulators, circuit breakers, bushing, isolators and transformers.

TEXT BOOKS:

1. M.S.Naidu and V. Kamaraju,"*High Voltage Engineering,"* TMH Publications, 4th Edition, 2004.
2. C.L.Wadhwa*,"High Voltage Engineering*," New Age Internationals (P) Limited, 1997.

REFERENCE BOOKS:

1. E.Kuffel, W.S.Zaengl, J.Kuffel, "*High Voltage Engineering: Fundamentals*" Elsevier, 2ndEdition, 2000.
2. Ravindra Arora, Wolfgang Mosch," *High Voltage Insulation Engineering*," New Age International (P) Limited, 1995.
3. L. L. Alston ,"*High Voltage Technology*," OXFORD University Press, Second Edition, 2009.
4. R. D. Begamudre ,"*High Voltage Engineering Problems & Solutions*,"New Age International Publishers, First Edt., 2010.

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(18EE0229) WIND AND SOLAR ENERGY SYSTEMS

PROFESSIONAL ELECTIVE COURSE(PEC)-III

COURSE OBJECTIVES:

Students undergoing this course are expected:

1. *To understand wind and solar energy resource assessment techniques. And also to understand the principles of conversion to useful forms of energy from solar and wind energy resources.*
2. *To understand the working principles of the conversion devices, limitations, cost of energy generation and environmental issues.*
3. *To discuss theories and parameters for designing solar and wind energy system*

COURSE OUTCOMES (COS):

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

1. *Understand the generation of electricity from solar and wind sources of energy.*
2. *Estimate the solar energy, Utilization of it, Principles involved in solar energy collection and conversion of it to electricity generation.*
3. *Differentiate the types of solar energy technologies, their importance, different tapping devices and describe the method of harnessing the solar energy.*
4. *Explore the concepts involved in wind energy conversion system by studying its components, types and performance.*
5. *Analyze and evaluate the implication of solar and wind energy. Concepts in solving numerical problems pertaining to solar and wind energy systems.*
6. *Demonstrate self -learning capability to design & establish renewable energy systems.*

UNIT I
INTRODUCTION

Solar radiation; Earth-Sun relation: Solar angles, Sun path diagram; Shadow determination, Solar spectrum, Effect of earth atmosphere on solar radiation, Measurement and estimation of solar radiation on horizontal and tilted surfaces, Solar radiation measurement devices.

UNIT II
SOLAR THERMAL SYSTEM

Introduction to different solar thermal energy systems: Solar flat plate collector, concentrating collector, Solar cooker, Solar Pond; Development of solar thermal collectors; Concentrating solar collector: optical design of concentrators, solar water heaters, solar dryers; Solar thermal power generation and economics; Solar Energy Mission.

UNIT III

PV SYSTEM

Photovoltaic: Principle of photovoltaic conversion; Solar cell basics and materials; Different solar cell technologies: Crystalline silicon solar cell, Thin Film solar cell, Tandem solar cell; Photovoltaic system: Component and configurations; stand alone, hybrid system and grid connected PV systems, PV system design and economics.

UNIT IV

INTRODUCTION TO WIND ENERGY

Atmospheric circulations, classification, factors influencing wind, wind shear, turbulence, wind speed monitoring, Wind resource assessment, Betz limit. Wind turbines: Wind turbine types, Horizontal Axis Wind Turbine (HAWT) - Blade Element Theory, Vertical Axis Wind Turbine (VAWT) aerodynamics. Application, power, torque and speed characteristics.

UNIT V

AERODYNAMICS AND WIND POWER GENERATION

Aerodynamic forces, rotor types, rotor characteristics, forces developed by blades, aerodynamic models, breaking systems, tower, control and monitoring system. Power and energy produce from wind turbines, wind power performance, maximum power coefficient, tip loss correction, wind driven induction generator, synchronous and asynchronous generators and loads, integration of wind energy converters to electrical networks, inverters. Types of wind energy generation (WEG) system: stand alone, grid connected, hybrid connection. Wind energy Programme in India.

TEXT BOOKS:

1. B.H. Khan, *Non-Conventional Energy Resources*,Tata McGraw-Hill Education, 2006
2. D.S. Chauhan, S.K.Srivastava , *Non-Conventional Energy Resources,* New Age Int.(P) Ltd, 2010
3. B. Sorensen "*Renewable Energy*", Academic press, June 2017.

