Study & Evaluation Scheme

Of

Bachelor of Technology (Electrical and Electronics Engineering) [Effective from Session 2019 - 2020]

I.E.C. UNIVERSITY BADDI (SOLAN) H.P.

IEC University, Baddi
SCHEME OF STUDY & EVALUATION FOR
B. TECH. PROGRAM

FIRST YEAR,
SEMESTER I
(Common for all branches)

Course			Periods			Evaluation Scheme					Course Total	
Sr. No	Code	Title	L	T	P	Sessional Marks				Exam marks	Marks	Credits
						MSE	CA	P	Total	ESE		
Theory												
1	MATH-101	Engineering Mathematics-I	3	1	0	40	20	0	60	40	100	3.5
2	PHY-101	Engineering Physics	3	1	0	40	20	0	60	40	100	3.5
3	CSE-101	Fundamentals of computer and programming in "C"	3	1	0	40	20	0	60	40	100	3.5
4	HUM-101	Communication Skills	3	0	0	30	20	0	60	40	100	3
5	ME-101	Engineering Mechanics	3	1	0	40	20	0	60	40	100	3.5
6	CSE-102	IT infrastructure Landscape Overview	3	0	0	40	20	0	60	40	100	3
(Practical/Training/Project)												
1	PHY-151	Engineering Physics Lab.	0	0	2			30	30	20	50	1
2	CSE-151	Programming in "C" lab.	0	0	2			30	30	20	50	1
3	ME-151	Engineering Mechanics Lab	0	0	2			30	30	20	50	1
4	HUM-151	Communication Skills Lab	0	0	2			30	30	20	50	1
Total									**480**	**320**	**800**	**24**

SEMESTER II

Theory												
1	MATH-201	Engineering Mathematics-II	3	1	0	40	20	0	60	40	100	3.5
2	CHEM-101	Engineering Chemistry	3	1	0	40	20	0	60	40	100	3.5

3	ME- 201	Engineering Drawing	3	0	0	40	20	0	60	40	100	3
4	EVS-101	Environment Science and technology	3	0	0	40	20	0	60	40	100	3
5	EEE-101	Basic Electrical & Electronics	3	1	0	40	20	0	60	40	100	3.5
6	CSE-201	Introduction to Internet of Things	3	0	0	40	20	0	60	40	100	3
Practical/Training/Project												
1	CHEM-151	Engineering Chemistry Lab	0	0	2			0	30	20	50	1
2	EEE-151	Basic Electrical & Electronics Lab	0	0	2			0	30	20	50	1
3	ME-152	Workshop lab	1	0	3			0	60	40	100	2.5
Total									**480**	**320**	**800**	**24**

COMPONENTS OF EVALUATION

The components of Evaluation for each course will be as under:

For Theory Subjects:

(a) Continuous Assessment (CA), -- 20 Marks in the form of:
  (i) Assignments (15 Marks)
  (ii) Attendance (05 Marks)

(b) Mid-Term Exams (MSE), ---------40 Marks
  (i) First MSE to be held after completion of 35% - 40% course coverage,
  (ii) Second MSE to be held after completion of 70% - 80% course coverage

(c) End- semester Exams (ESE), ------ 40 Marks

For Practical Courses:

(a) Continuous Assessment (CA) -- 30Marks

(b) End-semester Practical Exam----20

Total --50 Marks

B.Tech (Electrical and Electronics Engineering)
Semester-III

Sr. No	Course Code	Subject	Periods			Evaluation Scheme					Course Total	
			L	T	P	Sessional			Marks Total	Marks ESE	Marks	Credits
						MSE	CA	P				
(Theory)												
1	**MAT-301**	Engineering Mathematics-III	3	1	0	40	20	0	60	40	100	3.5
2	**EEE-301**	Circuit Theory	3	1	0	30	15	0	45	30	75	3.5
3	**EEE-302**	Electrical Machine-I	3	1	0	30	15	0	45	30	75	3.5
4	**EEE-303**	Digital Electronics	3	1	0	30	15	0	45	30	75	3.5
5	**EEE-304**	Electronic Devices and Circuits	3	1	0	40	20	0	60	40	100	3.5
6	**EEE-305**	Human Values & Professional Ethics	3	0	0	40	20	0	60	40	100	3
(Practical/Training/Project)												
1	**EEE-351**	Circuit Theory	0	0	2			15	15	10	25	1
2	**EEE-352**	Electrical machines Lab-1	0	0	2			15	15	10	25	1
3	**EEE-353**	Digital Electronics Lab	0	0	2			15	15	10	25	1
Total			**18**	**5**	**6**	**210**	**105**	**45**	**45**	**30**	**600**	**23.5**

B.Tech (Electrical and Electronics Engineering)
Semester-IV

S. No.	Course Code	Subject	Periods			Evaluation Scheme					Course Total	
			L	T	P	Sessional			Marks Total	Marks ESE	Marks	Credits
						MSE	CA	P				
(Theory)												
1	**EEE-401**	Electrical Machine-II	3	1	0	30	15	0	45	30	75	3.5
2	**EEE-402**	Analog Integrated Circuit	3	1	0	30	15	0	45	30	75	3.5
3	**EEE-403**	Electrical & Electronics Measurements & Instrumentation	3	1	0	30	15	0	45	30	75	3.5
4	**EEE-404**	Transmission & Distribution of Electrical Power	3	1	0	30	15	0	45	30	75	3.5
5	**EEE-405**	Human Resource Management	2	1	0	40	20	0	60	40	100	2.5
(Practical/Training/Project)												
1	**EEE-451**	Electrical Machine - II Lab	0	0	2			15	15	10	25	1
2	**EEE-452**	Analog Integrated Circuit Lab	0	0	2			15	15	10	25	1
3	**EEE-453**	Electrical & Electronics Measurements & Instrumentation Lab	0	0	2				15	10	25	1
4	**EEE-454**	Transmission & Distribution of Electrical Power Lab	0	0	2			15	15	10	25	1
Total			**14**	**5**	**8**	**160**	**80**	**45**	**300**	**200**	**500**	**20.5**

B.Tech (Electrical and Electronics Engineering)
SEMESTER-V

S. No	Course Code	Subject	Periods			Evaluation Scheme					Course Total	
			L	T	P	Sessional			Marks		Marks	Credits
						MSE	CA	P	Total	ESE		
(Theory)												
1	**EEE-501**	Microprocessor and its Applications	3	1	0	30	15	0	45	30	75	3.5
2	**EEE-502**	Electric Power Generation	3	1	0	40	20	0	60	40	100	3.5
3	**EEE-503**	Linear Control Systems	3	1	0	30	15	0	45	30	75	3.5
4	**EEE-504**	Power electronics	3	1	0	30	15	0	45	30	75	3.5
5	**EEE-505**	Electromagnetic Field Theory	3	1	0	40	20	0	60	40	100	3.5
6	**EEE-506**	Signals and Systems	3	1	0	40	20	0	60	40	100	3.5
(Practical/Training/Project)												
1	**EEE-551**	Microprocessor Lab	0	0	2			15	15	10	25	1
2	**EEE-552**	Electronics Work Shop and PCB Lab	0	0	2			15	15	10	25	1
3	**EEE-553**	Control System lab	0	0	2			15	15	10	25	1
4	**EEE-554**	Power electronics Lab	0	0	2			15	15	10	25	1
5	**EEE-555**	Summer Training	0	0	0			15	15	10	25	2
Total			**18**	**6**	**8**	**210**	**105**	**75**	**390**	**260**	**650**	**27**

B.Tech (Electrical and Electronics Engineering)
SEMESTER-VI

S. No	Course Code	Subject	Periods			Evaluation Scheme					Course Total	
			L	T	P	Sessional			Marks		Marks	Credits
						MSE	CA	P	Total	ESE		
(Theory)												
1	**EEE-601**	Communication Engineering	3	1	0	30	15	0	45	30	75	3.5
2	**EEE-602**	Switchgear & Protection	3	1	0	30	15	0	45	30	75	3.5
3	**EEE-603**	Microwave and RADAR Engineering	3	1	0	30	15	0	45	30	75	3.5
4	**EEE-604**	Elective –I (Digital System Design using VHDL)	3	1	0	30	15	0	45	30	75	3.5
5	**EEE-605**	Flexible AC Transmission System	3	1	0	40	20	0	60	40	100	3.5
6	**EEE-606**	Entrepreneurship Development	2	1	0	40	20	0	60	40	100	2.5
(Practical/Training/Project)												
1	**EEE-651**	Communication Lab-I	0	0	2			15	15	10	25	1
2	**EEE-652**	Electrical Simulation Lab	0	0	2			15	15	10	25	1
3	**EEE-653**	Microwave Lab	0	0	2			15	15	10	25	1
4	**EEE-654**	VHDL Lab	0	0	2			15	15	10	25	1
Total			**17**	**6**	**8**	**200**	**100**	**60**	**360**	**240**	**600**	**24**

B.Tech (Electrical and Electronics Engineering)
SEMESTER-VII

Sr. No	Course Code	Subject	Periods			Evaluation Scheme					Course Total	
			L	T	P	Sessional				Exam	Marks	Credits
						MSE	CA	P	Total	ESE		
(Theory)												
1	**EEE-701**	Computer Application &Power System Analysis	3	1	0	30	15	0	45	30	75	3.5
2	**EEE-702**	Digital Signal Processing	3	1	0	30	15	0	45	30	75	3.5
3	**EEE-703**	Elective-II(Neural Networks & Fuzzy Logic)	3	1	0	30	15	0	45	30	75	3.5
4	**EEE-704**	Elective-I (Electrical Energy Utilization)	3	1	0	40	20	0	60	40	100	3.5
5	**EEE-705**	Elective-III(Non conventional Energy Sources)	3	1	0	40	20	0	60	40	100	3.5
6	**EEE-706**	High Voltage Engineering	3	1	0	40	20	0	60	40	100	3.5
(Practical/Training/Project)												
1	**EEE-751**	Computer Application &Power System Analysis LAB	0	0	2			15	15	10	25	1
2	**EEE-752**	Digital Signal Processing Lab	0	0	2			15	15	10	25	1
3	**EEE-753**	Neural Networks & Fuzzy Logic Lab	0	0	2			15	15	10	25	1
4	**EEE-757**	Major Project	0	0	4			60	60	40	100	2
Total			**18**	**6**	**10**	**210**	**105**	**105**	**420**	**280**	**700**	**26**

B.Tech (Electrical and Electronics Engineering)
Semester VIII

Course			Periods			Evaluation Scheme					Course Total	
Sr. No	Code	Title	L	T	P	Sessional Marks				Exam marks	Marks	Credits
						MSE	CA	P	Total	ESE		
Theory												
(Practical/Training/Project)												
1	EEE-851	Industrial Training	0	0	0			300	300	200	500	20
Total								300	300	200	500	20

GRAND TOTAL CREDITS = 189

LIST OF ELECTIVES:

Elective - I

1. Introduction to RADAR systems
2. Digital System Design using VHDL
3. Electrical Energy Utilization

Elective – II

1. Embedded System
2. Neural Networks & Fuzzy Logic
3. Electrical Power Quality

Elective – III

1. Digital Image Processing
2. VLSI Design
3. Non conventional Energy Sources

1st & 2nd Semester

DETAILED SYLLABUS

B.Tech. Common for all branches of Engineering
Semester I

Course Code: MAT-101	**ENGINEERING MATHEMATICS -I**	**L**	**T**	**P**
		3	**1**	**0**

UNIT-I

Linear Algebra: Review of Matrices; Linearly dependent / independent of vectors; Rank and Matrix Inverse; Linear Transformation & Matrix Representation; System of Linear Equations, Eigen values and Eigenvectors; properties of Eigen values, Diagonalization of Matrices; Jordan Canonical Form, Cayley Hamilton Theorem.

UNIT-II

Complex Numbers: Roots of complex number, Real and imaginary parts of functions of a complex variables - Exponential, Circular, Hyperbolic, Logarithmic and Inverse hyperbolic functions; Summation of the series C+ iS; Limit and derivative of complex functions, Cauchy -Riemann equations, Analytic functions, Entire functions and its applications.

UNIT-III

Differential Calculus: Leibnitz theorem, Partial derivatives, Euler"s theorem for homogenous function, Total derivative, Change of variable; Taylor"s and Maclaurin"s series, Jacobian, Extrema of function of two variables, Method of undetermined multipliers. **Multiple Integrals:** Double and triple integrals and their applications, Change of order of integration, Change of variables. Application of multiple integral to surface area and volume, Beta and Gamma functions and their relationships.

UNIT-IV

Vector Differentiation: Scalar and vector point functions, Gradient of a scaler field, Directional derivative, Divergence and Curl of a vector field, Laplacian and second order operators. **Vector Integration**: Line, surface and volume integrals; Vector integral theorems: Greens, Stokes and Gauss divergence theorems (Without proof) and related problems.

Text Books:

1. Kreyszig E., "***Advanced Engineering Mathematics"***, Wiley ,9th edition.
2. B.S. Grewal, "***Higher Engineering Mathematics"***, Khanna Publishers.

Reference Books:

1. H.K. Dass and Rama Verma, ***"Engineering Mathematics",*** S. Chand Publications.
2. N.P. Bali and Manish Goel, ***"Engineering Mathematics",*** Laxmi Publications.
3. D. Kandu, ***"Engineering Mathematics",*** Neel Kamal Prakashan.
4. B.V. Ramana, ***"Higher Engineering Mathematics",*** Tata McGraw Hill Education Pvt. Ltd., New Delhi

B.Tech. Common for all branches of Engineering
Semester I

Course Code: PHY-101	**ENGINEERING PHYSICS**	**L**	**T**	**P**
		3	**1**	**0**

UNIT I

Electromagnetic fields and em wave: Gradient of a scalar, divergence and cul of a vector, Gauss's law (integral and differential form) and its applications, Electric potential and electric field (in vector form), Dieletrics, Polarization, Electric displacement, Susceptibility and permittivity, Lorentz foce law, Magnetic field of a steady current (Biot-Savart's law), Faraday's law, Ampere's circuital law and its applications, Maxwell's equations a dn their significance, Electromagnetic Spectrum (basic idea of different regions).

UNIT II

Quantum Theory: Need of Quantum Mechanics, Davisson-Germer Experiment and Matter waves, Group and Phase velocities. Uncertainity Principle and its applications, Time-independent and Time-Dependent Schrödinger Wave equation, Eigen values and Eigen Functions, Applications of Schrödinger Wave equation to Particle in a box (one dimensional).

UNIT III

Lasers and Optical Fibers: Spontaneous and Stimulated Emission, Einstein's coefficients, Population Inversion and Optical Pumping, Three-level and Four-level Lasers, Ruby, He-Ne, CO_2, Semiconductor Lasers, Application of lasers, Basic theory of fiber optics, accepatance angle, numerical aperture, modes of propagation, material and pulse dispersion, application of optical fibers.

UNIT IV

Magnetic materials and Superconductivity: Hard and soft magnetic materials and their applications, Ferrites and their applications, Phenomenon of superconductivity, Magnetic properties of superconductors (Meissner effect), Type-I and Type-II Superconductors, Applications of Superconductivity.

UNIT V

Radiation Physics: A few X- and Gamma-radioisotopes (^{109}Cd, ^{241}Am, ^{60}Co, ^{137}Cs) and their applications, Coolidge tube; Continuous and Characteristic X-rays; Moosley's law; Absorption of X-rays and gamma rays; X-ray Diffraction and Bragg's law, EDXRF and WDXRF (qualitative idea).

B.Tech. Common for all branches of Engineering
Semester I

Course Code: PHY-151	ENGINEERING PHYSICS LAB	L	T	P
		0	0	2

List of Experiments

1. To determine the specific rotation of cane sugar solution with the help of polarimeter.
2. To determine Planck's constant
3. To determine the dispersive power of the material of the prism using mercury light with the help of a spectrometer.
4. To determine the wavelength of sodium light by Newton's Ring.
5. To determine the Energy Band Gap of a Semiconductor by using Four probe method.
6. To measure the numerical aperture of the given an optical fiber.
7. To determine the specific resistance of a given wire using Carey Foster's bridge.
8. To determine e/m ratio using Thompson's method
9. To determine angle of divergence of Laser beam
10. To determine angle of prism and minimum deviation using spectrometer.

B.Tech. Common for all branches of Engineering
Semester I

FUNDAMENTALS OF COMPUTERS & PROGRAMMING IN "C"

Course Code: CSE-101 **L T P**
3 1 0

Unit I **(10hours)**

An Overview of Computer System: Anatomy of a digital Computer, Memory Units, Main and Auxiliary Storage Devices, Input Devices, Output Devices, Classification of Computers, Introduction to microprocessor, commonly used CPUs, Input/output ports and connectors. Radix Number System: Decimal, Binary, Octal, Hexadecimal numbers

Operating System: The user Interface, Running Programmes, Managing files, Introduction to PC operating Systems: Unix/Linux, DOS, and Windows 2000.

Unit II **(10hours)**

Networking Basics: Introduction to the basic concepts of Networks and Data Communications, Network topologies, Network Types (LAN, WAN and MAN), How Internet works, Major features of internet, Emails, FTP, Using the internet.

Programming Languages: Machine-, Assembly-, High Level- Language, Assembler, Compiler, Interpreter, debuggers, Programming fundamentals: problem definition, algorithms, flow charts and their symbols, introduction to compiler, interpreter, assembler, linker and loader and their inter relationship.

Unit III **(10hours)**

C Programming language: C fundamentals formatted input/ output, expressions, selection statements, loops and their applications; Basic types, arrays, union, structure, functions, including recursive functions, program organization: local and external variables and scope, pointers & arrays.

Unit I **(10hours)**

Strings: strings literals, string variables, I/O of strings, arrays of strings; applications. Structures, Unions and Enumerations: Structure variables and operations on structures; Structured types, nested array structures; unions; enumeration as integers, tags and types. Standard library: Input / output; streams, file operations, formatted I/O, character I/O, line I/O, block, string I/O, Library support for numbers and character data, error Handling:

TEXT BOOKS:

1. Using Information Technology, 5th Edi, Brian K Williams & Stacey C. Sawyer, 2003, TMH
2. The C Programming Language by Dennis M Ritchie, Brian W. Kernigham, 1988, PHI.
3. C Programming – A modern approach by K.N. King, 1996, WW Norton & Co.
4. Fundamentals of Computing and C Programming, R. B. Patel, Tech Publications, New Delhi.