REFERENCES:

1. Johnson G. L.; *Wind Energy Systems (Electronic Edition),* Prentice Hall, 2006
2. Hau E. *Wind Turbines: Fundamentals, Technologies, Application and Economics,* Springer, 2000
3. Mathew S. *Wind Energy: Fundamentals, Resource Analysis and Economics,* Springer, 2000.
4. Burton T. Sharpe D. Jenkins N. and Bossanyi E. *Wind Energy Handbook,* John Wiley, 2001.
5. Garg H. P. and Prakash S. Solar Energy: *Fundamental and Application,* Tata McGraw Hill, 2000.
6. Nayak J. K. and Sukhatme S. P. , *Solar Energy: Principles of Thermal Collection and Storage,* Tata McGraw Hill, 2006.

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(18EE0230) HVDC AND FACTS

PROFESSIONAL ELECTIVE COURSE(PEC)-IV

COURSE OBJECTIVES:

Students undergoing this course are expected to:

1. *Understand the basic components of a converter and applications of dc transmission*
2. *To know the methods for compensating the reactive power demanded by the converter.*
3. *To know converter control for HVDC systems and different firing anlge controls*
4. *Understand the basic concepts, definitions of flexible ac transmission systems and benefits from FACTS technology.*
5. *To know the operating principles of combined compensators*

COURSE OUTCOMES:

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

1. *Compare the HVDC Transmission and EHVAC transmission*
2. *Identify and analyse converter configurations used in HVDC and list the performance metrics.*
3. *Understand controllers for controlling the power flow through a dc link*
4. *Identify configuration of FACTS controller required for a given application*
5. *Understand the role of impedance control, phase angle control and voltage control in controlling real and reactive power in transmission system*
6. *Understand the working of shunt and series compensators and different approaches of FACTS devices*

UNIT-I

INTRODUCTION

Comparison of AC and DC Transmission systems, Application of D.C. Transmission, Types or DC links, Typical layout of a HVDC converter station. HVDC converters, pulse number, Analysis of 3 phase Bridge circuit with and without overlap, converter Bridge characteristics, equivalent circuits of Rectifier and inverter configurations.

UNIT –II

CONVERTER AND HVDC SYSTEM CONTROL

Principles of DC links control, converter control characteristics, system control hierarchy, Firing angle control, current and extinction Angle control starting and stopping of DC link.

HARMONICS, FILTERS AND REACTIVE POWER CONTROL

Introduction, generation of Harmonics, AC and DC Filters, Reactive power requirements at steady state, sources of Reactive power static Var systems.

UNIT -III

POWER FLOW ANALYSIS IN AC/DC SYSTEMS

Introduction, Modeling of DC/AC converters, controller equations, solutions of AD/DC load flow- simultaneous approach and sequential approach.

FACTS CONCEPTS

Flow of power in AC parallel paths and Meshed systems, Basic types of FACTS controllers, Brief description and Definitions of FACTS controllers.

UNIT - IV

STATIC SHUNT COMPENSATORS

Objectives of shunt compensation, Methods of controllable VAR generation, Static VAR compensators, SVC and STATCOM, comparison.

STATIC SERIES COMPENSATORS

Objectives of series compensation, variable impedance type-thyristor switched series capacitors (TCSC), switching converter type series compensators – static series synchronous compensator (SSSC) – power angle characteristics – Basic operating control Schemes.

UNIT - V

COMBINED COMPENSATORS

Introduction, unified power flow controller (UPFC), Basic operating principle, Independent real and reactive power flow controller, control structure.

TEXT BOOKS:

1. K.R. Padiyar *,"HVDC power Transmission systems"*, Wiley Eastern Limited, 2011.
2. N.G. Hingorani & L. Gyugyi *,"Understanding of FACTS"*, IEEE Press.1999
3. Young Huasong & Alian T. hons *,"Flexible AC Transmission Systems (FACTS)"*, The Institution of Electrical Engineers, IEE Powerand Energy Series 30.
4. Abhijit Chakrabarti, D. P. Kothari, A. K. Mukhopadhyay and Abhinandan De, *"An Introduction to: Reactive Power Control and Voltage Stability in Power Transmission Systems "*, Eastern Economy Edition, 2010.

REFERENCE BOOKS:

1. S.Rao *,"EHV - AC, HVDC Transmission & Distribution Engineering",* ,Khanna publishers, 3rd edition 2003.
2. E Acha. VG Agelidis & O Anaya-Lara*,"Power Electronic Control in Electrical Systems*". THE Miller – Elsevier, 2009.

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(18EE0231) NEURAL NETWORKS AND FUZZY LOGIC
PROFESSIONAL ELECTIVE COURSE(PEC)-IV

COURSE OBJECTIVES:

Students undergoing this course are expected to:

1. *To introduce the basics of Neural Networks and essentials of Artificial Neural*
2. *Networks with Single Layer and Multilayer Feed Forward Networks.*
3. *To have knowledge on Associate Memories, Fuzzy sets and Fuzzy Logic system components.*
4. *To know Neural Network and Fuzzy Network system application to Electrical Engineering*
5. *The main objective of this course is to provide the student with the basic understanding of neural networks and fuzzy logic fundamentals.*

COURSE OUTCOMES:

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

1. *Understand the basic concept of artificial neural networks*
2. *Understand different learning mechanism in artificial neural networks*
3. *Create Neural Network models for electrical engineering.*
4. *Understand the basic concepts of fuzzy sets.*
5. *Understand the basic concepts of fuzzy logic.*
6. *Create Fuzzy models for electrical engineering*

UNIT - I:

FUNDAMENTALS OF ARTIFICIAL NEURAL NETWORKS

Neural networks- introduction, Organization of human brain, Biological neuron, artificial neuron, McCulloch- Pitts neuronmodel,Characteristics and Applications of artificial neural networks Architecturesofartificialneuralnetworks-activationfunctions,important terminologies of ANN, learning strategies- supervised,unsupervised, reinforced learning.

UNIT - II:

SUPERVISED NETWORKS

Perceptron networks-Perceptron learning, Limitations of Perceptron, back propagation networks-architecture, Computations in each layer, Error calculation in Back propagation networks, Gradient descent method in learning, back propagation algorithm, learning factors - initial weights, leaning constant, momentum coefficient, Applications of Neural Networks to Electrical Engineering.

UNIT - III:

ASSOCIATIVE MEMORIES

Introduction, Associative Memories- Auto associative Memory, Bidirectional Associative Memory (BAM), Architectures, Storage and Recall Phases, Recognition of noisy patterns, Hamming distance and Energy functions.Discrete Hopfield network architecture and storage and recall algorithm.

UNIT - IV:

CLASSICAL AND FUZZY SETS

Introduction to classical sets- properties–Fuzzyvs crsip Fuzzy sets ,Membership functions, basic fuzzy set operation, properties of fuzzysets- Fuzzy relations–Fuzzy Cartesian product, operations on fuzzy relations.

UNIT -V:

FUZZY LOGIC SYSTEMS

Fuzzification–Fuzzy quantifiers, fuzzy inference, fuzzy rulebased system-developmentof rule base and decision making system-Defuzzification to crispsets-Fuzzification and Defuzzification methods. Applications of Fuzzy logic systems in Electrical Engineering.

TEXT BOOKS:

1. S. Rajasekaran, G.A. Vijayalakshmi Pai *Neural Networks, Fuzzy Logic, and Genetic Algorithms Synthesis and Applications* PHI, 2012
2. S.N. Sivanandam, S.N. Deepa *Principles of Soft computing*, Wiley India private Ltd., 2nd edition, 2013.

REFERENCES:

1. Timothy J Ross *Fuzzy Logic with Engineering Application* , McGraw HillInc.1997.
2. Jacek M. Zurada *Introduction to Artificial Neural Networks*, Jaico Publishing House.1994
3. Simon Haykin *Neural Networks - A Comprehensive Foundation*, Prentice- Hall Inc,1999.