B.Tech. Common for all branches of Engineering
Semester I

FUNDAMENTALS OF COMPUTERS & PROGRAMMING IN "C" LAB

Course Code: CSE-151

L	T	P
0	0	2

List of Experiments

(1) WAP TO ADD TWO NUMBERS.
(2) WAP TO SWAP TWO NUMBERS.
(3) WAP TO FIND SIMPLE INTEREST.
(4) WAP TO CHECK NO IS ODD/EVEN.
(5) WAP TO FIND GREATEST NO. OUT OF THREE NUMBERS.
(6) WAP TO FIND GREATEST & SECOND GREATEST OUT OF THREE NUMBERS.
(7) WAP TO FIND YEAR IS CENTUARY/LEAP YEAR OR NOT.
(8) WAP TO FIND GRADE WITH PERCENTAGE.
(9) WAP TO FIND INCOME TAX FROM TOTAL SALARY.
(10) WAP TO PRINT DAY OF WEEKS USING SWITCH STATEMENT.
(11) WAP TO PRINT NO OF DAYS OF MONTHS USING SWITCH STATEMENT.
(12) WAP TO PRINT 'N' NATURAL NUMBERS USING WHILE LOOP.
(13) WAP TO FIND NUMBER OF DIGITS IN AN INTEGER USING WHILE LOOP.
(14) WAP TO FIND REVERSE OF AN INTEGER USING WHILE LOOP.
(15) WAP TO CHECK WHEATHER NUMBER IS PALLINDROME OR NOT USING WHILE LOOP.
(16) WAP TO FIND SUM OF AN INTEGER USING DO-WHILE LOOP.
(17) WAP TO USE GOTO & CONTINUE STATEMENT
(18) WAP FOR LINEAR SEARCH
(19) WAP FOR BINARY SEARCH
(20) WAP FOR BUBBLE SORT
(21) WAP TO FIND ADDITION OF TWO MATRICES
(22) WAP TO FIND MULTIPLICATION OF TWO MATRICES
(23) WAP TO FIND TRANSPOSE OF A MATRIX
(24) WAP TO FIND WHEATHER THE MATRIX IS SYMMETRIC OR NOT
(25) WAP TO PRINT ADDRESS USING POINTERS
(26) WAP FOR STRUCTURE
(27) WAP FOR UNION

B.Tech. Common for all branches of Engineering
Semester I

Course Code: ME-101 **ENGINEERING MECHANICS** **L T P**
3 1 0

Unit I **(8hours)**

Two Dimensional Concurrent Force Systems: Basic concepts, Units, Force systems, Laws of motion, Moment and Couple, Vectors - Vectorial representation of forces and moments - Vector operations. Principle of Transmissibility of forces,, Resultant of a force system, Equilibrium and Equations of Equilibrium, Equilibrium conditions, Free body diagrams, Determination of reaction, Resultant of Two dimensional concurrent forces, Applications of concurrent forces

Unit II **(13hours)**

Two Dimensional Non-Concurrent Force Systems: Basic Concept, Varignon's theorms, Transfer of a force to parallel position, Distributed force system, Types of supports and their reactions, converting force into couple and Vise versa Applications.

Friction: Introduction, Laws of Coulomb Friction, Equilibrium of Bodies involving Dry-friction, Belt friction, ladder Friction, Applications of Friction in daily life.
Structure: Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section.

Unit III **(8hours)**

Centroid and Moment of Inertia: Centroid of plane, curve, area, volume and composite bodies, Moment of inertia of plane area, Parallel Axes Theorem, Perpendicular axes theorems, Mass Moment of Inertia of Circular Ring, Disc, Cylinder, Sphere and Cone about their , Axis of Symmetry. Pappus theorems, polar moment of inertia, Applications of Moment of Inertia in daily life.

Unit IV **(8hours)**

Kinematics of Rigid Body: Introduction, plane rectilinear motion of rigid body, Plane curvilinear Motion of Rigid Body, Velocity and Acceleration under Translation and Rotational Motion, Relative Velocity.

Unit V **(8hours)**

Kinetics of Rigid Body: Introduction, Force, Mass and Acceleration, Work and Energy, Impulse and Momentum, D'Alembert's Principles and Dynamic Equilibrium, Friction in moving bodies

Text books:

1. Engineering Mechanics Statics , J.L Meriam , Wiley
2. Engineering Mechanics Dynamics , J.L Meriam , Wiley
3. Engineering Mechanics by Irving H. Shames, Prentice-Hall
4. Engineering Mechanics : Statics and Dynamics, R. C. Hibbler
5. Mechanics of Solids by Abdul Mubeen, Pearson Education Asia.
6. Mechanics of Materials by E.P.Popov, Prentice Hall of India Private limited.

B.Tech. Common for all branches of Engineering
Semester I

Course Code: ME-151	**ENGINEERING MECHANICS LAB**	**L**	**T**	**P**
		0	**0**	**2**

List of Experiments

1. To study the 2-stroke & 4-stroke I.C. Engine models.
2. Friction experiment(s) on inclined plane.
3. To determine the velocity ratio, mechanical advantage and efficiency of a simple screw jack.
4. Simple & compound gear-train experiment.
5. Belt-Pulley experiment.
6. Torsion of rod/wire experiment.
7. Experiment on Trusses.
8. Dynamics experiment on momentum conservation.
9. Experiment on Moment of Inertia.
10. To draw the load-extension curve of a metallic wire and hence determine the modulus of elasticity of the material of the wire.
11. To investigate the relationship between shear stress and shear strain for rubber and to determine the modulus of rigidity of the material.
12. To determine the central deflection of a simply supported beam loaded by a concentrated load at mid point and hence determine the modulus of elasticity of the material of the beam.
13. To determine the central deflection of a fixed ended beam loaded at mid-span by concentrated loads and to compare with theoretical value.
14. To verify the laws of shearing force and bending moment on a beam.

Outcome of the course:

The students are expected to compare experimental results with theoretical concepts, speculate about reasons for discrepancies, and learn from deductive reasoning. The purposes of experimentation as a subject in the curriculum are many, but perhaps the most important ones are to provide opportunities for the student to:

1. Verify certain theories
2. Become familiar with methods of measurements
3. Organize his/her own work and carry it through systematically and carefully
4. Organize the work of a team
5. Analyze data, assess its reliability and draw conclusions.

References:

1. Applied Mechanics and Strength of Materials, U.C. Jindal, Galgotia Publications
2. Engineering Mechanics For Uptu With Experiments, D.S. Kumar, S.K. Kataria publication
3. Advanced Practical Physics for Students, Worsenop & Flint

B.Tech. Common for all branches of Engineering
Semester I

Course Code: HUM-101 COMMUNICATION SKILLS

L	T	P
2	0	0

Unit I

Communication: Meaning of Communication, Types of Communication, Process of Communication, Channels of Communication, modes of communication, Barriers to communication, Role of communication in society.

Reading Skills: Characteristics of reading, Types of reading, Purpose of reading, Process of reading, Rules for faster comprehension, Approach to reading, SQ3R, Comprehension (Unseen passage).

Unit II

Listening Skills: Process of listening, Types of listening, and Barriers to effective listening, Difference between hearing and listening, Feedback skills.

Speaking Skills: Study of Vowels symbols & diagram(Long, Short, Open, Close, Rounded, Unrounded, Monophthongs, Diphthongs) , Consonants & symbols , Accent , Stress , Voice Modulation

Unit III

Grammar: Abbreviations, Idioms & phrases, One word substitution, Antonyms, Synonyms, Homophones, Homonyms, Word formation: prefix, suffix, Punctuation. Transformation of sentences: Simple to compound, compound to Complex& vice versa.

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Unit IV

Writing Skills: Business letters: principles, structure, Writing a memo, Job application letters, preparing a personal resume; Writing notices, Agenda and Minutes of meetings; Paragraph writing, Report writing: Characteristics, types of reports, structure of technical/research reports, preparatory steps to report writing.

Text Books:

1. Bhattacharya, Inderjit, an Approach to Communication Skills. Dhanpat Rai, New Delhi.
2. K.K.Sinha, Business Communication, Galgotia Publishing Company, New Delhi, 1999.

References:

1. Sheila H.A. Smith, M and Thomas, L., Methuen, Reading to Learn; London, 1982.
2. McGraw, SJ;Basic Managerial Skills for all, Prentice Hall of India, New Delhi 1991
3. Technical Reporting Writing British Association for commercial and Industrial Education, BACIE, 1992
4. Chrissie Wright (Ed.); Handbook of Practical Communication Skills; JAICO Books
5. Common Errors in English, by Sudha Publication (P) Ltd., B-5, Prabhat Kiran Building, Rajendra Place, New Delhi – 110008.
6. Abul Hashem, Common Errors in English, Ramesh Pub. House, Daryagang New Delhi.
7. Objective English by Tata McGraw Hill Publishing Co. Ltd., New Delhi.
8. R.K.Bansal & J.B. Harrison, spoken English for India, Orient Longman.
9. Veena Kumar, the Sounds of English, Makaav Educational Software, New Delhi.

B.Tech. Common for all branches of Engineering
Semester I

Course Code: HUM-151	**COMMUNICATION SKILLS LAB**	**L**	**T**	**P**
		0	**0**	**2**

Practical syllabus-

a) Group Discussion
b) Just a minutes session: Speaking Extempore for one minutes on given topics
c) Reading aloud of newspaper headlines and important articles.
d) Improving pronunciation through tongue twisters.
e) Soft Skills: Mannerism or Etiquette.
f) Mock Interview
g) Preparing PPTs
h) Telephonic Skills
i) Phonetics

B.Tech. Common for all branches of Engineering
Semester I

Course Code: CSE-102 **IT Infrastructure Landscape Overview** **L T P**
3 0 0

Unit 1 Database Overview - 10 Hrs.
Understanding Database types, Database Terminology, Characteristics Of Databases, Introduction To Database Management Systems, Types Of Database Management Systems, Database Security And Recovery, Data Mining, Data Warehousing, And Data Marts, Data Mining (DM), Data Warehousing and Data Marts, SQL Overview , Introduction to SQL, History of SQL, Relational database schema, Data Types, Dates and Times, Creating a table, Default Values, NULL values, Constraints, Referential integrity, Creating a schema, Creating a view, Creating other database objects, Modifying database objects, Renaming database objects, Data manipulation with SQL, Selecting data, Ordering the result set, Cursors, Inserting data, Deleting data, Updating data, Table joins, Inner joins , Equi-join, Natural join, Cross join, Outer joins, Left outer join, Right outer join, Full outer join, Union, intersection, and difference operations, Union, Intersection, Difference (Except), Relational operators, Grouping operators, Aggregation operators, HAVING Clause, Sub-queries, Sub-queries returning a scalar value, Sub-queries returning vector values, Correlated sub-query, Sub-query in FROM Clauses, Mapping of object-oriented concepts to relational concepts, JDBC, What is JDBC?, JDBC Architecture:, Common JDBC Components: Database APIs, ODBC and the IBM Data Server CLI driver, Indexes , Clustered And Non-clustered Indexes, Failure Management With Db2 Cluster Services.

Unit 2 Storage Overview - 6 Hrs.
Storage Networking Technology, Types Of Storage System, FC-AL (Fibre Channel Arbitrated Loop), Fabric, Storage Area Network, Zoning, Storage Virtualization.

Unit 3 Systems & Directory Services Overview - 6 Hrs.
Server Technology, Operating System, Virtualization, Hypervisor, I/o Virtualization, Partitioning, Server Deployment, Server Management Console, Server Availability Concepts And Techniques, Server Workload.
Directory Server Concepts, Directory, LDAP PROTOCOL, Overview of LDAP, LDAP Architecture, LDAP Models, LDAP Replication Topologies, LDAP Data Interchange Format (LDIF).

Unit 4 Network Security and Overview - 6 Hrs.
Network Overview, Network Topologies, Tree Topology, Firewalls, Switching Concepts , What Is Routing? , Virtual Lan's, Security Basics, Loss Of Privacy, Loss Of Integrity, Security Technology, Active Audit , Secure Messaging, Data Security, Network Security.

Unit 5 Application and Middleware Overview - 8Hrs.
Introduction To Common Messaging System (MQ SERIES), Application Integration – Business Need, Middleware, Message Oriented Middleware, Synchronous interaction, Asynchronous interaction, Coupling, Reliability, Scalability, Availability, IBM Websphere MQ, Websphere MQ Objects, Web Tier Deployment, Application Servers And Clustered Deployment, EMAIL, Lotus Architecture, Lotus Domino Server Types, Lotus Notes Clients, Types of Certificates, data warehousing, Warehouse Modeling Approaches , Basic Concepts, Dimension, Basic OLAP Operations.

Text Book - IT Infrastructure Landscape Overview (IBM ICE Publication)

B.Tech. Common for all branches of Engineering
Semester II

ENGINEERING MATHEMATICS-II

Course Code: MATH-201 **L T P**
3 1 0

UNIT-I

Ordinary Differential Equations: Brief review of first order ordinary differential equations, Exact differential equations, Equations reducible to exact equations; Solution of differential equations – variable separable.

Linear Differential Equations of first order and Higher degree: Equations of the first order and higher degree, Linear differential equations with constant coefficients (nth order): general solution, complementary function and particular integral; Method of variation of parameters, Equations reducible to linear equations with constant co-efficients (Cauchy"s and Legendre"s linear equations), Applications of differential equations to engineering problems.

UNIT-II

Series Solution of Differential Equations: Series solution of second order differential equations with variable coefficient (Power series method and Frobeneous method).

Special Functions: Bessel and Legendre equations and their series solutions, Properties of Bessel function and Legendre polynomials.

UNIT-III

Laplace Transforms: Laplace **t**ransforms of simple functions, Basic operational properties, Transforms of derivatives and integrals, Initial and final value theorems; Inverse Laplace transforms – Convolution theorem; Periodic functions - Unit step function, Laplace transform of Periodic function; Applications of Laplace transforms for solving linear ordinary differential equations up to second order with constant coefficients only.

UNIT-IV

Fourier Series: Periodic Functions, Fourier Series of period 2π, Change of interval, Even and Odd periodic functions, Expansion of odd and even periodic functions, Half range Sine and Cosine Series, Typical wave-forms, Parseval"s formula.

Partial Differential Equations: Harmonic analysis, Partial Differential Equations with constant coefficients, Complimentary function and particular integral.

Text Books:

1 *B.S. Grewal**, "Higher Engineering Mathematics"***, Khanna Publishers.
2. H.K. Dass and Rama Verma, "***Engineering Mathematics"***, S. Chand Publications.

Reference Books:

1. N.P. Bali and Manish Goel, ***"Engineering Mathematics***", Laxmi Publications
2. B.V. Ramana, ***"Higher Engineering Mathematics",*** Tata McGraw Hill Education Pvt. Ltd., New Delhi.

B.Tech. Common for all branches of Engineering
Semester II
ENGINEERING CHEMISTRY

	L	T	P
CourseCode:CHEM-101	**3**	**1**	**0**

UnitI **(Lectures09)**

Periodic properties (4 Lectures)

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases, molecular geometries

Unit-II **(Lectures06)**

Atomic and molecular structure (12 lectures)

Schrodinger equation. Particle in a box solutions and their applications for conjugated molecules and nanoparticles. Forms of the hydrogen atom wave functions and the plots of these functions to explore their spatial variations. Molecular orbitals of diatomic molecules and plots of the multicentre orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomics. 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.

Unit-III **(Lectures07)**

Polymers

Introduction, classification, types of polymerization, synthesis and applications of some important polymers. PVC, Polyamides, Polyurethane, Polyethylene, Poly propylene, PET, Resins (Phenol Formaldehyde), PMMA, PAN. Conducting and Biodegradable polymers; Introduction: Rubber and different types of rubber, Vulcanization of rubber. Natural and synthetic rubber. Some important rubber and its uses.

Unit-IV **(Lectures10)**

Spectroscopic techniques and applications (8 lectures)

Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Nuclear magnetic resonance and magnetic resonance imaging, surface characterisation techniques. Diffraction and scattering.

Unit-V **(Lectures10)**

Green Chemistry

Solvents: Reactions in solvent less systems, use of supercritical fluids such as CO_2, Ionic liquids.Catalysts: For increased selectivity, reduced energy requirement, photocatalytic reaction and asymmetric synthesis. Synthetic Methodologies: New synthetic protocols using new energy sources like Microwaves, Ultrasound etc.

Books

1. Organic Chemistry, P.Y. Bruice, Ninth Impression, 2011, Pearson India
2. Chemistry 3 , A. Burrows, john Holman, A, Parsons, G. Pilling, G.Price, Oxford Univ. Press, 2009
3. Engineering Chemistry, published by John Wiley and Sons, India 2011
4. Unit processes in Organic Synthesis by Groggins, Tata McGraw Hill, 2001
5. Applied Chemistry- A textbook for engineers and technologist by H.D. Gesser.
6. Engineering Chemistry: by P C Jain & Monika Jain
7. A Text Book of Engineering Chemistry: by Shashi Chawla
8. Chemistry: Principles and Applications, byM. J. SienkoandR. A. Plane

B.Tech. Common for all branches of Engineering
Semester I

Course Code: CHEM-151	**ENGINEERING CHEMISTRY LAB**	**L**	**T**	**P**
		0	**0**	**2**

1. Determination of total, permanent and temporary hardness of water sample EDTA method.
2. Preparation of polystyrene by anionic/cationic/emulsion polymerization method.
3. Estimation of chloride content in water by argentometric method [mohr's method]
4. Estimation of alkalinity in water sample.
5. Ion exchange column for removal of hardness of water.
6. Thin layer chromatography.
7. Estimation of total iron in iron ore.
8. Chemical analysis of a salt
9. Verification of Lamberts Beer's law by UV-Vis spectrophotometer.
10. Analysis of concentration of a drug in the given sample by comparing with the given standard.