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(18EE0232) ADVANCED ELECTRICAL DRIVES

PROFESSIONAL ELECTIVE COURSE(PEC)-IV

COURSE OBJECTIVES:

Students undergoing this course are expected to:

1. *Understand the operation, application and control of power conversion systems employing electric drive to cater to industrial needs.*
2. *Familiarize the operation principles, and design of starting, braking, and speed control arrangements for electric motors and their applications.*
3. *Provide strong foundation to asses performance of different industrial drives considering issues such as, energy efficiency, power quality, economic justification, environmental issues, and practical viabilities.*

COURSE OUTCOMES:

On successful completion of the subject, students should be able to

1. *Understand about different types of electrical drives.*
2. *Ability to use standard methods to determine accurate modeling/simulation parameters for various general-purpose electrical machines and power electronics devices*
3. *Compare the characteristics of dc motor drives and induction motor drives.*
4. *To estimate & solve harmonic and power factor related problems in controlling AC and DC drives.*
5. *Explain the operation principles, design of starting, braking, and speed control arrangements for electric motors and their applications.*
6. *Choose drives as per practical operational industrial requirement.*

UNIT I

FUNDAMENTALS OF ELECTRICAL DRIVES

Introduction, Advantages of electrical drives, Parts of electrical drives, Choice of electrical drives, Status of ac and dc drives, Types of load, Load with translational motion, Load with rotational motion, Load torque variation with time, Speed sensing, Current sensing.

UNIT II

DYNAMICS OF ELECTRICAL DRIVES

Steady state load Torque speed characteristics, Multi quadrant operation of drives, Close loop

control of drives-Current limit control, Close loop torque control, Close loop speed control, Close loop speed control of multi motor drive.

UNIT III

DC DRIVES

Controlled rectifier fed DC drives with continuous and discontinuous mode of operation, Supply harmonics, Power factor and ripple in motor current, Chopper controlled DC Drives, Sources of current harmonics in chopper, Converter ratings, Closed loop control, Control structure of DC drive, inner current loop and outer speed loop, dynamic model of dc motor dynamic equations and transfer functions. Applications of DC drive in electrical vehicles.

UNIT IV

INDUCTION MOTOR DRIVES

Variable frequency control (VSI, CSI, Cycloconverter based), Static rotor resistance control and slip power recovery control schemes, Introduction to scalar control (v/f) of Induction motor, Vector controlled Induction motor Drives.

UNIT V

SYNCHRONOUS MOTOR DRIVES

Review of three phase Synchronous motor and its performance, Self-controlled schemes, Variable frequency control of multiple synchronous motor, Permanent magnet AC motor drives, Applications of AC drives in electrical drives

TEXT BOOKS:

1. B. K. Bose, *"Modern Power Electronics and AC drives",* Pearson Education Asia.2001
2. P. S. Bhimbra*, "Generalized Theory of Electrical Machines ",* Khanna Publications.2018
3. G. K. Dubey*, "Fundamentals of Electrical Drives"* Narosa, 2001

REFERENCE:

1. Dubey. G. K. *"Power semiconductor controlled Drives",* Prentice Hall international, New Jersey,1988.
2. R. Krishnan, *"Electrical motor drives Modelling, Analysis and Control"* PHI-India.2001.

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(18CE0146) PROJECT PLANNING AND CONTROL

OPEN ELECTIVE –II

COURSE OBJECTIVES

1. *To describe various elements of an engineering project and to draw the network*
2. *To perform PERT & CPM calculations and to identify the critical path*
3. *To perform various operations on the network*

COURSE OUTCOMES (COs)

After the successful completion of the course the student able to

1. *Differentiate various tools for planning and controlling the project*
2. *Construct the network for a project*
3. *Perform PERT computations and evaluate the critical path*
4. *Perform CPM computations and identify the critical path*
5. *Optimize time and cost for a project*
6. *Work with network during the progress of a project by updating the network and allocating the resource*

UNIT – I

Project Management: Project planning – Project scheduling – Project controlling – Project monitoring and control – Project monitoring and information cell – Decision making in project management – Project life cycle

Basic Techniques of Project Management: Bar charts – Steps for the construction of a bar chart – Limitations of bar charts – Milestone charts – Velocity diagrams – Development of Network – CPM/PERT Networks – Advantages of network over milestone chart

UNIT – II

Elements of Network: Event – Activity – Dummy – Network rules – Graphical guidelines for network – Common partial situations in network – Numbering the events – Cycles

Development of Network: Planning for network construction – Modes of network construction – Steps in development of network – Work breakdown structure – Hierarchies

UNIT – III

PERT: Time Estimates: Uncertainties: Use of PERT – Time estimates – Frequency distribution – Mean, variance and standard deviation – Probability distribution – Beta distribution – Expected time