References:

1. Vogel's quantitative Analysis A I Vogel, G Svelha Seventh Edition longman Group ltd.
2.Elementary Practical Organic Chemistry Fifth Edition Quantitave analysis, A I Vogel, Longman Group Ltd.
3. Practical Eng. Chemistry S. S. Dara , First edition S. Chand Company.
4. Engg. Chemistry Sudha Rani and S.K. Bhasin First edition Dhanpat rai Publication.
5. Saltcomindia.gov.in./NIDCCP- EstimatContent.html

B.Tech. Common for all branches of Engineering
Semester II

Course Code: ME-201 **ENGINEERING GRAPHICS** **L T P**
3 1 0

UNIT-I

Introduction **(10 Lectures)**

Sheet layout, Drawing instruments and their uses, Lettering and free hand practicing, Dimensioning, Types of lines, BIS conventions.

UNIT-II

Orthographic projections **(10 Lectures)**

Definitions, Planes of projection, Reference line and convention employed, Projections of points, lines, True and apparent lengths, inclinations, Orthographic projections of plane surfaces.

UNIT-III

Projections of solids **(8 Lectures)**

Definitions, Projections of right regular tetrahedron, Projections of hexahedron, Projections of prisms, Projections of pyramids, cylinders and cones.

UNIT-IV

Isometric projections **(10 Lectures)**

Isometric scales, Isometric projections of simple figures, tetrahedron, hexahedron, right regular prisms, pyramids, cylinder and cones, Spheres, cut spheres and combination of solids.

UNIT-V

Sections and Sectional Views of Right Angular Solids **(10 Lectures)**

Covering, Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone;

Text books:

1. Engineering Drawing – N D Bhatt & V M Panchal, 48th edition, 2005 Charotar Publishing House, Gujarat.
2. A Primer on Computer Aided Engineering Drawing – 2006, Published by VTU, Belgaum.
3. A Textbook of Engineering Graphics, K. Venugopal and V. Prabhu Raja, New Age International Publishers.
4. Engineering Drawing and Graphics using Auto Cad, T. Jeyapoovan, Vikas Publishing House Pvt. Ltd.

Reference Books:

1. Computer Aided Engineering Drawing – S. Trymabaka Murthy, I K International Publishing House Pvt. Ltd., New Delhi, 3rd revised edition – 2006.
2. Engineering Graphics – K R Gopalakrishna, 32nd edition, 2005 – Subhash Publishers, Bangalore.
3. Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production – Luzadder Warren J., duff John M., Eastern Economy Edition, 2005 - Prentice – Hall of India Pvt. Ltd., New Delhi.

B.Tech. Common for all branches of Engineering
Semester II
ENVIRONMENTAL SCIENCE AND TECHNOLOGY

Course Code: EVS-101 **L T P**
2 0 0

Unit I **(10 hours)**

INTRODUCTION: Definition and Scope: Importance, Public awareness and education.
Natural Resources: Introduction, Renewable and non-renewable, Forest, water, mineral, food, energy and land resources, Conservation of resources, Equitable use of resources.
Human population and the environment: Population growth, Environment and human health, Human rights, HIV/AIDS, Value education, Women and child welfare.

Unit II **(7 hours)**
ECOLOGY: Ecosystems, Concept, Structure, Function, Energy flow, Ecological pyramids, Forest, grassland, desert and aquatic ecosystems - Introduction, characteristic features, structure and function.
Biodiversity: Genetic, Species and ecological diversity, Threats to biodiversity, Conservation of Biodiversity.

Unit III **(8 hours)**
SOCIAL ISSUES & ENVIRONMENTAL LEGISLATION: Social Issues: Sustainable development, Water conservation, Climatic change, Concept of Green Computing, and Green Building
Environmental Laws: Environmental ethics, EIA, Environmental protection acts and issues.

Unit IV **(11 hours)**
POLLUTION &WASTE MANAGEMENT
Pollution: Definition, Causes, effects and control measures of the pollution – Air, soil, Noise, Water, Marine and Thermal and Nuclear Pollution.
Disaster management: Flood, Earthquake, Cyclone, Landslide, Drought.
Solid waste management: Waste Management hierarchy; Collection, transportation and storage of MSW; Treatment and disposal of MSW.

Unit IV **(6 hours)**
ENVIRONMENTAL CHEMISTRY
General Chemistry: Review of concepts like oxidation-reduction, Gas laws, pH and Buffers.
Atmospheric Chemistry: Photochemical reactions in atmosphere, Major chemical pollutants and their effects.
Water and Wastewater Chemistry: Hardness, Residual chlorine, Dissolved oxygen, BOD, COD, Solids.
Green Chemistry: Principles, Green materials, reactions, reagents and product.

Text Books:
- Environmental Studies by J.P.Sharma.
- Environmental studies by Smriti Srivastava.

Reference Books:
- Environment and Ecology by H.Kaur.
- Environmental Studies by Ranjit Daniels.

B.Tech. Common for all branches of Engineering
Semester I
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Course Code: EEE 101

L	T	P
3	1	0

UNIT 1 : DC Circuits (8 hours)
Electrical circuit elements (R, L and C), voltage and current sources, Kirchoff current and voltage laws, analysis of simple circuits with dc excitation. Superposition, Thevenin and Norton Theorems.

UNIT 2: AC Circuits (8 hours)
Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three-phase balanced circuits, voltage and current relations in star and delta connections.

UNIT 3: DC Machine (6 hours)
Construction and working of DC motor and generator, Fleming's Rule, Different types of Dc Motors , Starting of DC motor and Speed Control.

UNIT 4: Transformers (6 hours)
Construction and Working Principle, Transformation Ratio, emf equation, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer.

UNIT 5: Electrical Machines (8 hours)
Types of AC motors and their applications, Construction and working principle of Single phase and three phase induction motor, Stating of Three phase induction motor using Star/Delta and DOI, Starters, Starting of Single Phase Motors.

UNIT 6: Basic Electronics (8 hours)
Basic idea of Semiconductor products, Diode, Zener Diode, Transistor, SCR and their Applications.

Suggested Text / Reference Books

1. D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2010.
2. T.K. Nagsarkar and M.S. Sukhija, "Basic Electrical Engineering", Oxford University Press
3. D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2009.
4. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
5. E. Hughes, "Electrical and Electronics Technology", Pearson, 2010.
6. V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 1989.
7. B. L. Theraja, "Electrical Technology", S Chand Publishing
8. J. B. Gupta, "Basic Electrical Engineering", S.K. Kataria & Sons

B.Tech. Common for all branches of Engineering
Semester I
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB

Course Code: EE 151	**L**	**T**	**P**
	0	**0**	**2**

List of Experiments:

1. Verification of Ohm's Law
2. Series and parallel connection of resistance.
3. Verification of Kirchoffs laws.
4. Verification of Superpostion theorem
5. Verification of Thevenin's theorem.
6. Verification of Maximun Power Transfer theorem
7. To observe sine wave, square wave, triangular wave and ramp waveforms on the C.R.O. and to measure amplitude and frequency of the waveforms.
8. Study of study of phenomenon of resonance in RLC series circuit and obtain resonance frequency.
9. Measure the armature and field resistance of a dc machine.
10. Starting and speed control of a DC shunt motor.
11. Determination of, voltage ratio, polarity and efficiency by load test of a single phase transformer.
12. Short circuit/open circuit tests on single phase transformer.
13. Measurement of power and power factor in a single phase AC series inductive circuit
14. To study VI characteristics of PN diode.
15. To study VI characteristics of NPN diode.
16. To obtain V-I characteristics of Zener diode.

B.Tech. Common for all branches of Engineering
Semester II

Introduction to Internet of Things (IOT)

Course Code: CSE-201

L	T	P
3	0	0

Unit 1 – Introduction - 5 Hrs.
IOT Concepts, Introduction to IOT Communications, Telemetry vs IOT, Applications of IOT Communications, People, Processes and Devices.

Unit 2 - IOT Technologies behind smart and intelligent devices - 5 Hrs.
Automation, asset management, telemetry, transportation, telematics. Telemetry and Telemetric; Report location, logistics, tracking and remote assistance; Next generation kiosks, self-service technology; Cellular IOT connectivity services

Unit. 3 - IOT Applications - 4 Hrs.
IOT Verticals; IOT Hosted Services; IOT Application development.; IOT Connectivity; IOT Software providers.

Unit 4 - IOT Systems and Networks - 5 Hrs.
Study of RF Wireless Sensors; Wireless networks; Computer Connected to Internet; Network Devices; Device configuration and management; Exchange information in real time without human intervention.

Unit 5 - IOT Design and System Engineering - 6 Hrs.
Discuss IOT Requirements; Hardware & Software; Study of IOT Sensors; Tagging and Tracking; Embedded Products; IOT Design; (U) SIM Card Technology; IOT Connectivity and Management; IOT Security & IOT Communication.

Unit 6 - IOT Communication Technologies - 6 Hrs.
Discuss Wireless Sensor Networking (WSN); Cellular Machine-to- Machine (M2M) application networks; Software for M2M Applications, Hardware, IP Based Cellular Networks & 3G, 4G.

Unit 7 - IOT Security - 5 Hrs.
Discuss Security & Trust M2M Communications; Secure Communications;; M2M Security Framework; Securing Data input/output and internet communication.

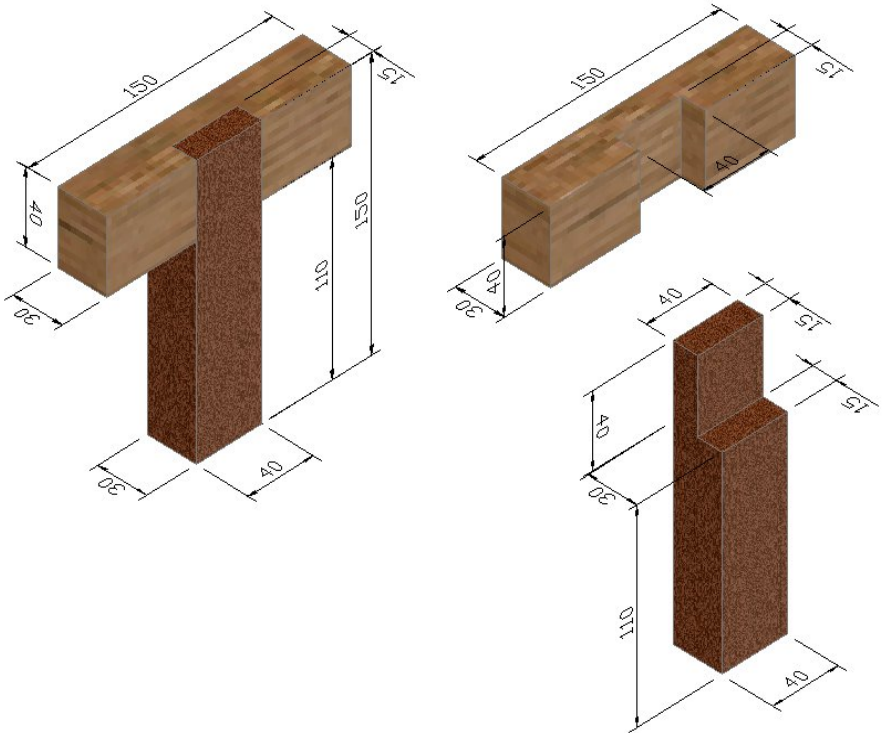
Text Book - Introduction to Internet Of Things (IOT) (IBM ICE Publications)

B.Tech. Common for all branches of Engineering
Semester I

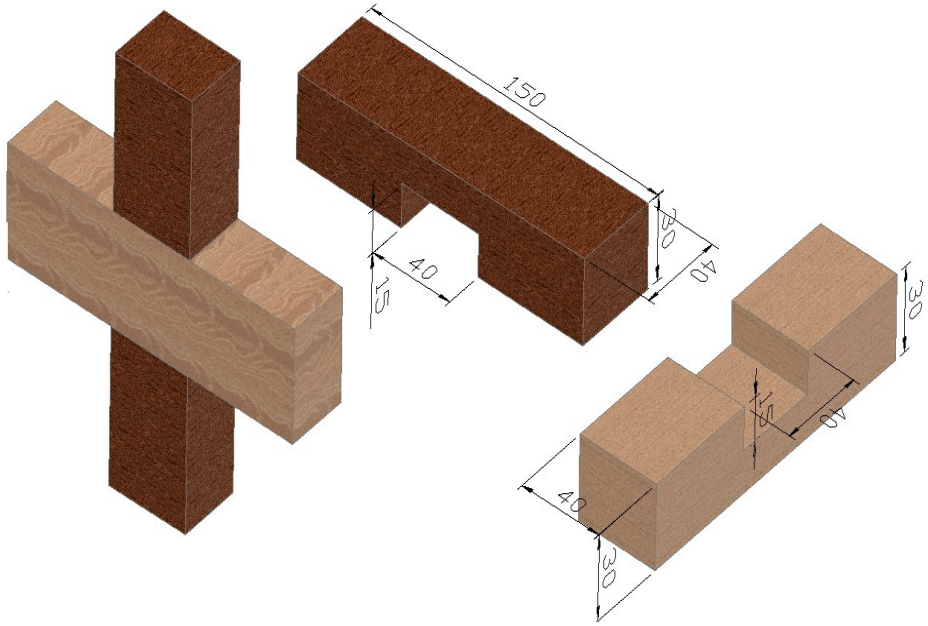
Course Code: ME-152	**WORKSHOP PRACTICE**	**L**	**T**	**P**
		0	**0**	**3**

List of Jobs

Carpentry Shop
Job No. 1
Objective: To Prepare a "T–LAP JOINT" as per sketch.

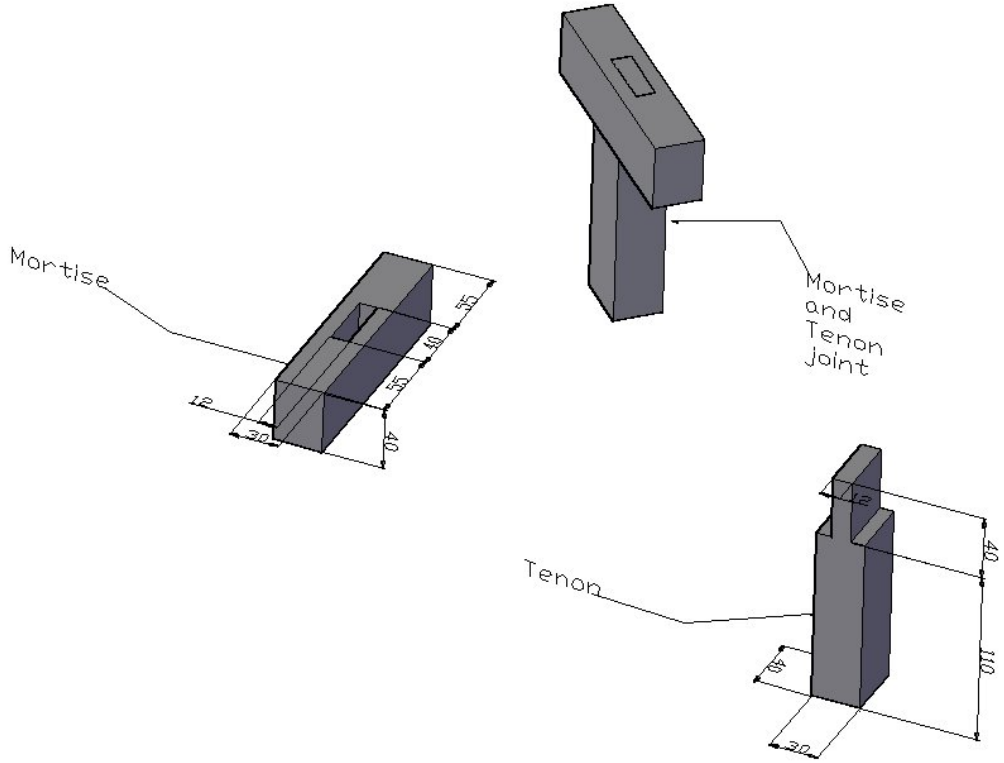


Job No. 2
Objective: To prepare a "Cross Lap Joint" as per given sketch.



Job No. 3

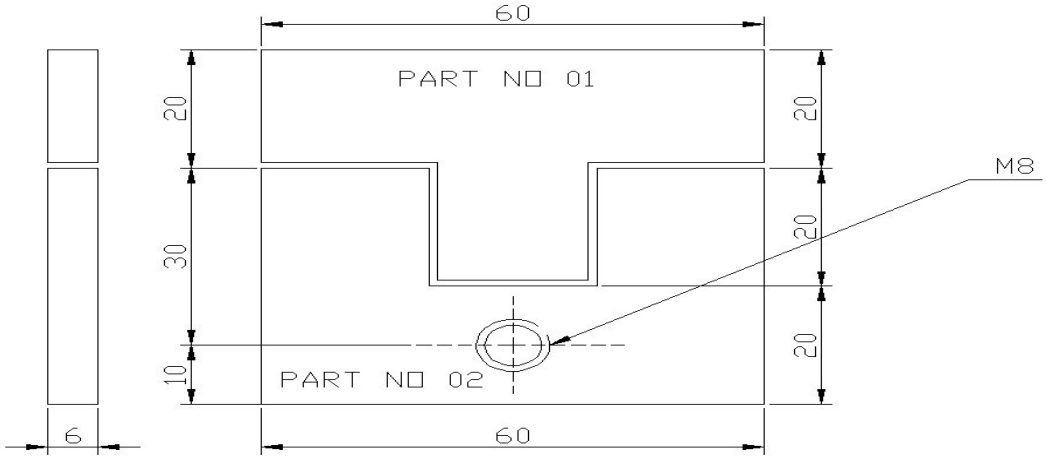
Objectives: To prepare Mortise and Tenon Joint



Fitting Shop

Job No. 1

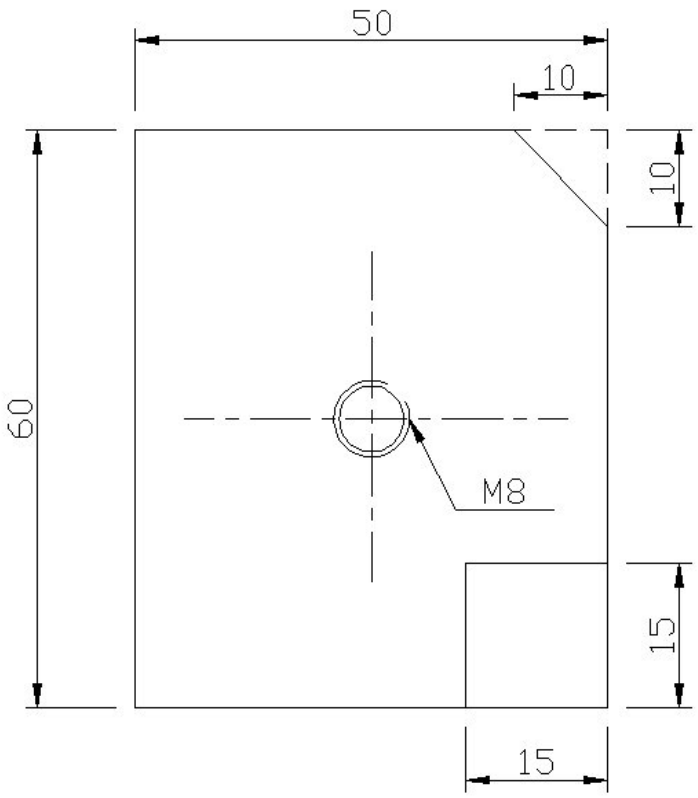
Objectives: To Make Right Angle Fitting Job



- ALL DIMENSIONS ARE IN mm
- MATERIAL MILD STEEL FLAT 62*6mm
- TOLERANCES ±0.5mm

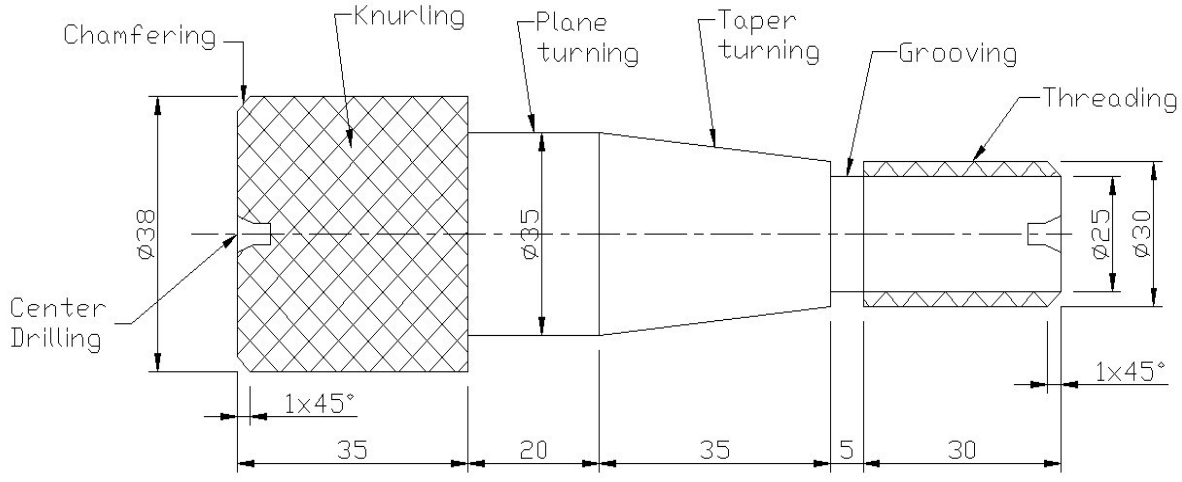
Job No. 2

Objectives: To Make A Square Fitting Job.



Machine Shop **Job No. 1**

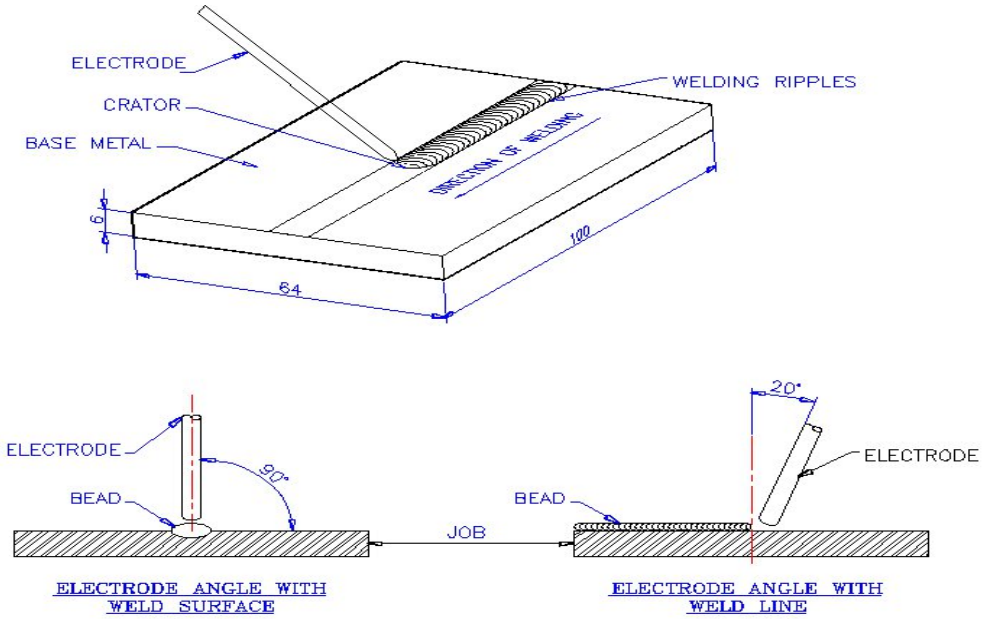
Objective: To prepare the job as per the given specifications provided for different operations on lathe machine



Swiveling angle = Half of the taper angle = 4°, All Dimensions are in mm, Tolerance = ± 0.5mm

Welding Shop **Job No. 1**

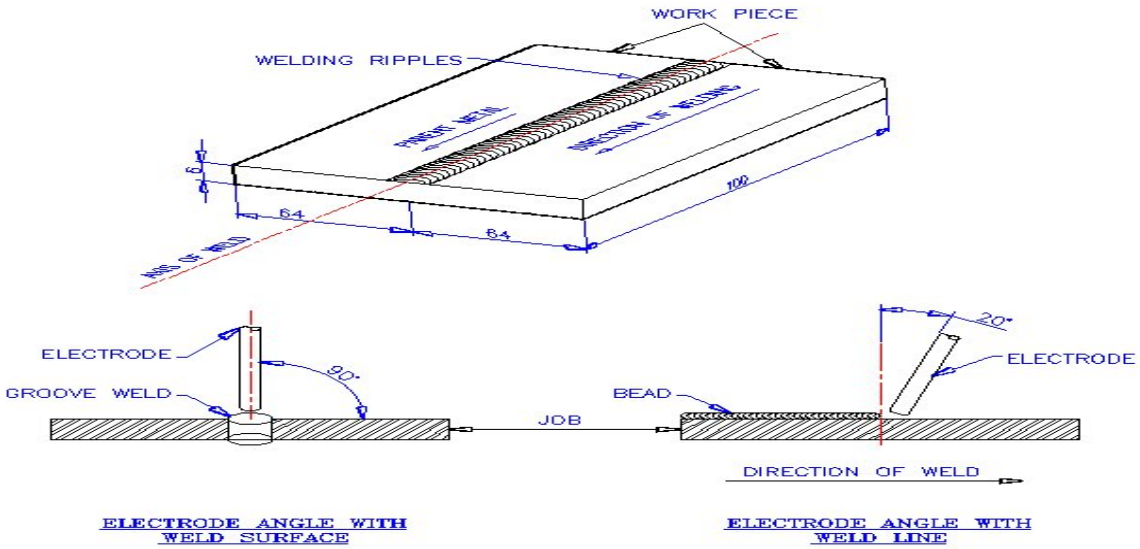
Objective: Beading practice with arc welding



ELECTRODE POSITION WHEN MAKING ON FLAT BEAD

Job No. 2

Objective: To make a butt joint by arc welding.



ELECTRODE POSITION WHEN MAKING A BUTT JOINT IN A FLAT POSITION

3rd Semester

B.Tech. Electrical and Electronics Engineering
Semester III

ENGINEERING MATHEMATICS-III

Course Code: MAT 301 **L T P**
3 1 0

UNIT-I Fourier Series: Periodic functions, Fourier series of period $2p$, Euler's formulas, Dirichlet's condition, Fourier series for discontinuous functions, Change of interval, Odd and even function, Half- range sine and cosine series. **[8 hours]**

UNIT-II Fourier Transforms: Fourier integrals, Fourier transforms, Fourier cosine and sine transforms, Properties of Fourier transforms, Convolution theorem, Perseval's identity, Relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of a function, Application to boundary value problems. **[10 hours]**

UNIT-III Functions of a Complex Variables: Functions of a complex variable, Exponential function, limit and continuity of a function, Analytic function, Cauchy-Riemann equations, Necessary and sufficient conditions for a function to be analytic, Polar form of the Cauchy-Riemann equations, Harmonic functions, Cauchy integral theorem, Cauchy residue theorem. [**11 hours]**

UNIT-IV Numerical analysis: Solution of algebraic and transcendental equations by the Bisection, Regula-falsi and Newton-Raphsion methods, Solution of linear simultaneous equations by Gauss elimination method, Iteration methods, Jacobi's iteration method, Gauss-seidel method, Relaxation method, Numerical integration methods, Trapezoidal rule, Simpson's one-third rule, Simpson's three-eighth rule, Numerical solution of differential equations, Picard's method, Taylor's series method, Euler's method and forth-order Runge-Kutta method. **[12 hours]**

UNIT-V Linear Programming: Linear programming problems formulation, Solution of Linear Programming Problem using Graphical method, Simplex Method, Dual-Simplex Method. **[10hours]**

Text Books:

1. Higher Engineering Mathematics, H.K. Dass, S. Chand, 11th Edition.
2. A Text Book of Engineering Mathematics, N.P. Bali Laxmi publication.
3. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley 9th Edition.
4. Higher Engineering Mathematics, Dr. B. S. Grewal, Khanna Publishers.
5. Numerical Methods for Scientific and Engineering Computation, Jain, Iynger & Jain, New Age International, New Delhi, 2003.

References:

1. Higher Engineering Mathematics, B.V. Ramana, Tata McGraw Hill.
2. Thomas Calculus, Maurice D. Weir, Joel Hass and others, Pearson, 11th Edition.
3. Thomas Calculus, Maurice D. Weir, Joel Hass and others, Pearson, 11th Edition.
4. An introduction to numerical analysis, Devi Prasad, Narosa Publication House

B.Tech. Electrical and Electronics Engineering
Semester-III
CIRCUIT THEORY

Course Code: EEE-301

L	T	P
3	1	0

Unit-I **Lectures -8**

Laplace Transformation: Laplace transformation and its applications to circuit theory in obtaining steady state and transient response of linear RC and RL circuits.

Fourier Analysis: Fourier Analysis of complex waveform, solution of linear circuit impressed with complex waveform, power and power factor associated with complex wave.

Unit II **Lectures -8**

Two Port network: Network elements, classification of networks, symmetrical two port networks, Equivalent T and π representation in parameter form, ladder and lattice networks, Parameter representation: Z parameters (open ckt impedance parameters), Y parameters (short circuit admittance parameters), Hybrid parameters (h- parameter representation), ABCD parameter representation, condition of reciprocity & symmetry in two port networks.

Unit-III **Lectures -10**

Analysis of network using Graph Theory: Graph for given network, classification of graph and sub graphs, incidence , tie set and cut set matrices, terminology used in Network Graph, properties of tree in a graph, variable solution of network using graph theory and matrix from the concept of network function.

Coupling Circuit: Dot convention, coefficient of coupling, mutual inductances, loop and nodal equation for coupling circuits.

Unit-IV **Lectures -10**

Network Synthesis: Driving point functions, P.R functions , properties of P.R functions, Hurwitz polynomials, properties of Hurwitz polynomial functions, synthesis of reactive network by Foster & Cauer's method: Form-I & Form-II for LC networks,Synthesis of RC network by Foster & Cauer Form.

Recommended Books

1. Circuit Theory By Chakravorty.
2. Network and Circuit: Synthesis and Analysis by A.Sudhakar,Tata Mc Graw Hill.
3. Network Analysis by M.E Valkenburg.
4. Network Analysis by Sundaram Seshu & N Balbanian John.
5. Network Analysis and Synthesis by D Roy Choudhary.
6. Network Analysis and Synthesis By Soni Gupta.
7. Network Analysis by Schaum Series.

B.Tech. Electrical and Electronics Engineering
Semester-III
ELECTRICAL MACHINES-I

Course Code: EEE-302

L	T	P
3	1	0

Unit –I **Lectures -6**

Principle of Energy Conservation: Introduction, singly excited magnetic system, extreme cases of armature motion, doubly excited magnetic system, elementary synchronous machines, singly excited electric field system.

Unit-II **Lectures -12**

Transformers: principle of transformer operation, emf equation, voltage ratio and turns ratio, construction of single-phase transformers, ideal transformer, transformer on no load, phasor diagram and equivalent circuit, practical transformer, phasor diagram and equivalent circuit, voltage regulation, losses, separation of hysteresis and eddy current losses, open circuit, short circuit, back to back tests, transformer efficiency, condition for maximum efficiency, per unit transformer values, all day efficiency, distribution transformers, power transformers, application of transformers.

Single-phase auto transformer, volt ampere relation, step up auto transformer, auto transformer efficiency, saving in conductor material, conversion of a two winding transformer to an auto transformer, advantages & disadvantages of auto transformer, applications of auto transformer.

UNIT –III **Lectures - 10**

Three-phase transformer: Introduction, advantages of three-phase unit transformer, advantages of a transformer bank of three-phase transformers, three-phase transformer construction, three-phase transformer groups, three-phase transformer connections, factors affecting the choice of connections, delta- delta connection, star-star connection, star- delta connection, delta-star connection, open delta connection, scott three-phase/ two phase connection, relationship between input and output currents, advantages, disadvantages and applications(star-star, delta-delta, star-delta, delta-star, open-delta, Scott connections) of these type of connections, Three-phase to six phase transformation, diametrical connection, 3-phase to 12-phase transformation, 3 winding transformers: equivalent circuit, determination of parameters, voltage regulation. polarity of the transformers, parallel operation, single-phase transformers and 3-phase transformers in parallel wave shape of no load (exciting) current, inrush of magnetizing current, harmonic phenomenon in 3- phase transformer, construction of current transformers and voltage transformers, transformer cooling.

Unit-IV **Lectures -8**

Dc machines: basic structure of electric machine, dc generator construction, equivalent circuit of dc machine armature, type of dc machine, emf equation of dc machine, lap & wave winding, armature reaction in dc generators, commutation, methods of improving commutation, demagnetizing and cross magnetizing ampere turns, characteristics of dc generator.

Unit-V
Lectures -8

Direct current motors: motor principle, back emf, equivalent circuit of a dc motor armature, torque of dc machine, types of dc motor, armature reaction in dc motor and interpoles,

characteristics of shunt, series & compound motors, speed control of dc motors, starting of dc motors & starters, losses in dc machine, efficiency of a dc machine, testing of a dc machines, application of dc machines.

Recommended Books:

1. " Electrical Machinery" by P. S.Bimbhra, Khanna Publishers, Delhi.
2. "Generalized theory of electrical machines" by P. S.Bimbhra, Khanna Publishers, Delhi.
3. "Electric Machinery" by Fitzgerald & Kingsley, MGH.

B.Tech. Electrical and Electronics Engineering
Semester III

DIGITAL ELECTRONICS

Course Code: EEE-303 **L T P**
3 1 0

Unit-I **Hours-8**

Number system and their inter conversion, Signed binary numbers, binary codes, cyclic codes, error detecting and correcting codes, hamming codes.

Logic Gates, Minimization of logic gates using K- map method and Quine Mc-Clusky method (Tabular method)

Unit II **Hours 9**

Combinational circuits, analysis procedure, design procedure, binary adder-subtractor, decimal adder, binary multiplier, magnitude comparator, decoders, encoders, multiplexers, demultiplexers.

Unit-III **Hours-9**

Sequential circuits, Flip flops, SR flip flop JK flip flop.D Flip flop and T flip flop.

Registers and counters: Shift registers, ripple counter, synchronous counter, other counters

Unit-IV **Hours-8**

Introduction and performance criteria for logic families, various logic families - DCTL, RTL, DTL, TTL & ECL working and their characteristics in brief, MOS Gates and GMOS Gates, comparison of various logic families.

Unit V **Hours 8**

Memory and programmable logic: Introduction, Memory organisation, Classification and characteristics of memories, Sequential memories, RAM, ROM, PLA, and PAL.

Text Book:

M. Morris Mano and M. D. Ciletti, "Digital Design", 4th Edition, Pearson Education

Reference Books:

1. Hill & Peterson, "Switching Circuit & Logic Design", Wiley.

B.Tech. Electrical and Electronics Engineering
Semester III
ELECTRONICS DEVICES AND CIRCUITS

Course Code: EEE-304 **L T P**
3 1 0

Unit-I **Hours-8**

BJT: Review of device structure operation and V-I characteristics, BJT circuits at DC, BJT as amplifier and switch, biasing in BJT amplifier circuit, small-signal operation and models, single stage BJT amplifier, BJT internal capacitances and high frequency model, frequency response of CE amplifier.

Unit-II **Hours-8**

MOSFET: Review of device structure operation and V-I characteristics. Circuits at DC, MOSFET as Amplifier and switch, Biasing in MOS amplifier circuits, small-signal operation and models, single stage MOS amplifier, MOSFET internal capacitances and high frequency model,frequency response of CS amplifier

Unit-III **Hours-8**

Feedback amplifier: Feedback concept, characteristics of negative and positive feedback. Effect of negative and positive feedback on input impedance, output impedance, gain, and noise and frequency response.

Unit-IV **Hours-8**

Oscillators Classification of Oscillators, frequency and frequency stability of oscillatory circuits, Tuned based Oscillators, Hartley Oscillator, Colpitts Oscillators Clapp Oscillator, Crystal Oscillator, Phase Shift Oscillator, Wein Bridge Oscillator

Unit-V **Hours-8**

Some special devices:

Photodiodes, photo detectors, solar cell, light emitting diodes, semiconductor lasers, Tunnel Diode: degenerate semiconductors, IMPATT diode;

The transferred electron mechanism: The GUNN diode. P-N-P-N diode, semiconductor controlled rectifier (SCR), bilateral devices: DIAC, TRIAC, IGBT.