PERT: Time Computations & Network Analysis: Earliest expected time – Formulation for T_E – Latest allowable occurrence time – Formulation for T_L – Combined tabular computations for T_E and T_L – Slack – Critical path – Probability of meeting scheduled date

UNIT – IV

CPM: Network Analysis: CPM Process – CPM Network – Activity time estimate – Earliest event time – Latest allowable occurrence time – Combined tabular computations for T_E and T_L – Start and finish times of activity – Float – Critical activities and critical path

UNIT – V

CPM: Cost Model: Project cost – Indirect project cost – Direct project cost – Slope of direct cost curve – Total project cost and optimum duration – Contracting the network for cost optimization – Steps in time cost optimization

CPM: Updating: Updating process – Data required for updating – Steps in the process updating – When to update

Resources Allocation: Resources usage profiles: histograms – Resources smoothing – Resources levelling

TEXT BOOKS

1. Dr.B.C. Punmia, K.K. Khandelwal, *Project Planning and Control with PERT AND CPM,* Laxmi Publications (P) Ltd., 4th Edition, Reprint 2006
2. Dr.P.N. Modi, Sanjeev Modi and Rajeev Modi, *Program Evolution and Review Technique and Critical Path Method*, Standard Book House, 5th Edition, 2012

REFERENCES

1. L.S. Srinath, *PERT and CPM Principles and Applications,* Affiliated East-West Press (Pvt.) Ltd.
2. S.K. Bhattacharjee, *Fundamentals of PERT/CPM and Project Management*, Khanna Publishers
3. Kumar Neeraj Jha, *Construction Project Management: Theory and Practice,* Pearson, 2rd edition, 2015

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(18ME0353) COMPUTER AIDED PROCESS PLANNING

OPEN ELECTIVE -II

COURSE OBJECTIVES

The objectives of this course is to

1. *Provide the student with an understanding of the importance of process planning role in manufacturing.*
2. *Classify the various methods of CAPP*
3. *Understand the importance of product development through CIMS, shop floor control, Computer Integrated Manufacturing and Automation*
4. *Understands about NC, CNC and DNC systems.*
5. *Know about capacity Planning, Adaptive control machining systems, FMS and MRP's*

COURSE OUTCOMES

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

1. *Know the importance of process planning role in manufacturing*
2. *Describe the various methods of CAPP*
3. *Recognize the importance of product development through CIMS, shop floor control, Computer Integrated Manufacturing and Automation*
4. *Gain the knowledge about NC, CNC and DNC systems.*
5. *Identify about capacity Planning, Adaptive control machining systems*
6. *Familiar in FMS and MRP I and MRP II*

UNIT- I

Introduction to Process Planning: Role of process planning in the manufacturing cycle- Information requirement for process planning system - Merits of conventional process planning over CAPP - Structure of automated process planning system, features recognition, methods.

UNIT- II

Generative CAPP System: Importance - Generative CAPP system - Automation of logical decisions - Knowledge based systems - Inference Engine, implementation, benefits.
Retrieval CAPP System: Significance - Retrieval CAPP system, structure, relative advantages and disadvantages- implementation and applications.

UNIT- III

Implementation Techniques for CAPP: MIPLAN system - The Bottom-up approach - The Top-Down approach - Computer programming languages for CAPP- Criteria for selecting a CAPP system - Benefits of CAPP - MRP - I, MRP - II and benefits.

UNIT- IV

Computer Integrated Production Planning: Capacity planning- shop floor control- MRP-I, MRP-II- CIMS benefits.

Computer Integrated Manufacturing System (CIMS): Introduction to CIMS, Automation strategies, Automation and CAD/CAM, Scope of CIM- Computer controls in NC- NC, CNC and DNC systems, components, block diagram, applications- Part programming- Group technology, benefits.

UNIT- V

Flexible Manufacturing systems (FMS): Components of FMS, workstation, Material handling system and computer control system, FMS Layout configurations and benefits of FMS.

Adaptive control machining systems: Introduction to adaptive control machining systems, application- approaches, adaptive control optimization system, adaptive control constraint system, applications to machining processes, computer process monitoring and computer process control.

TEXT BOOKS

1. Mikel P.Groover *Automation, Production systems and Computer Integrated Manufacturing Systems,* Pearson Higher Education, Inc., 4th Edition, 2015.
2. Dr. Sadhu Singh, *Computer Aided Design and Manufacturing*, Khanna Publishers, 2009.