Text books

1. Integrated devices & circuits by Millman & Halkias.
2. Electronic Devices & circuit theory by R. Boylestad.

Reference books

1. Electronic Devices & circuit-II by A.P. Godre & U.A. Bakshi.
2. Electronic Devices & Circuit by G.K.Mithal

B.Tech. Electrical and Electronics Engineering
Semester III
HUMAN VALUES AND ETHICS

Course Code: EEE-305

L	T	P
2	1	0

Contact Hours: 40

UNIT 1 **(12 Hours)**

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education Understanding the need, basic guidelines, content and process for Value Education. Self Exploration–what is it?- its content and process; „Natural Acceptance" and Experiential Validation- as the mechanism for self exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario Method to fulfill the above human aspirations: understanding and living in harmony at various levels

UNIT 2 **(10 Hours)**

Understanding Harmony in the Human Being - Harmony in Myself! Understanding human being as a co-existence of the sentient "I" and the material „Body" Understanding the needs of Self („I") and „Body" - *Sukh* and *Suvidha* Understanding the Body as an instrument of „I" (I being the doer, seer and enjoyer) Understanding the characteristics and activities of „I" and harmony in „I" Understanding the harmony of I with the Body: *Sanyam* and *Swasthya*; correct appraisal of Physical needs, meaning of Prosperity in detail Programs to ensure *Sanyam* and *Swasthya*)

UNIT 3 **(10 Hours)**

Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship Understanding harmony in the Family- the basic unit of human interaction Understanding values in human-human relationship; meaning of *Nyaya* and program for its fulfillment to ensure *Ubhay-tripti*; Trust (*Vishwas)* and Respect (*Samman)* as the foundational values of relationship Understanding the meaning of *Vishwas*; Difference between intention and competence Understanding the meaning of *Samman*, Difference between respect and differentiation; the other salient values in relationship Understanding the harmony in the society (society being an extension of family): *Samadhan, Samridhi, Abhay, Sah-astitva* as comprehensive Human Goals Visualizing a universal harmonious order in society- Undivided Society (*Akhand Samaj),* Universal Order (*Sarvabhaum Vyawastha)*- from family to world family!

UNIT 4. **(8 Hours)**

Understanding Harmony in the Nature and Existence - Whole existence as Coexistence Understanding the harmony in the Nature Interconnectedness and mutual fulfillment among the four orders of naturerecyclability and self-regulation in nature Understanding Existence as Co-existence (*Sah-astitva*) of mutually interacting units in all-pervasive space Holistic perception of harmony at all levels of existence.

SUGGESTED READINGS:

1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey,2004 (Indian Reprint)
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available)
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003

B.Tech. Electrical and Electronics Engineering
Semester-III
CIRCUIT THEORY LAB

Course Code: EEE-351

L	T	P
0	0	2

1. Verification of principle of superposition with dc and ac sources.
2. Verification of Thevenin, Norton and Maximum power transfer theorems in ac circuits
3. Verification of Tellegin's theorem for two networks of the same topology
4. Determination of transient response of current in RL and RC circuits with step voltage input
5. Determination of transient response of current in RLC circuit with step voltage input for underdamp, critically damp and overdamp cases.
6. Determination of frequency response of current in RLC circuit with sinusoidal ac input
7. Determination of z and h parameters (dc only) for a network and computation of Y and ABCD Parameters
8. Determination of driving point and transfer functions of a two port ladder network and verify with theoretical values
9. Determination of image impedance and characteristic impedance of T and Π networks, using O.C. and S.C. tests Write Demo for the following (in Ms-Power point)
10. Verification of parameter properties in inter-connected two port networks: series, parallel and cascade also study loading effect in cascade.
11. Determination of frequency response of a Twin – T notch filter.
12. To determine attenuation characteristics of a low pass / high pass active filters.

B.Tech. Electrical and Electronics Engineering
Semester-III
ELECTRICAL MACHINES-I LAB

Course Code: EEE-352

L	T	P
0	0	2

LIST OF EXPERIMENTS:

TRANSFORMERS

1. To find turns ratio & polarity of single-phase transformer.
2. To perform open & short circuit tests on single-phase transformer.
3. To perform Sumpner's (Back to Back) test on two identical 1-Φ transformers.
4. Parallel operation of two single-phase transformers & to study the load shared by each transformer.
5. To convert three-phase to 2-phase By Scott-connection of transformers.

DC MACHINES

6. To plot the magnetizing characteristics of a dc generator running at rated speed.
7. To obtain and plot the external characteristics of a dc shunt generators & to deduce the internal characteristics from the above.
8. To perform load test on DC shunt generator.
9. Speed control of DC shunt motor.
10. Swinburne's tests of DC shunt motor.
11. To obtain and plot the characteristics of DC series motor.
12. To perform load test on DC series motor.

NOTE: At least ten experiments are to be performed in the semester from the above list.

Recommended Book:

"Experimentation and viva voce on electrical machines" by V.N. Mittal & A. Mittal, Standard Publications.

B.Tech. Electrical and Electronics Engineering
Semester III

DIGITAL ELECTRONICS LAB

Course Code: EEE-353

L	T	P
0	0	2

List of Experiments

1. Introduction to digital electronics lab- nomenclature of digital ICs, specifications, study of the data sheet, concept of Vcc and ground, verification of the truth tables of logic gates using TTL ICs.
2. Implementation and verification of various logic gates.
3. Verification of state tables of RS, JK, T and D flip-flops.
4. Implementation and verification of Decoder/De-multiplexer and Encoder using logic gates.
5. Implementation of 4x1 multiplexer using logic gates.
6. Implementation of 4-bit parallel adder using 7483 IC.
7. Design, and verify the 4-bit synchronous counter.

4th Semester

B.Tech. Electrical and Electronics Engineering
Semester-IV
ELECTRICAL MACHINES-II

Course Code: EEE-401

L	T	P
3	1	0

Unit-I **Lectures -10**

Induction machines: Constructional features, production of torque, phasor diagram, equivalent circuit, performance analysis, torque slip characteristics, no-load and blocked rotor test, load test, effect of rotor resistance, deep bar and double cage induction motor, starting method of squirrel cage and wound rotor induction motor, various methods of speed control of squirrel cage and wound rotor induction motor, Effect of space harmonics, generator operation.

Unit-II **Lectures -8**

Single phase induction motors: Introduction, production of rotating fields, principle, double revolving field theory, rotor slip, equivalent circuit, determination of equivalent circuit parameters, starting methods, types of single-phase induction motors, characteristics and applications of single-phase motors.

Unit-III **Lectures -10**

Synchronous generators: Introduction, advantages of rotating field alternators, speed and frequency, construction of 3-phase synchronous machines. Excitation system, emf equation, armature winding, coil span factor, distribution factor, actual voltage generated, armature leakage reactance, armature reaction, synchronous impedance, equivalent circuit & Phasor diagram, voltage regulation, measurement of synchronous impedance. Magnetic axis of the rotor, two reaction theory, salient pole synchronous machine- two reaction model, torque angle characteristic of salient pole synchronous machine, maximum reactive power for a synchronous generator, determination of Xd and Xq, parallel operation of alternators, synchronizing power and synchronizing torque coefficient, transient conditions of alternators, constant flux linkage theorem with proof, symmetrical short circuit transients, short circuit ratio, cooling of synchronous generators.

Unit-IV **Lectures -10**

Synchronous motors: Introduction, construction, principle of operation, main features, equivalent circuit and phasor diagram of a cylindrical rotor synchronous motor, different torques in synchronous motor, power flow equation for a synchronous motor, phasor diagram of salient pole synchronous motor, effect of varying field currents, effect of load changes, synchronous motor V curves and inverted V curves, starting of synchronous motors, hunting, synchronous condenser, applications of synchronous motors.

Unit V **Lectures -6**

Introduction to special Motors

Stepper Motors: Introduction, Construction and working of Permanent –magnet stepper Motor ,advantage and application.

Universal Motor: Introduction, Operation of a universal motor, Advantage and Disadvantage of universal motor.

Reluctance Motor: Introduction ,working and use of reluctance motor, speed-torque characteristics

Recommended Books:

1. "Electrical Machinery" by P.S. Bimbhra, Khanna Publishers, Delhi.
2. "Generalized theory of electrical machines" by P.S. Bimbhra, Khanna Publishers, Delhi."Electric Machinery" by Fitzgerald & Kingsley, MGH.

B.Tech. Electrical and Electronics Engineering
Semester IV
ANALOG INTEGRATED CIRCUITS

Course Code: EEE-402 **L T P**
3 1 0

Unit-I **Hours-8**

IC OP-AMP applications: OP-AMP Fundamentals (brief review of differential amplifier, current mirror, active load, level shifter, output stage; ac and dc characteristics) Basic building blocks using OP-AMPS. Inverting/Non-inverting VCVS, Integrators, Differentiators, CCVS and VCCS, Instrumentation Amplifiers.

Unit-II **Hours-8**

Waveform Generator:

Square wave generators: 555Timer, Crystal controlled Oscillator Ramp Generator: Triangle generator, Sawtooth generator Sine wave generator: Requirement for sinusoidal oscillations, Wien-bridge and twin-T oscillators. Function Generators: Multi op-amp function generators, IC function generators Digitally controlled frequency synthesizer: PLL Fundamentals, PLL synthesizer, Totally digital synthesizer.

Unit-III **Hours-8**

Active Filters:

Introduction to filtering: Frequency response, Characteristics and terminology, Active versus passive filters Low pass filter: First order low pass active filter, second order active filter model, second order low pass filter characteristics, Sallen-Key unity gain filter, Sallen-Key equal component filter, Higher order filters. High pass active filter. Band pass filter: single op-amp band pass filter, multistage band pass filter State variable filter

Unit-IV **Hours-8**

Non-linear Circuits:

Logarithmic Amplifiers, Log/Antilog Modules, Precision Rectifier, Peak Detector, Sample and Hold Circuits. OP-AMP as Comparator, Schmitt Trigger, Square and Triangular Wave Generator, Monostable Multivibrator. IC Analog Multiplier applications OTA

Unit- V **Hours-8**

Voltage Regulators: OP-AMP Regulators, IC Regulators, Fixed Voltage Regulators (78/79, XX), SMPS.

Text Book:

1. Sedra and Smith, Microelectronic Circuits", Oxford University press, 5th Edition, 2005.
2. J. Michael Jacob, Applications and design with Analog Integrated Circuits", PHI, 2nd Edition, 2004.

Reference Book :

1. B.P. singh and Rekha Singh, Electronic Devices an Integrated Circuits; Pearson Education, 1st Edition 2006.

B.Tech. Electrical and Electronics Engineering
Semester IV
Electrical & Electronics Measurements & Instrumentation

Course Code: EEE-403 **L T P**
3 1 0

Unit I **Hours 8**
Unit, dimensions and standards: Scientific notations and metric prefixes. SI electrical units, SI temperature scales, Other unit systems, dimension and standards. Measurement Errors: Gross error, systematic error, absolute error and relative error, accuracy, precision, resolution and significant figures, Measurement error combination, basics of statistical analysis. PMMC instrument, galvanometer, DC ammeter, DC voltmeter, series ohm meter

Unit II **Hours 8**
Transistor voltmeter circuits, AC electronic voltmeter, current measurement with electronic instruments, multimeter probes Digital voltmeter systems, digital multimeters, digital frequency meter system

Unit III **Hours 8**
Voltmeter and ammeter methods, Wheatstone bridge, low resistance measurements, low resistance measuring instruments AC bridge theory, capacitance bridges, Inductance bridges, Q meter

Unit IV **Hours 8**
CRO: CRT, wave form display, time base, dual trace oscilloscope, measurement of voltage, frequency and phase by CRO, Oscilloscope probes, Oscilloscope specifications and performance. Delay time based Oscilloscopes, Sampling Oscilloscope, DSO, DSO applications

Unit V **Hours 8**
Instrument calibration: Comparison method, digital multimeters as standard instrument, calibration instrument Recorders: X-Y recorders, plotters

Text Book: David A. Bell, "Electronic Instrumentation and Measurements", 2nd Ed., PHI , New Delhi 2008.

Reference Books:
1. Oliver and Cage, "Electronic Measurements and Instrumentation", TMH, 2009.
2. Alan S. Morris, "Measurement and Instrumentation Principles", Elsevier (Buterworth Heinmann), 2008.

B.Tech. Electrical and Electronics Engineering
Semester-IV
TRANSMISSION & DISTRIBUTION OF ELECTRICAL POWER
Course Code: EEE-404

L	T	P
3	1	0

Unit-I **Lectures -8**

Introduction: Structure of a power system, indoor and outdoor substations, equipment for substation layout, auxiliary supply.

Distribution Systems: Radial, ring mains and network distribution system, comparison of various types of ac and dc systems.

Unit-II **Lectures -8**

Transmission Lines: Introduction: inductance of a conductor due to internal flux and external flux, inductance of a single phase two-wire line, inductance of three phase line, capacitance of three phase line, charging current due to capacitance, skin effect, Ferranti effect, proximity effect.

Performance of Lines: Models of short, medium and long transmission lines, performance of transmission lines, circle diagram, capacity of synchronous condenser, tuned lines, voltage control.

Unit-III **Lectures -8**

Mechanical Design: Sag and stress calculations, effect of ice and wind, string chart, line supports, conductor material, dampers.

Insulators: Types, insulating materials, voltage distribution over insulator string, equalizer ring, configuration of insulators for EHV AC & HVDC transmission systems, post insulators, insulator failures, testing of the insulators,

Unit-IV **Lectures -8**

Cables: Types of cables, construction of cables, grading of cables, capacitance, ratings, power factor in cables, thermal characteristics and applications.

Corona: Phenomenon, critical voltage, power loss, reduction in losses& radio-interference. HVDC Transmission- types of links, advantages and limitations, corona in HVDC lines.

Recommended Books:

1. Power System Engg: by I.J.Nagrath and D.PKothari (TMH)
2. A Course in Electrical Power by Gupta, Soni & Bhatnagar (Dhanpat Rai & Sons).
3. Power system by Aqshaf Hussain, Dhanpat Rai, Delhi
4. Elements of power system analysis by W.D.Stevenson (MGH)
5. Electrical power by J.B.Gupta (S.K.Kataria & Sons).
6. Power System Engineering by B. R. Gupta.
7. Transmission & Distribution of Electrical Engineering by H.Cotton.

B.Tech. Electrical and Electronics Engineering
Semester IV
HUMAN RESOURCE MANAGEMENT

Course Code: EEE-405 **L T P**
2 1 0

UNIT I **(12 Hours)**

Human Resources Management (HRM) : Meaning, Nature and Scope, Difference between HRM and Personnel Management, HRM functions and objectives, Evolution of HRM environment – external and internal.

Human Resources Development in India: evolution and principles of HRD, HRD Vs. Personnel functions, Role of HR managers.

Strategic Human Resource Management : Nature of Strategies and Strategic Management, Strategic Management Process – Environmental Scanning, Strategy Formulation, implementation and evaluation.

UNIT II **(8 Hours)**

Human Resources planning: Definition, purposes, processes and limiting factors; Human Resources Information system (HRIS): HR accounting and audit, Job Analysis – Job Description, Job Specification.

The systematic approach to recruitment: recruitment policy, recruitment procedures, recruitment methods and evaluation.

The systematic approach to selection: the selection procedure, the design of application form, selection methods, the offer of employment, and evaluation of process.

UNIT III **(10 Hours)**

Training and Development: Purpose, Methods and issues of training and management development programmes.

Performance Appraisal: Definition, Purpose of appraisal, Procedures and Techniques including 360 degree Performance Appraisal, Job Evaluation.

Compensation Administration: Nature and Objectives of compensation, components of pay structure in India, Wage Policy in India – Minimum Wage, Fair Wage and Living Wage.

Incentive Payments : Meaning and Definition, Prerequisites for an effective incentive system, Types and Scope of incentive scheme, Incentive Schemes in Indian Industries, Fringe Benefits.

UNIT IV **(10 Hours)**

Discipline and Grievance Procedures: Definition, Disciplinary Procedure, Grievance Handling Procedure.

Industrial Relations: Nature, importance and approaches of Industrial Relations.

Promotion, Transfer and Separation: Promotion – purpose, principles and types; Transfer – reason, principles and types; Separation – lay-off, resignation, dismissal, retrenchment, Voluntary Retirement Scheme.

Suggestion Readings :

1. Aswathappa K - Human Resource and Personnel Management (Tata McGraw Hill, 5th Ed.).
2. Rao VSP – Human Resource Management, Text and Cases (Excel Books, 2nd Ed.),
3. Ivansevich – Human Resource Management (Tata McGraw Hill, 10th Ed.)
4. Dessler – Human Resource Management (Prentice Hall, 10th Ed.)
5. Bernardi – Human Resource Management (Tata McGraw Hill, 4th Ed.)

B.Tech. Electrical and Electronics Engineering
Semester-IV
ELECTRICAL MACHINES-II LAB

Course Code: EE-451

L	T	P
0	0	2

LIST OF EXPERIMENTS:

INDUCTION MOTORS

1. To perform no load test & block rotor test on three-phase squirrel cage induction motor.
2. To perform no load test & block rotor test on three-phase slip ring induction motor.
3. To study the starting methods of three-phase induction motors.
4. To study the cascading of two induction motors.
5. To conduct the load test to determine the performance characteristics of the induction motor.
6. To study speed changing by pole changing method.

SYNCHRONOUS MACHINES

1. To draw characteristics of alternator under different loading condition.
2. To find out regulation by synchronous impedance method.
3. To find out regulation by ZPF method.
4. To draw characteristics of alternator under different loading condition.
5. To plot V-Curves of a synchronous motor.
6. To measure steady state reactances (X_d, X_q) of a synchronous machine.

NOTE: At least ten experiments are to be performed in the semester from the above list.

Recommended Books:

"Experimentation and viva voce on electrical machines"by V.N. Mittal & A. Mittal, Standard Publications

B.Tech. Electrical and Electronics Engineering
Semester IV
ANALOG INTEGRATED CIRCUITS LAB

Course Code: EEE-452	**L**	**T**	**P**
	0	**0**	**2**

List of Experiments

1. Measurement of Op-amp Parameters. (Open Loop Gain, Input offset Voltage, CMRR, Slew rate)
2. Determination of Frequency response of Op-Amp.
3. Precision Rectifier
4. Instrumentation Amplifier.
5. Open Loop operation of Op-amp -Comparators - Schmitt Trigger.
6. Astable & Monostable Operation Using 555.
7. IC Voltage Regulator.
8. Voltage Controlled Oscillator.
9. Phase Locked Loop.
10. Frequency Multiplier
11. A/D Converters & D/A Converters.
12. Second Order Active Filter- High Pass & Low Pass Realization

B.Tech. Electrical and Electronics Engineering
Semester IV
Electrical & Electronics Measurements &
Instrumentation Lab

Course Code: EEE-453

L	T	P
0	0	2

1. Study of semiconductor diode voltmeter and its us as DC average responding AC voltmeter .
2. Study of L.C.R. bridge and determination of the value of the given components.
3. Study of distortion factor meter and determination of the % distortion of the given oscillator.
4. Study of the transistor tester and determination of the parameters of the given transistors.
5. Study of the following transducer (i) PT-100 trans (ii) J- type trans. (iii) K-type trans (iv) Presser trans
6. Measurement of phase difference and frequency using CRO (lissajous figure)
7. Measurement of low resistance Kelvin's double bridge.
8. Radio Receiver Measurements

B.Tech. Electrical and Electronics Engineering
Semester-IV
TRANSMISSION AND DISTRIBUTION OF ELECTRIC POWER LAB

Course Code: EEE-454

L	T	P
0	0	2

LIST OF EXPERIMENTS

1. To find out A, B, C, D parameters, hybrid parameters and image parameters of a given transmission line model.

2. To study the performance of a long transmission line under no load condition and under light load condition.

3. To study the performance of a long transmission line under load at different power factors.

4. Visit to substation and preparing layout of various equipments in the substation.

5. To study the performance characteristics of a typical DC distribution system (Radial Configuration)

6. To study the performance characteristics of a typical DC distribution system (Ring main Configuration)

7. To find out voltage distribution across the string of insulators without guard ring.

8. To find out voltage distribution across the string of insulators with guard ring.

9. To plot equipotential lines of paper model of single layer cable.

10. To plot equipotential lines of paper model of multi layer cable.

11. To measure the insulation resistance of cable.

Note: At least 10 experiments should be performed from above list

5th Semester

B.Tech. Electrical and Electronics Engineering
Semester V
MICROPROCESSOR AND ITS APPLICATIONS

Course Code: EEE-501 **L T P**
3 1 0

Unit I **Hours 8**

Introduction to Microprocessor, Microprocessor architecture and its operations, Memory, Input & output devices, Logic devices for interfacing, The 8085 MPU, Example of an 8085 based computer, Memory interfacing.

Unit II **Hours 8**

Basic interfacing concepts, Interfacing output displays, Interfacing input devices, Memory mapped I/O, Flow chart symbols, Data Transfer operations, Arithmetic operations, Logic Operations, Branch operation, Writing assembly language programs, Programming techniques: looping, counting and indexing

Unit III **Hours 8**

Additional data transfer and 16 bit arithmetic instruction, Arithmetic operations related to memory, Logic operation: rotate, compare, counter and time delays, Illustrative program: Hexadecimal counter, zero-to-nine, (module ten) counter, generating pulse waveforms, debugging counter and time delay, Stack, Subroutine, Restart, Conditional call and return instructions, Advance subroutine concepts, The 8085 Interrupts, 8085 vector interrupts

Unit IV **Hours 8**

Program: BCD-to-Binary conversion, Binary-to-BCD conversion, BCD-to- Seven segment code converter, Binary-to-ASCII and ASCII-to-Binary code conversion, BCD Addition, BCD Subtraction, Introduction to Advance instructions and Application, Multiplication, Subtraction with carry.

Unit V **Hours 8**

8255 Programmable peripheral interface, interfacing keyboard and seven segment display, 8254 (8253) programmable interval timer, 8259A programmable interrupt controller, Direct Memory Access and 8237 DMA controller. Introduction to 8086 microprocessor: Architecture of 8086 (Pin diagram, Functional block diagram, Register organization).

Text Book:

1. Ramesh Gaonkar, “Microprocessor Architecture, Programming, and Applications with the 8085”, 5th Edition, Penram International Publication (India) Pvt. Ltd.
2. * Douglas V. Hall, “Microprocessors and Interfacing”, 2nd Edition, TMH, 2006.

Reference Book:

1. Kenneth L. Short, “Microprocessors and programmed Logic”, 2nd Ed, Pearson Education Inc.

B.Tech. Electrical and Electronics Engineering
Semester-V
ELECTRICAL POWER GENERATION

Course Code: EEE-502

L	T	P
3	1	0

Unit-I **Lectures -8**

Load Curves: Energy requirements, connected load, maximum demand, demand factor, diversity factor, types of load, variation in demand, Chronological load curve, load duration curve, Energy load curve, Mass curve, load factor, Capacity factor, utilization factor.

Unit-II **Lectures -8**

Conventional Methods of Generation:

Hydro Stations- location, layout, types and selection of prime mover, calculation of energy generated.

Thermal stations- Location, layout, calculations of energy generated. Nuclear stations-Principle of nuclear generation, location, layout and calculation of energy generated.

Unit-III **Lectures -8**

Classification Of Plants: Base load, peak load and stand by stations, stand by capacity in power plants, selection of number and size of units for different types of stations.

Power Station Auxiliaries: Ash handling in thermal plants, necessity of condensers in thermal and nuclear plants, Radiation protection in nuclear plants, station batteries and their maintenance, Fire fighting equipment.

Unit-IV **Lectures -8**

Economic Operation Of Steam Plants: Methods of loading turbo alternators, input output curve, heat rate, incremental cost, optimum generator scheduling neglecting transmission loss, sequence of adding units, load dispatching.

Recommended Books:

1. A Course in Electrical power by Soni, Gupta, Bhatnagar.
2. Power System by J B Gupta.
3. Power Plant Engineering by Arora and S.Domkundwar

B.Tech. Electrical and Electronics Engineering
Semester-V
LINEAR CONTROL SYSTEMS

Course Code: EEE-503

L	T	P
3	1	0

Unit-I **Lectures -7**

INTRODUCTION: Open loop and closed loop control systems, feedback, effects of feedback, linear and non-linear control systems, Servomechanism.

MODELLING: Mathematical models of linear electrical, mechanical, translational, rotational and thermal systems, electrical and mechanical analogies. Laplace transforms and transfer function, block diagram representation, signal flow graphs, characteristic equation.

Unit-II **Lectures -9**

TIME DOMAIN ANALYSIS: Standard test signals, transient response of the first order, second order systems, steady state error and error coefficients.

STABILITY: Concept of absolute and relative stability, Necessary conditions for stability, pole - zero location, Routh – Hurwitz criterion.

Unit-III **Lectures -9**

FREQUENCY DOMAIN ANALYSIS: Closed loop frequency response, correlation between time and frequency response, Bode diagram, polar plots, log magnitude vs. phase plot.

STABILITY IN FREQUENCY RESPONSE: Nyquist stability criterion, stability analysis, relative stability , Gain margin and phase margin.

Unit-IV **Lectures -8**

COMPENSATION DESIGN: Necessity of compensation, compensating network, phase lag compensation, phase lead compensation, phase lag and lead compensation.

CONTROL SYSTEM COMPONENTS: Error detectors – potentiometers and synchros, stepper motor, servo motor, ac and dc tachogenerators.

Recommended Books:

1.Control System Engineering by I.J.Nagrath & M.Gopal.
2. Modern Control Engineering by K.Ogata (PHI)
3. Automatic Control System by B.C.Kuo (PHI)
4. Control System Components by J.F.Gibsen (MGH)

B.Tech. Electrical and Electronics Engineering
Semester-V
POWER ELECTRONICS

Course Code: EEE-504

L	T	P
3	1	0

Unit I **Lectures -08**

Power electronics devices: Role of power electronics, construction and characteristics of power diode, power transistor, power MOSFET, SCR, GTO, TRIAC & DIAC. SCR: two transistor model, methods of turn-on, R, RC and UJT firing circuit and other firing circuits based on ICs and microprocessors, commutation techniques, series and parallel operation.

Unit II **Lectures -10**

Phase-controlled converters (AC to DC converters): one, two, three, six and twelve pulse converters, fully and half controlled converters, load voltage waveforms with different types of loads, output voltage equations, continuous and discontinuous modes of operation, input power factor of converter, reactive power demand, effect of source inductance, introduction to four quadrant/dual converter.

Unit III **Lectures -08**

Cycloconverters (AC to AC converter): basic principle of frequency conversion, types of cycloconverter, non-circulating and circulating types of cycloconverter, principle of operation of step up and step down cycloconverter, single-phase to single-phase cycloconverter with resistive and inductive load. Three-phase to single-phase cycloconverter: half wave and full wave, three-phase to three-phase cycloconverter, output voltage equation of cycloconverter.

Unit IV **Lectures -08**

Choppers (DC to DC converter): classification of choppers, principle of operation, steady state analysis of class-a choppers, step up chopper, steady state analysis, current commutated and voltage communicated copper, basic scheme, output voltage control techniques, one, two and four quadrant choppers, voltage commutated chopper, current commutated chopper.

Recommended Books:

1. ,"Power Electronics: Circuits, Devices & Applications" by M.H. Rashid, Prentice Hall of India Ltd, 2004.
2. "Power Electronics" by P.S. Bimbhra, Khanna Publishers, 2006.
3. "Power Electronics" by M.D. Singh and K.B. Khanchandani, Tata MC Graw Hill Pub, 2005.
4. "Power Electronics: Converters, Applications and Design" by Ned Mohan, T.M. Undeland

B.Tech. Electrical and Electronics Engineering
Semester-V
ELECTROMAGNETIC FIELD THEORY

Course Code: EEE-505

L	T	P
3	0	0

Unit-I **Lectures -10**

Introduction: Review of vector analysis, scalar and vector product, gradient, divergence and curl of a vector and their physical interpretation, transformation amongst rectangular, cylindrical and spherical co-ordinate system

Electrostatic field: Coulomb's law, electric field intensity from point charges, Electric field due to continuous field distribution of charges, gauss's law, electric displacement and displacement density, potential functions, potential field of a charge, laplace's and poission's equation, capacitance and electrostatic energy.

Unit-II **Lectures -8**

Steady magnetic fields: Faraday Induction law, Ampere's Work law in the differential vector form, Ampere's law for a current element, magnetic field due to volume distribution of current and the Dirac-delta function, Ampere's Force Law, magnetic vector potential, vector potential (Alternative derivation), equation of continuity.

Unit-III **Lectures -10**

Time varying fields: Equation of continuity for time varying fields, inconsistency of Ampere's law, Maxwell's field equations and their interpretation; solution for free space conditions, electromagnetic waves in a homogeneous medium, propagation of uniform plane-wave, relation between E & H in a uniform plane-wave, wave equations for conducting medium, Maxwell's equations using phasor notation, wave propagation in a conducting medium, conductors, dielectrics, wave propagation in good conductor and good dielectric, depth of penetration, polarization: linear, circular and elliptical.

Unit-IV **Lectures -8**

Reflection and refraction of EM waves: Reflection and refraction of plane at the surface of a perfect conductor & perfect dielectric (both normal incidence as well as oblique incidence), Brewster's angle and total internal reflection, reflection at the surfaces of a conductive medium, surface impedance, transmission-Line analogy, poynting theorem, interpretation of E x H, power loss in a plane conductor.

Unit- V **Lectures -8**

Transmission line theory: Transmission line as a distributed circuit, transmission line equation, traveling & standing waves, characteristic impedance, input impedance of terminated line, reflection coefficient, VSWR, Smith's chart and its applications.

Recommended Books:

1. Electro-magnetic Waves and Radiating System by Jordan & Balmain, PHI.
2. Electromagnetic field theory by PV Gupta.
3. Engineering Electromagnetic by Hayt; TMH
4. Electro-Magnetics by Krauss J.DF; Mc Graw Hill.

B.Tech. Electrical and Electronics Engineering
Semester V
SIGNALS AND SYSTEMS

Course Code: EEE-506 **L T P**
3 1 0

Unit I **Hours 8**

Signals: Definition, types of signals and their representations: continuous-time/discrete-time, periodic/non-periodic, even/odd, energy/power, deterministic/ random, one dimensional and multidimensional; commonly used signals (in continuous-time as well as in discrete-time): unit impulse, unit step, unit ramp (and their interrelationships), exponential, rectangular pulse, sinusoidal; operations on continuous-time and discrete-time signals (including transformations of independent variables).

Unit II **Hours 8**

Systems: Classification, linearity, time-invariance and causality, impulse response, characterization of linear time-invariant (LTI) systems, unit sample response, convolution summation, step response of discrete time systems, stability. convolution integral, co-relations, signal energy and energy spectral density, signal power and power spectral density, properties of power spectral density,

Unit III **Hours 8**

Laplace-Transform (LT) and Z-transform (ZT):

(i) One-sided LT of some common signals, important theorems and properties of LT, inverse LT, solutions of differential equations using LT, Bilateral LT, Regions of convergence (ROC)

(ii) One sided and Bilateral Z-transforms, ZT of some common signals, ROC, Properties and theorems, solution of difference equations using one-sided ZT, s- to z-plane mapping

Unit IV **Hours 8**

Fourier Transforms (FT):

(i) Definition, conditions of existence of FT, properties, magnitude and phase spectra, Some important FT theorems, Parseval's theorem, Inverse FT, relation between LT and FT

(ii) Discrete time Fourier transform (DTFT), inverse DTFT, convergence, properties and theorems, Comparison between continuous time FT and DTFT

Unit V **Hours 8**

Time and frequency domain analysis of systems

Analysis of first order and second order systems, continuous-time (CT) system analysis using LT, system functions of CT systems, poles and zeros, block diagram representations; discrete-time system functions, block diagram representation, illustration of the concepts of system bandwidth and rise time through the analysis of a first order CT low pass filter

Text Book: P. Ramakrishna Rao, `Signal and Systems' 2008 Ed., Tata McGraw Hill, New Delhi

Reference Books:

1. Chi-Tsong Chen, `Signals and Systems', 3rd Ed., Oxford University Press, 2004
2. V. Oppenheim, A.S. Willsky and S. Hamid Nawab, 'Signals & System', Pearson Education, 2nd Ed., 2003.

B.Tech. Electrical and Electronics Engineering
Semester V
MICROPROCESSOR LAB

Course Code: EEE-551 **L T P**
0 0 2

1.Simple programs for sorting a list of numbers in ascending and descending order.
2. To find the largest and smallest number in an array of data using 8085 instruction set.
3. Sorting a list without destroying the original list.
4. Code conversion - Binary to Gray/Gray to Binary.
5. Program for addition of BCD numbers.
6. Program for multiplication of 8-bit numbers .
7. Interface an LED array and 7-segment display through 8255 and display a specified bit pattern/character sequence at an interval of 2 seconds.
8. Interface the given microprocessor kit to a personal computer through R.S-232C. The band rate is specified. Verify data transfer in both directions (P - PC and PC - P)

1. Assembly language programming of 8086

B.Tech. Electrical and Electronics Engineering
Semester V

ELECTRONICS WORKSHOP AND PCB

Course Code: EEE-552	**L**	**T**	**P**
	0	**0**	**2**

List of experiments

1. Study of CRO, DMM & Function Generator
2. Identification of Active & Passive Components
3. Winding shop: Step down transformer winding of less than 5VA.
4. Soldering shop: Fabrication of DC regulated power supply
5. PCB Lab: (a) Artwork & printing of a simple PCB. (b) Etching & drilling of PCB.
6. Wiring & fitting shop: Fitting of power supply along with a meter in cabinet.
7. Testing of regulated power supply fabricated.

B.Tech. Electrical and Electronics Engineering
Semester-V
CONTROL SYSTEM LAB

Course Code: EE-553

L	T	P
0	0	2

LIST OF EXPERIMENTS

(1) To Study the step response of a second order system for different damping factors.
(2) To plot the speed torque characteristics of a 2 phase AC servomotor.
(3) To plot the torque speed characteristics of a DC servomotor.
(4) To study the closed loop control of a three phase AC motor.
(5) To study the performance characteristics of a D.C. motor angular position control system.
(6) To study the magnetic amplifier.
(7) To Study the synchro transmitter rotor position versus stator voltages for three phase.
(8) To Study the microcontroller based stepper motor controller circuit.
(9) To Study various lag-lead compensation networks.

Note: At least eight experiments to be performed from above list.

B.Tech. Electrical and Electronics Engineering
Semester-V
POWER ELECTRONICS LAB

Course Code: EEE-554

L	T	P
0	0	2

LIST OF EXPERIMENTS:

1. Experiment to study characteristics of diode, SCR and TRIAC.
2. Experiment to study characteristics of transistor and MOSFET.
3. Experiment to study R and R-C firing circuits.
4. Experiment to study UJT firing circuit.
5. Experiment to study AC phase control.
6. To study three-phase full-wave uncontrolled rectifier operation with R and R-L load and observe its input/output characteristics.
7. Experiment to study dc chopper.
8. Experiment to study single-phase cycloconverter characteristics.
9. To study single-phase full wave controlled rectifier using SCR and UJT with R and R-L load and observe its input/output characteristics with and without freewheeling (commutating) diode.
10. Experiment to study Lamp-Dimmer circuit using Diac & Triac with lamp load.

Note: At least eight experiments have to be performed in the semester from the above list.

6th Semester

B.Tech. Electrical and Electronics Engineering
Semester VI
COMMUNICATION ENGINEERING

Course Code: EEE-601 **L T P**
3 1 0

Unit 1 **Hour 9**

Introduction: Overview of Communication system, Communication channels Need for modulation, Baseband and Pass band signals, Amplitude Modulation: Double side band with Carrier (DSB-C), Double side band without Carrier, Single Side Band Modulation, DSB-SC, DSB-C, SSB Modulators and Demodulators, Vestigial Side Band (VSB), Quadrature Amplitude Modulator, Radio Transmitter and Receiver.

Unit II **Hour 8**

Angle Modulation, Tone Modulated FM Signal, Arbitrary Modulated FM Signal, FM Modulators and Demodulators, Approximately Compatible SSB Systems, Stereophonic FM Broadcasting, Examples Based on Mat Lab.