REFERENCES

1. Gideon Halevi and Roland D. Weill, “Principles of Process Planning", A logical approach, Chapman & Hall, 1995.
2. Chang T C and Richard A Wysk, “An Introduction to automated process planning systems”, Prentice Hall, 1985.
3. H.P. Wang and J.K. Li, “Computer Aided Process Planning”, Elsevier Science and Technology Publishers, 1st edition, 1991.

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(18EC0450) MATLAB PROGRAMMING

OPEN ELECTIVE -II

COURSE OBJECTIVES:

The objectives of this course:

1. *Understand the MATLAB Desktop, Command window and the Graph Window*
2. *Be able to do simple and complex calculation using MATLAB*
3. *Understand the mathematical concepts upon which numerical methods*
4. *Understand the tools that are essential in solving engineering problems*

COURSE OUTCOMES:

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

1. *Analyze and visualize data effectively by using MATLAB.*
2. *Apply numeric techniques and computer simulations to solve engineering-related problems.*
3. *Apply a top-down, modular, and systematic approach to design, write, test, and debug sequential MATLAB programs to achieve computational objectives.*
4. *Design and document computer programs and analyses in a careful and complete manner so as to effectively communicate results, to facilitate evaluation and debugging by another programmer, and to anticipate and resolve user errors.*
5. *Demonstrate understanding and use of fundamental data structures (classes).*
6. *Create and control simple plot and user-interface graphics objects in MATLAB.*

UNIT-I

INTRODUCTION TO MATLAB: MATLAB Interactive Sessions, Menus and the toolbar, computing with MATLAB, Script files and the Editor Debugger, MATLAB Help System, Programming in MATLAB.

UNIT-II

ARRAYS: Arrays, Multidimensional Arrays, Element by Element Operations, Polynomial Operations Using Arrays, Cell Arrays, Structure Arrays.

UNIT-III

FUNCTIONS & FILES: Elementary Mathematical Functions, User Defined Functions, Advanced Function Programming, Working with Data Files.

UNIT-IV

PROGRAMMING TECHNIQUES: Program Design and Development, Relational Operators and Logical Variables, Logical Operators and Functions, Conditional Statements, Loops, the Switch Structure, Debugging MATLAB Programs.

PLOTTING: XY- plotting functions, Subplots and Overlay plots, Special Plot types, Interactive plotting, Function Discovery, Regression, 3-D plots.

UNIT-V

LINEAR ALGEBRAIC EQUATIONS: Elementary Solution Methods, Matrix Methods for Linear Equations, Cramer Method, Undetermined Systems, Order Systems.

TEXT BOOKS

1. G. H. Golub and C. F. Van Loan, *Matrix Computations*, 3rd Ed., Johns Hopkins University Press, 1996.
2. B. N. Datta, *Numerical Linear Algebra and Applications*, Brooks/Cole, 1994 (out of print)

REFERENCES

1. William J Palm, *Introduction to MATLAB* for Engineers, 3rd edition, Mc GRAW HIL.
2. L. Elden, *Matrix Methods in Data Mining and Pattern Recognition*, SIAM Press,2007.
3. Amos Gilat, *MATLAB: An Introduction with Applications*,4th edition, WILEY.

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(18CS0544) SOFTWARE DEVELOPMENT & TESTING
OPEN ELECTIVE -II

COURSE OBJECTIVES

The objectives of this course is to

1. *Illustrate the Software Development Models*
2. *Explain Software Requirements Engineering Process and SRS document*
3. *Illustrate the importance of modeling and modeling languages*
4. *Explain various testing methodologies*
5. *Explain Quality assurance and test cases*

COURSE OUTCOMES

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

1. *Define and develop as software project from requirement gathering to implementation*
2. *Ability to code and test the software*
3. *Ability to plan, estimate and maintain software systems*
4. *Understand the basic testing procedures*
5. *Able to generate test cases and test suites.*
6. *Test the applications manually by applying different testing methods and automation tools.*

UNIT-I

Introduction: Introduction to Software Engineering, Software Process, Software Myths, A generic view of process, A layered Technology, A Process Framework, Software Process Models, Unified process

Introduction to Agility: Agility, Agile Process, Agile Process Models

UNIT-II

Requirements Analysis and Specification: Requirements Engineering, Eliciting Requirements, Requirements Analysis, Types of Requirements, Requirement Modeling and Data Modeling concepts.