Unit III **Hour 9**

Pulse Modulation Digital Transmission of Analog Signals: Sampling Theorem and its applications, Pulse Amplitude Modulation (PAM), Pulse Width Modulation, Pulse Position Modulation. Their generation and Demodulation, Digital Representation of Analog Signals, Pulse Code Modulation (PCM), PCM System, Issues in digital transmission: Frequency Division Multiplexing, Time Division Multiplexing.

Unit IV **Hour 8**

Differential Pulse Code Modulation, Delta Modulation. Adaptive Delta Modulation, Voice Coders, Sources of Noises, Frequency domain representation of Noise, Super position of Noises, Linear filtering of Noises ,Mathematical Representation of Noise.

Unit V **Hour 8**

Noise in Amplitude Modulation: Analysis ,Signal to Noise Ratio, Figure of Merit ,Noise in Frequency Modulation: Pre emphasis ,De Emphasis and SNR Improvement, Phase Locked Loops Analog and Digital

Text Book

H. Taube, D L Schilling, Goutom Saha, “Principles of Communication”, 3rd Edition, Tata McGraw-Hill Publishing Company Ltd.

Reference Books

1. B.P. Lathi, “Modern Digital and Analog communication Systems”, 3rd Edition, Oxford University Press, 2009.
1. Simon Haykin, “Communication Systems”,4th Edition, Wiley India.
2. H. P. HSU & D. Mitra , “Analog and Digital Communications”, 2nd Edition, Tata McGraw-Hill Publishing Company Ltd.

B.Tech. Electrical and Electronics Engineering
Semester-VI
SWITCHGEAR AND PROTECTION

Course Code: EEE-602

L	T	P
3	1	0

Unit-I **Lectures -8**

Relays: Operating Principles, constructional features and characteristics of relays. Relay classification, principal types of electromagnetic relays, theory of Induction relays, relay design, general equation for electromagnetic relays, general equation of comparators, Overcurrent relays, instantaneous over current relay, Directional relays, Distance relays, Differential relays.
Feeder Protection: Overcurrent protection, Distance protection, Pilot protection.

Unit-II **Lectures -8**

Apparatus Protection: Transformer protection, C.T.s, P.T.s and their application in protective schemes.
Static Relays: Basic concepts, Input Output devices and circuits, Phase and amplitude comparator, general organization of static relays.

Unit-III **Lectures -8**

Protection Against Over Voltages: Ground wire, shielding angle, rod gap, horn gap, impulse gap, valve type and non linear arrestors, surge absorbers.
Fuses: Types, ratings, theory and characteristics, characteristics and construction of HRC fuses.

Unit-IV **Lectures -8**

Theory of Circuit Interruption: Physics of arc interruption, maintenance of arc, arc interruption theories. Circuit Constants In Relation To Circuit Breaking: Circuit breaker rating, circuit constants and circuit conditions, Restriking voltage.
Theory Of Circuit Breakers: Air break circuit breaker, oil circuit breaker, Air blast circuit beaker, Vacuum circuit breaker, SF_6 circuit breaker, circuit breaking in HVDC systems, Testing and maintenance of circuit breakers. Introduction to gas insulated switchgear.

Recommended Books:

1. A course in Electrical Power by Soni, Gupta, Bhatnagar.
2. Power System Protection and Switchgear by B.Ravinder Nath & M.Chander, Willy Eastern.
3. Switchgear and Protection by Sunil S.Rao.
4. Art and Science of Protective relaying by C.R.Mason, John Wiley.
5. Electrical Power Systems by C.L.Wadhwa.

B.Tech. Electrical and Electronics Engineering
Semester VI
MICROWAVE AND RADAR ENGINEERING

Course Code: EEE-603 **L T P**
3 1 0

Unit I **Hours 8**
Rectangular Wave Guide: Field Components, TE, TM Modes, Dominant TE10 mode, Field Distribution, Power, Attenuation. Circular Waveguides: TE, TM modes. Wave Velocities, Micro strip Transmission line (TL), Coupled TL, Strip TL, Coupled Strip Line, Coplanar TL, Microwave Cavities,

Unit II **Hours 8**
Scattering Matrix , Passive microwave devices: Microwave Hybrid Circuits. , Terminations, Attenuators, Phase Shifters, Directional Couplers: Two Hole directional couplers, S Matrix of a Directional coupler, Hybrid Couplers, Microwave Propagation in ferrites, Faraday Rotation, Isolators, Circulators. S parameter analysis of all components.

Unit III **Hours 8**
Microwave Tubes: Limitation of Conventional Active Devices at Microwave frequency, Two Cavity Klystron, Reflex Klystron, Magnetron, Traveling Wave Tube, Backward Wave Oscillators: Their Schematic, Principle of Operation, Performance Characteristic and their applications.

Unit IV **Hours 8**
Microwave tunnel diode, Microwave Field-effect Transistor, Transferred electron devices, Avalanche Transit –time devices: IMPATT Diode, TRAPPAT Diode,
Microwave Measurements:
Measurement of frequency, Wave length, VSWR, Impedance, Attenuation, Low and high power. Radiation pattern

Unit V **Hours 8**
Principles of Radar:
Radar Block diagram operation, Radar Range equation, Radar Frequencies, Pulse and C.W. Radar, Introduction to Doppler and M.T. Radar, Applications.

Radar Transmitters & Devices:
Block diagram of radar receiver for C.W. and pulse radar, front end amplifier, Receiver noise figure, Duplexers Radar antennas, Radar Displays, Introduction to Radar clutter.

Text Books:
1. Samuel Y. Liao, “Microwave Devices and Circuits”, 3rd Ed, Pearson Education.
2. A. Das and S. K. Das, “Microwave Engineering”, TMH.
Reference Books:
1. R.E Collin, “Foundation for Microwave Engineering “, 2nd Ed., John Wiley India.

B.Tech. Electrical and Electronics Engineering
Semester-VI
FLEXIBLE ALTERNATING CURRENT TRANSMISSION SYSTEM (FACTS)

Course Code: EEE-605

L	T	P
3	1	0

Unit-I **Lectures -8**

Facts concepts: Electrical Transmission Network, Necessity, Power Flow in AC System, Power Flow and Dynamic stability considerations of a transmission interconnection, relative importance of controllable parameter, opportunities for FACTS, possible benefits for FACTS Technology, FACTS Controllers: Types, brief description and definitions.

Unit-II **Lectures -8**

Static shunt compensators: SVC and STATCOM, Operation and Control of TSC and TCR, direct and indirect control of STATCOM. Decoupled control strategy, Compensators, Comparison between SVC and STATCOM, transient and dynamic stability enhancement using STATCOM. Principle and operation of Thyristor controlled dynamic brake.

Unit-III **Lectures -8**

Static series compensators: TSSC, TCSC and SSSC, Operation and Control, External System Control for Series Compensators, SSR and its damping, Static Voltage and Phase Angle Regulators, TCVR and TCPAR, Operation and Control, The Unified Power Flow Controller. Operation, Comparison with other FACTS devices, control of P and Q, Dynamic Performance.

Unit-IV **Lectures -8**

Custom facts controllers: Principle and operation of Thyristor controlled dynamic brake. Introduction to DSTATCOM, DVR, UPQC, Custom Power Park. Load compensation using DSTATCOM, distributed generation and grid interconnection, standards, power quality issues, islanding issues.

Recommended Books:

1. "Understanding FACTS – Concepts and Technology of Flexible AC Transmission Systems" by Narain G. Hingorani and Laszlo Gyugyi, Standard Publishers, New Delhi, 2001.
2. "Flexible AC Transmission Systems"by Y.H. Song and A.T. Johns(Ed), IEE Press, 2001.
3. "Thyristor Based FACTS Controller for Electrical Transmission Systems" by R. Mohan Mathur and Rajiv K. Varma, Wiley Interscience Publications, 2002
4. "Static Reactive Power Compensation" by T.J.E. Miller, John Wiley & Sons, New York, 1982.
5. "High Power Electronics in Flexible AC Transmission"by Narain G. Hingorani IEEE Power Engineering Review, 1998.
6. "Energy Systems Theory" by Olle I Elgard, TMH, 1986.

B.Tech. Electrical and Electronics Engineering
Semester VI
ENTREPRENEURSHIP DEVELOPMENT

Course Code: EEE-606 **L T P**
3 1 0

Unit I **(10 Hours)**

Entrepreneurship: Definition of Entrepreneur, Internal and External Factors, Functions of an Entrepreneur, Entrepreneurial motivation and Barriers, Classification of Entrepreneurship, Theory of Entrepreneurship, Concept of Entrepreneurship, Development of entrepreneurship; Culture, stages in entrepreneurial process.

Unit II **(10 Hours)**

Creativity and Entrepreneurial Plan: Idea Generation, Screening and Project Identification, Creative Performance, **Feasibility Analysis**: Economic, Marketing, Financial and Technical; **Project Planning:** Evaluation, Monitoring and Control segmentation. **Creative Problem Solving:** Heuristics, Brainstorming, Synectics, Value Analysis, **Innovation.**

Unit III **(10 Hours)**

International Entrepreneurship Opportunities: The nature of international entrepreneurship, Importance of international business to the firm, International versus domestics' entrepreneurship, Stages of economic development.

Institutional support for new ventures: Supporting Organizations; Incentives and facilities; Financial Institutions and Small scale Industries, Govt. Policies for SSIs.

Unit IV **(10 Hours)**

Family and Non Family Entrepreneur: Role of Professionals, Professionalism vs family entrepreneurs, Role of Woman entrepreneur.

Venture Capital: Venture capital, Nature and Overview, Venture capital process, locating venture capitalists**.**

Suggested Readings:

1. Couger, C- Creativity and Innovation (IPP, 1999)
2. Nina Jacob, - Creativity in Organisations (Wheeler, 1998)
3. Jonne & Ceserani - Innovation & Creativity (Crest) 2001.

B.Tech. Electrical and Electronics Engineering
Semester VI
COMMUNICATION LAB I

Course Code: EEE-651

L	T	P
0	0	2

1. To study DSB/ SSB amplitude modulation & determine its modulation factor & power in side bands.
2. To study amplitude demodulation by linear diode detector
3. To study frequency modulation and determine its modulation factor
4. To study PLL 565 as frequency demodulator.
5. To study sampling and reconstruction of Pulse Amplitude modulation system.
6. To study the Sensitivity, Selectivity, and Fidelity characteristics of super heterodyne receiver.
7. To study Pulse Amplitude Modulation
   a. using switching method
   b. by sample and hold circuit
8. To demodulate the obtained PAM signal by 2nd order LPF.
9. To study Pulse Width Modulation and Pulse Position Modulation.

B.Tech. Electrical and Electronics Engineering
Semester-VI
ELECTRICAL SIMULATION LAB

Course Code: EEE-652

L	T	P
0	0	2

LIST OF EXPERIMENTS

(1) Symmetrical fault level analysis on a d.c.network analyzer.
(2) Unsymmetrical fault level analysis on a d.c. network for various type of faults.
(3) Symmetrical fault level analysis on an a.c network analyzer.
(4) Unsymmetrical fault level analysis on an a.c network for various types of faults.
(5) To plot time current characteristics of Electromagnetic type over-current relay.
(6) To plot time-current characteristics of an IDMT relay.
(7) Performance and study of Merz-Price protection.
(8) Study of the performance and operation of a three phase over-current and earth fault static relay.

Note: At least six experiments to be done from above list.

B.Tech. Electrical and Electronics Engineering
Semester VI
MICROWAVE ENGINEERING LAB

Course Code: EEE-653 **L T P**
0 0 2

List of Experiments:

1. Measurement of guide wavelength and frequency of the signal in a rectangular waveguide.
2. Measurement of VSWR using slotted line.
3. Study of mode characteristics of reflex Klystron and determination of mode number, transit time & electronic tuning sensitivity.
4. Study of characteristics of Gunn oscillator.
5. Study of Gunn diode as modulated source (PIN modulation) and determination of modulation depth.
6. Measurement of coupling coefficient and directivity of a directional coupler.
7. Study of insulation & coupling coefficient of a magic T.
8. Measurement of attenuation using substitution method and plot of attenuation versus frequency characteristics.
9. Study of waveguide horn and its radiation pattern and determination of the beam width.
10. Study of a ferrite circulator and measurement of isolation, insertion loss, cross coupling and input VSWR.
11. Measurement of microwave power using power meter

B.Tech. Electrical and Electronics Engineering
Semester VI
VHDL LAB

Course Code: EEE-654	**L**	**T**	**P**
	0	**0**	**2**

List of Experiments:

1. HDL Code to realize all the logic gates.
2. Design of 2-to-4 decoder
3. Design of 8-to-3 encoder (without and with priority)
4. Design of 8-to-1 multiplexer
5. Design of 4 bit Binary to Gray code converter
6. Design of Multiplexer/ Demultiplexer , comparator
7. Design of Full Adder using 3 modeling styles
8. Design of Flip Flops: SR, D, JK,T(Asynchronous Reset and Synchronous Reset)
9. Design of 4-bit binary, BCD Counters(Asyn Reset and Syn Reset) or any Sequence Counter
10. Finite State Machine Design

7th Semester

B.Tech. Electrical and Electronics Engineering
Semester-VII
COMPUTER APPLICATIONS TO POWER SYSTEM ANALYSIS

Course Code: EEE-701

L	T	P
3	1	0

Unit-I **Lectures -9**

Representation of Power System components: Per unit System, Representation of Power System Components, Regulating Transformers (Tap changing & Phase Shifting), Generators, Transmission line and loads, Single line diagram and the impedance diagrams, Z-bus and Y-Bus formulation, building algorithm.

Unit-II **Lectures -10**

Load Flow Study: Load Flow Problem, Power Flow Equations, Load Flow solution using Gauss-Siedel and Newton-Raphson methods, Decoupling between real and reactive Power, Decoupled and Fast Decoupled load flow Methods, Comparison of Load Flow Methods, Reactive Power compensation and voltage control.

Unit-III **Lectures -08**

Symmetrical Components: Symmetrical component transformation, power invariance, significance of positive, negative and zero sequences, phase shift in star-delta transformer, Sequence Impedance of Transmission line, Transformer and Generators, Sequence Networks of power systems.

Unit-I **Lectures -08**

Unsymmetrical Fault Analysis: Symmetrical component analysis for unsymmetrical faults, single line to ground fault, line to line fault, and double line to ground fault, Open conductor fault, Bus Impedance matrix method for the analysis.

Recommended books

1. "Modern Power System Analysis" by Nagrath & Kothari, Tata Mcgraw Hill (2001).
2. "Power System Analysis" by Hadi & Sadat Tata McGraw Hill. (2002).
3. Power System Analysis, by Grainger J.D McGraw-Hill, Inc, Singapore.
4. Power Generation, Operation and Control by Wood A.J. and Wollenberg B.F., John Wiley & Sons, New York, USA.
5. Power System Analysis & Design by Glover J.D. and Sarma,PWS Publishing Company, Boston, USA.
6. Computer Methods in Power System Analysis by Stagg G. W. and Elabiad A. H., McGraw Hill, New York
7. Power system Analysis and Design by B.R. Gupta

B.Tech. Electrical and Electronics Engineering
Semester VII
DIGITAL SIGNAL PROCESSING

Course Code: EEE 702 **L T P**
3 1 0

Unit-I **Hours-8**

INTRODUCTION TO SIGNALS AND SYSTEMS
Signals and classification of signals, Basic continuous time signals, Basic discrete time signals, Systems and classification of signals, Basic signals - Impulse function, Unit step function, Unit ramp function, Sinusoidal and exponential signals, even and odd signals, casual and non causal system, Periodic non-periodic signals , energy and power signals.

Unit II **Hours 8**
The Z-Transform:
Introduction to Z-Transform & Inverse Z-Transform-Transform Theorems & Properties. Relation to Fourier Transform. Rational Z-Transform & System Function ,One-sided Z Transform and solution of Difference Equations. Stability- Time-Domain& Frequency Domain Analysis

Unit III **Hours 8**
Discrete Fourier Transforms:
Definitions, Properties of the DFT,Circular Convolution, Linear Convolution

Fast Fourier Transform Algorithms:
Introduction, Decimation –In Time(DIT) Algorithm, Computational Efficiency, Decimation in Frequency(DIF) Algorithm

Unit IV **Hours 8**
Realization of Digital Systems:
Introduction, direct form realization of IIR systems, cascade realization of an IIR systems, parallel form realization of an IIR systems, Ladder structures: continued fraction expansion of H(z), example of continued fraction, realization of a ladder structure, example of a ladder realization
.

Unit V **Hours 8**
Finite Impulse Response Filter Design:
Windowing and the Rectangular Window, Other Commonly Used Windows, Examples of Filter Designs Using Windows ,The Kaiser Window

Design of Infinite Impulse Response Digital Filters:
Introduction to Filters, Impulse Invariant Transformation, Bi-Linear Transformation, All-
Pole Analog Filters: Butterworth and Chebyshev, Design of Digital Butterworth and Chebyshev Filters

Text Books: Johnny R. Johnson, “Digital Signal Processing”, PHI Learning Pvt Ltd., 2009.
Reference Books:
1. John G Prokias, Dimitris G Manolakis, “Digital Signal Processing”, Pearson Education.
2. Oppenheim & Schafer, “ Digital Signal Processing” PHI

B.Tech. Electrical and Electronics Engineering
Semester-VII
HIGH VOLTAGE ENGINEERING

Course Code: EEE-706

L	T	P
3	1	0

Unit-I **Lectures -8**

Discharges In Gases: General characteristics of gaseous insulation, basic processes of ionization in a gas, discharges in uniform and non-uniform fields, Paschen's law, Corona discharges due to direct and alternating voltage, commonly used gases for insulation and their properties.

Unit-II **Lectures -8**

Breakdown Of Solids And Liquids: Different mechanisms of breakdown of solids, Intrinsic breakdown, theories of intrinsic breakdown, different theories of breakdown in liquids, commonly used solid and liquid insulating materials and their properties.

Lightning Phenomenon: Charge accumulation in clouds – formation of lightning stroke, characteristics of lightning stroke, current and voltage magnitudes, protection of transmission lines and substations against lightning, lightning arrestors, switching surges, Insulation co-ordination.

Unit-III **Lectures -8**

High Voltage Testing Equipment: Cascade connection of transformers, generation of high direct voltage by voltage doubler circuit and Cockrort Walton circuit.