Architectural Design Concepts: The Design Process, Design Concepts, Design Model, Software Architecture, Architecture Styles.

UNIT-III

User Interface Design: The Golden Rules, User Interface Analysis and Design, Interface Analysis, Interface Design Steps.

Web App Design: Introduction, Web App Interface Design, Aesthetic Design, Content Design, Architecture Design, Navigation Design, Component-Level Design

UNIT-IV

Software Testing: Introduction, Levels of Software Testing – Unit Testing, Module Testing, Integration Testing, System Testing, Acceptance Testing, Alpha Testing, Beta Testing,

Approach to Software Testing: Types of Software Testing - Black Box Testing, White Box Testing, Test Strategies for Conventional Software, Test Strategies for Object-Oriented Software, Art of Debugging.

UNIT-V

Software Quality: Software Testing Life Cycle, Software Quality, Testing Principles, Test Process – Testing Activities, Quality Assurance.

Software Test Cases: Introduction to Test cases, Test Case Selection – Test Planning and Design – Test Execution – Case Study on Test tools and automation.

TEXT BOOKS

1. Roger S.Pressman, *Software Engineering*- A practitioner‘s Approach, McGraw-HillInternationalEdition, seventh edition, 2001.
2. Software Testing techniques, Boris Beizer, Dreamtech, Second Edition

REFERENCES

1. Ian Sommerville, *Software Engineering*, 8th Edition, Pearson Education, 2008.
2. Richard Fairley, *Software EngineeringConcepts* , McGraw Hill, 2004.
3. Dr.K.V.K.K.Prasad, *Software Testing Tools*, Dreamtech

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(18HS0815) ENTREPRENEURSHIP DEVELOPMENT

OPEN ELECTIVE -II

COURSE OBJECTIVES:

The objectives of this course is to

1. *To acquire necessary skills and knowledge required for organizing and carrying out entrepreneurial activities,*
2. *To develop the ability of analyzing and understanding business situations in which entrepreneurs act*
3. *To develop the ability of analyzing various aspects of entrepreneurship – especially of taking over the risk, and the specificities as well as the pattern of entrepreneurship development*

COURSE OUTCOMES:

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

1. *The ability to discern distinct entrepreneurial traits and identify the successful elements of successful entrepreneurial ventures*
2. *Consider the legal and financial conditions for starting a venture and to assess the opportunities and constraints for new ventures*
3. *Design strategies for the successful implementation of ideas*
4. *To comprehend the evaluation of business opportunity from the prospective of an investor*
5. *Identify the most suitable sources of finance for start-ups*
6. *To write and execute their own business plan*

UNIT-I

INTRODUCTION TO ENTREPRENEURSHIP - Concept of Entrepreneur‘s, Enterprise and Entrepreneurship; Characteristics, Qualities, Functions of entrepreneur and Advantages of Entrepreneurship; Role of entrepreneurship in Economic development, Challenges faced by entrepreneurs, Entrepreneurial scenario in India and Abroad; Elements of Social Entrepreneurship, Types of Entrepreneurs, Entrepreneurship vs. Intrapreneurship.

UNIT-II

SMALL BUSINESS AND ITS IMPORTANCE - Introduction, Need, Classification of Micro, Small and Medium Enterprises (MSMEs), Role of MSMEs, Problems of MSMEs, Steps for Starting MSMEs, The role of government in supporting MSMEs in India.

Forms of Business Organization: Evaluation of Form of Business organization: Sole Proprietorship, Partnership, Joint Hindu Family, Joint Stock Company and Co-operative Society. Special forms of business ownership: Licensing, Franchising and Leasing.

UNIT-III

INNOVATION AND IDEA GENERATION IN ENTREPRENEURSHIP - Concept of Invention and Innovation, types of innovation, Sources of Innovation, Importance of Innovation in Entrepreneurship. Sources of new ideas, Methods of generating ideas and Opportunity recognition and idea generation in entrepreneurship. Intellectual Property Rights (IPRs): Patents, trademarks, copyrights, and trade secrets. E-commerce and Business Start-ups, Sources of information for Start-up Entrepreneurs in India. Problems of Start-ups without IPRs.

UNIT-IV

ENTREPRENEURIAL MOTIVATION - Concept of Motivation and Factors influencing the entrepreneurs; Motivational Theories-Maslow's Need Hierarchy Theory, McClelland's Acquired Need Theory. Entrepreneurship Development Programs (EDPs) - Need and Role of EDPs. Opportunities for entrepreneurship in present scenario. Successful entrepreneurs

FINANCING OF ENTERPRISES - Source of financing - Debt capital, seed capital, venture capital, Loans available for starting ventures in India, Role of government agencies in small business financing. Role of consultancy organizations.

UNIT-V

PROJECT PLANNING AND FEASIBILITY STUDY - Meaning of Project, Project Life Cycle, and Stages of Planning Process. Project Planning and Feasibility, Project proposal and report preparation.

TEXT BOOKS:

1. Robert D Hisrich, Mathew J.Manimala, Michael PPeters, Dean A.Shepherd *Entrepreneurship*, 8/e, , McGraw Hill Education.
2. Vasanth Desai *The Dynamics of Entrepreneurial Development and Management*, , Himalaya Publishing House, Mumbai.

REFERENCES:

1. S.S. Khanka *Entrepreneurial Development*, S. Chand and Company Limited.,
2. H. Nandan *Fundamentals of Entrepreneurship*, PHI.
3. Bholanath Dutta *Entrepreneurship Management* – text and cases, Excel Books.
4. *Entrepreneurship* – New venture Creation, Holt and PHI.
5. Ramachandran *Entrepreneurial Development*, Tata McGraw Hill, New Delhi.

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(18EC0422) MICROCONTROLLER AND ITS APPLICATIONS LAB

COURSE OBJECTIVES

The objectives of this course:

1. *To understand the structure of assembly language and wiring programming.*
2. *Develop programs using various instructions and addressing modes of 8051 microcontroller*
3. *Design and simulate the interfacing of peripherals to microcontroller board.*

COURSE OUTCOMES (COs)

On successful completion of this course, student 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 microcontrollers.*
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*

Note: Minimum **TEN** Experiments to be conducted (9 from Part A and one from Part B)

Part A: 8051 Microcontroller Programming

1. a) 8-bit addition operations
   b) 8-bit subtraction operations
2. a) 8-bit Multiplication operations
   b) 8-bit Division operations
3. Logical operations on an 8-bit number
4. a) String copy
   b) String concatenation
5. Interfacing LED
6. Interfacing Push button
7. Interfacing 7 segment display
8. Interfacing ADC
9. Interfacing Sensors
10. Interfacing Actuators

Part B: Mini projects

1. 4-way Traffic light control system.
2. Three floor elevator system.
3. Automatic streetlight control system.
4. Intruder alert system.
5. Automatic Tollgate system.
6. Water level control system.
7. Digital alarm clock.
8. Electronic code lock.
9. Automatic gardening system.
10. Self-developed project

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(18EE0233) SUBSTATION AUTOMATION LAB (Virtual Lab)

COURSE OBJECTIVES:

Students undergoing this course are expected to:

1. *To analyze the operation of switch gears.*
2. *To learn the operation of feeders in work station.*
3. *To understand the substation automation schemes*

COURSE OUTCOMES:

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

1. *Test and analyze circuit breakers and switches performance.*
2. *Understand the control, monitoring and protection functions in work station.*
3. *To Describe scenario Fault simulation of feeders, transformers and buses.*
4. *To analyze development of substation automation scheme using PLC for normal load operation.*
5. *To analyze development of substation automation scheme using PLC for timer ON/OFF load control and cyclic ON/OFF load control.*
6. *Understand Auto recloser and Sectionalizers Operation*

LIST OF EXPERIMENTS

1. Circuit Breaker Status Indication from field input.
2. Control of Group Operated Switches (GOS) from workstation.
3. Monitoring Feeder parameter from workstation.
4. Fault scenario simulation in a feeder.
5. Fault scenario simulation in a Transformer /Bus.
6. Load Transfer from one Feeder to other during Transformer Maintenance.
7. Control Of Bus Voltages Through Onload Tap Changes.
8. Development of 11KV/433 volts substation automation scheme using PLC for normal load operation.
9. Development of 11KV/433 volts substation automation scheme using PLC for timer ON/OFF load control.
10. Development of 11KV/433 volts substation automation scheme using PLC for cyclic ON/OFF load control.
11. Auto recloser and Sectionalizers Operation.