Impulse Generator: Definition of impulse wave, single stage and multistage impulse generators and equivalent circuits, determination of front and tail resistance to produce a given wave shapes.

High Voltage Measurements: Measurement of ac, dc and impulse voltage, sphere gap, resistance and capacitance potential dividers, standard capacitors, High voltage measurements by measuring rectified current of a standard capacitor, Electrostatic voltmeter, Impulse voltage measurement by Cathode Ray Oscillograph.

Unit-IV **Lectures -8**

HVDC: Merits and demerits of HVDC transmission systems, types of HVDC systems, bipolar, monopolar, back-to-back, Normal operation of an H.V.D.C link, Energy considerations in breaking direct current in H.V.D.C. circuit breakers, HVDC system requirement, Typical layout of an HVDC substation.

Recommended Books:

1. High Voltage Engineering by M.S.Naidu & V.Kamaraju.
2. Power System Transients and High Voltage Principles – by B.Thapar, B.R.Gupta & L.K.Khera.
3. High Voltage Engineering – by C.L.Wadhwa.
4. A course in Electrical power by Soni, Gupta, Bhatnagar.

B.Tech. Electrical and Electronics Engineering
Semester-VII
COMPUTER APPLICATIONS TO POWER SYSTEM ANALYSIS LAB
Course Code: EEE-751

L	T	P
0	0	2

LIST OF EXPERIMENTS

APPLICATION OF STANDARD COMPUTER SOFTWARE FOR:

1. Determination of sequence impedances of a transmission line.
2. Fault calculation of power systems.
3. Power Flow Studies.
4. Power Flow control.
5. Transient Stability Studies.

B.Tech. Electrical and Electronics Engineering
Semester VII
DIGITAL SIGNAL PROCESSING LAB

Course Code: EEE 752

L	T	P
0	0	2

List of Experiments

1. Study of Floating Point Digital Signal Processor & Fixed Point Digital Signal Processor
2. Realisation of Circular & Linear Convolution and Correlation of two sequences.
3. Computation of DFT&IDFT of a given Sequence using DSP Processors
4. Radix-2 & Radix-4 algorithm FFT Calculation using DSP Processors
5. FIR & IIR Filter Implementation using the DSP Processors.
6. Basics of MATLAB-Realisation of Unit Impulse, Unit Step & Unit Ramp signals
7. Linear & Circular Convolution of two Sequences, Correlation of two sequences
8. DFT&IDFT Computation
9. Radix-2&Radix-4 algorithm FFT Calculation
10. Generation of Gaussian Distributed Numbers

B.Tech. Electrical and Electronics Engineering
Semester-VII
NEURAL NETWORKS AND FUZZY LOGIC LAB

Course Code: EEE-753

L	T	P
0	0	2

List of MATLAB Programs to be done

1) Write a MATLAB program to compute determinant and inverse of a square matrix A defined by:

$$A=\begin{pmatrix} 2t & t & \\ 3 & 6 & 2t-1 \\ 2 & t-1 & 3t \end{pmatrix}$$; at different values of t.

2) Write MATLAB script to plot the waveform defined by:

$$y=f(t)=3e^{-4t}\cos 5t - 2e^{-3t}\sin 2t + \frac{t^2}{t+1}$$

3) Write a MATLAB function to obtain conversion table from Celsius to Fahrenheit temperatures. The input of the function should be two numbers: ti and tf, specifying the lower and upper range of the table in Celsius. The output should be a two-column matrix: the first column showing the temperatures in Celsius from ti to tf in the increments of 1^{o}C and the second column showing corresponding temperatures in Fahrenheit.
4) Write MATLAB Program to defuzzify the fuzzy values by ***Centroid*** method for Trapezoidal and Triangular membership functions.
5) Write MATLAB Program to create a Fuzzy Inference System for water heating control using ***newfis.***
6) To develop **Fuzzy Inference System** (FIS) comprising of two-input, one-output and rule-base for a Washing Machine using FIS editor of Fuzzy Logic toolbox.
7) Write MATLAB Program to create a Perceptron model using ***newp*** command and apply it on linearly separable classification problems.
8) Write MATLAB Program to create a 2-layer Feed forward Neural Network to approximate the function y=f(x) using command ***newff.***

ELECTIVE-I

B.Tech. Electrical and Electronics Engineering
INTRODUCTION TO RADAR SYSTEMS

Course Code	**L**	**T**	**P**
	3	**1**	**0**

Unit-I **Hours-8**

Introduction to Radar: Basic Radar, The Simply Form of the Radar Equations, Radar Block Diagram, Radar Frequencies, Applications of Radar. The Radar Equation: Detection of Signals in Noise, Receiver Noise and the Signal-to-Noise Ratio, Probabilities of Detection and False Alarm, Integration of Radar Pulses, Radar Cross Section of Targets, Radar Cross- Section of Targets, Radar Cross-Section Fluctuations, Transmitter Power, Pulse Repetition Frequency, Antenna Parameters, System Losses,

Unit-II **Hours-8**

MTI and Pulse Doppler Radar: Introduction to Doppler and MTI Radar, Delay-Line Cancelers, Staggered Pulse Repetition Frequencies, Doppler Filter Banks, Digital MTI Processing, Moving Target Detector, Limitations to MTI Performance.

Unit-III **Hours-8**

Tracking Radar: Tracking with Radar, Mono pulse Tracking, Conical Scan and Sequential Lobing, Limitations to tracking Accuracy, Low- Angle Tracking, Tracking in Range, Other Tracking Radar Topics, Comparison of Trackers, Automatic Tracking with Surveillance Radars(ADT)

Unit-IV **Hours-8**

Detection of Signals in Noise: Introduction, Detection Criteria, Detectors, Automatic Detection, Integrators, Constant-False-Alarm Rate Receivers.

Unit-V **Hours-8**

Information from Radar Signals: Basic Radar Measurements, Theoretical Accuracy of Radar Measurements, Ambiguity Diagram, Pulse Compression, Target Recognition, Land Clutter, Sea Clutter, Weather Clutter

Text/ Reference Books:

1. Merrill I. Skolnik " Introduction to Radar Systems" Third Edition.
2. J.C. Toomay , Paul J. Hannen " Principles of Radar" Third Edition.

B.Tech. Electrical and Electronics Engineering
DIGITAL SYSTEM DESIGN USING VHDL

Course Code:	**L**	**T**	**P**
	3	**1**	**0**

Unit-I Digital Design **Hours-8**

Logic Gates, Minimization of logic gates using K- map method, Combinational circuits, Binary Adder-Subtractor, Decimal Adder, Binary Multiplier, Magnitude Comparator, Decoders, Encoders, Multiplexers, De-multiplexers.

Unit-II Introduction to VHDL **Hours-8**

Introduction to VHDL, Capabilities, Hardware Abstraction, Basic Terminology, Entity Declaration, Architecture Body, Configuration Declaration, Package Declaration, Package Body, Identifiers, Data Objects, Data Types, Operators.

Unit-III Behavioral Modelling **Hours-8**

Entity Declaration, Architecture Body, Process Statement, Variable Assignment Statement, Signal Assignment Statement, Wait Statement, if Statement, Case Statement, Null Statement, Loop Statement, Exit Statement Assertion Statement, Report Statement, Other Sequential Statement, Multiple Processes, Postponed Processes.

Unit-IV Dataflow Modelling **Hours-8**

Concurrent Signal Assignment Statement, Concurrent Versus Sequential Signal Assignment, Delta Delay, Multiple Drivers, Conditional Signal Assignment Statement, Selected Signal Assignment Statement, Unaffected Value, Block Statement, Concurrent Signal Assignment Statement, Value of signal

Unit-V Structural Modelling and Generic **Hours-8**

Component Declaration, Component Instantiation, Resolving Signal Values, Some Basic Examples, Generics, Why Configuration, Configuration Specification, Configuration Declaration, Default Rules, Sub programs and Overloading (Brief).

TEXT BOOKS:

1. Bhasker .J ,VHDL Primer , 3rd Edition,PearsonEdu./PrenticeHall,2003
2. Perry ,VHDL Programming By Example ,4th ,Tata Mcgraw-Hills,2004

REFERENCE BOOKS:

1. Skaill ,VHDL for Programming Logic ,1st Ed.Pearson Edu.,2005.
2. Bedin Zainala,VHDL Analysis & Modeling of Digital System ,2nd Ed. MC Graw Hill,1998

B.Tech. Electrical and Electronics Engineering
ELECTRICAL ENERGY UTILIZATION

Course Code: EEE-704

L	T	P
3	1	0

Unit-I **Lectures -10**

Electric traction: Different systems of traction – their comparison, types of motors for traction, systems of track electrification, speed time curves, energy consumption. Current collection system: Conductor rail system, overhead equipment system – Pole collector, bow collector, Pantograph collector. Control of dc motors: Series parallel control, drum controller, contactor type controller, energy saving with series parallel starting. Mechanics of braking: Mechanical brakes, Electric braking – Plugging, rheostatic braking, regenerative braking. An idea of Traction System such as tram, Metro Trains and Magnetic Lavitation.

Unit-II **Lectures - 8**

Electric energy as light: Production of light by different methods, units of quantities used in study of light, Laws of illumination, different light sources – their construction and operating principle, design of lighting schemes and equipment used, Indoor, roadway, industrial and flood lighting.

Unit-III **Lectures - 8**

Electric heating: Different methods of electric heating, Constructional details and performance of resistance heating furnaces, heating elements design, direct and indirect induction and arc furnaces, estimation of power and energy requirement, power supply problems.

Unit-IV **Lectures - 6**

Electrical welding: AC and DC welding, resistance arc and atomic hydrogen welding, electron beam welding, ultrasonic welding, laser welding, different types of control equipment used for controlling temperature and pressure in arc and resistance welding, welding transformer.

Recommended Books:

1. "Art and Science of Utilization of Electrical Energy" by H. Partab, Dhanpat Rai & Co., Delhi, 2001
2. "Utilization of Electrical Energy" by Openshaw Taylor Orient Longman Pub. 2000
3. "Utilization of Electrical Energy & Electric Traction" by J.B. Gupta, S.K. Kataria, Delhi. 2004

ELECTIVE-II

B.Tech. Electrical and Electronics Engineering
EMBEDDED SYSTEMS

Course Code:	**L**	**T**	**P**
	3	**1**	**0**

UNIT 1 **Hours 8**

Introduction: Introduction to embedded system, Classification of embedded system, Needs of embedded system, Different types of microcontrollers: Embedded microcontrollers, External memory microcontrollers; Processor architectures: Harvard V/S Princeton, CISC V/S RISC; Microcontrollers memory types; Microcontrollers features: Clocking, I/O pins, Interrupts, Timers, Peripherals**.**

UNIT – II **Hours 8**

Microcontroller Architecture: Introduction to PIC microcontrollers, Pin description and block diagram of PIC16C61 and PIC16C62, PIC reset circuit, Architecture and pipelining, Program memory considerations, Addressing modes, CPU registers, Instruction set, Simple operations.

UNIT-III **Hours 8**

Interrupts and I/O Ports: Interrupt logic, Timer2 scalar initialization, IntService interrupt service routine, Loop time subroutine, External interrupts and timer 0, timer 1, Pulse-width modulated outputs, Synchronous serial port module, Serial peripheral device, O/P port Expansion, I/P port expansion, UART

UNIT-IV **Hours 8**

Programming with Microcontrollers: Arithmetic operations, Bit addressing, Loop control, Stack operation, Subroutines, RAM direct addressing, State machines, Oscillators, Timer Interrupts, Memory mapped I/O.

UNIT V **Hours 8**

Designing using Microcontrollers: Marya's music box, Mouse wheel turning, Remote operation control with an infrared TV remote control, RS-232 interface, Aircraft demonstration, Light sensors for robots, Ultrasonic distance measuring, Temperature Sensor.

Text Book:

1. Design with PIC Microcontrollers by John B. Peatman , Pearson.

Reference Books:

1. Programming and Customizing the 8051 Microcontroller : Predko ; TMH.
2. Designing Embedded Hardware : John Catsoulis ;SHROFF PUB. & DISTR. N

B.Tech. Electrical and Electronics Engineering
ARTIFICIAL NEURAL NETWORKS

Course Code:	**L**	**T**	**P**
	3	**1**	**0**

Unit-I **Hours-8**

Introduction:
Introduction and history, human brain, biological neuron, models of neuron, signal flow graph of neuron, feedback, network architecture, knowledge representation, Artificial intelligence and neural networks.
Learning Process:
Error correction learning, memory based learning, Hebbian learning, competitive learning, Boltzmann learning, learning with and without teacher, learning tasks, memory and adaptation.

Unit-II **Hours-8**

Artificial neurons, Neural networks and architectures Introduction, neuron signal function, mathematical preliminaries, Feed forward & feedback architecture. Geometry of Binary threshold neurons and their networks Pattern recognition, convex sets and convex hulls, space of
Boolean functions, binary neurons for pattern classification, non linear separable problems, capacity of TLN, XOR solution.

Unit-III **Hours-8**

Perceptrons and LMS
Learning objective of TLN, pattern space & weight space, perceptron learning algorithm, perceptron convergence theorem, pocket algorithm, LMS learning, MSE error surface, steepest descent search, Back propagation and other learning algorithms Multilayered architecture, back propagation learning algorithm, practical considerations, structure growing algorithms, applications of feed forward neural networks, reinforcement learning

Unit-IV **Hours-8**

Statistical Pattern Recognition
Bayes' theorem, classical decisions with Bayes' theorem, probabilistic interpretation of neuron function, interpreting neuron signals as probabilities, multilayered networks & posterior probabilities, error functions for classification problems. RBF Networks Regularization networks, generalized RBF networks, RBF network for solving XOR problem, comparison of RBF networks & multilayer perceptrons. Stochastic Machines Statistical mechanics, simulated annealing, Boltzmann machine

Unit-V **Hours-8**

Adaptive Resonance Theory
Building blocks of adaptive resonance, Adaptive Resonance Theory 1. Self Organizing Feature MAP Introduction, Maximal eigenvector filtering, principal component analysis, generalized learning laws, competitive learning, vector quantization, Mexican hat networks

Text Books:

1. Kumar Satish, "Neural Networks", TMH
2. Simon Haykin, "Neural Networks", PHI

B.Tech. Electrical and Electronics Engineering
ELECTRICAL POWER QUALITY

Course Code: EEE-703

L	T	P
3	1	0

Unit-I **Lectures -9**

Introduction of Power Quality: General classes of power quality problems, effects of poor power quality on power system devices, standards and guidelines referring to Power Quality.

Unit-II **Lectures -8**

Voltage sags and interruptions: Sources of sags and interruptions, motor starting sags.
Transient Over voltages- Sources of transient over voltages, principles of over voltage protection, devices for over voltages protection.

Unit-III **Lectures -10**

Harmonic distortions: Power system quantities under non sinusoidal conditions, harmonic indices, harmonic sources from commercial and industrial loads, system response characteristics, effects of harmonic distortions, harmonic distortion evaluations, principles for controlling harmonics, IEEE-519 Standard on harmonics.

Unit-IV **Lectures -7**

Power Quality Monitoring: Monitoring considerations, Power Quality measurement equipments, assessment of power quality measurement data.

Recommended books

1. Electrical power systems quality- by Roger Dugan, Mc Granaghan, Santoso, Mc Graw Hill Publisher.
2. Power quality in power systems and electrical machines- by Ewald F Fuchs, M.A.S. Masoum, Elsevier Publisher.

B.Tech. Electrical and Electronics Engineering
ELECTRONIC SWITCHING

Course Code: ECE 802 **L T P**
3 1 0

Unit I **Hours 8**
Evolution of Switching systems: Introduction: Message switching, circuits switching, functions of a switching system, register-translator-senders, distribution frames, crossbar switch, a general trunking, electronic switching, Reed electronic system, digital switching systems.

Unit II **Hours 8**
Digital switching: Switching functions, space division switching, Time division switching, two dimensional switching, Digital cross connect systems, digital switching in analog environment

Unit III **Hours 8**
Telecom Traffic Engineering: Network traffic load and parameters, grade of service and blocking probability, modelling switching systems, incoming traffic and service time characterization, blocking models and loss estimates, Delay systems.

Unit IV **Hours 8**
Control of Switching Systems: Introduction, Call processing functions; common control, Reliability availability and security; Stored program control. Signalling: Introduction, Customer line signalling, AF junctions and trunk circuits, FDM carrier systems, PCM and inter register signalling, Common channel signaling principles, CCITT signalling system No. 6 and 7, Digital customer line signalling.

Unit V **Hours 8**
Packet Switching: Packets formats, statistical multiplexing, routing control, dynamic, virtual path circuit and fixed path routing, flow control, X.25 protocol, frame relay, TCP/IP, ATM cell, ATM service categories, ATM switching, ATM memory switch, space memory switch, memory-space, memory-space-memory switch, Banyan network switch.

Text Books:
1. Thiagarajan Viswanathan, “Telecommunication switching System and networks”, PHI.
2. J.E. Flood, “Telecommunication switching, Traffic and Networks”, Pearson education.
3. J.C. Bellamy, “Digital Telephony”, John Wiley, 3rd Ed

ELECTIVE-III

B.Tech. Electrical and Electronics Engineering
DIGITAL IMAGE PROCESSING

Course Code: **L T P**
3 1 0

Unit-I **Hours-8**

Introduction: Fundamental steps in DIP, elements of DIP, Simple image model, sampling & quantization, basic relationships between pixels, colour image model.

Unit-II **Hours-8**

Image Transforms: One-dimensional & two-dimensional DFT, cosine, sine, Hadamard, Haar, and Slant & KL transforms. Image Enhancement: Introduction, point operations, histogram modelling, spatial operations, Transform operations

Unit-III **Hours-8**

Image Restoration: Introduction, image observation models, Inverse & Wiener filtering, difference between enhancement & restoration Restoration-spatial filtering, Noise reduction in frequency domain.

Unit-IV **Hours-8**

Image Compression: Introduction, Pixel coding, Predictive coding, Transform coding, Inter-frame coding

Unit-V **Hours-8**

Image Segmentation: Introduction, Spatial feature extraction, Transforms features, Edge detection, Boundary extraction, Segmentation techniques.

Text Books:

1. Rafael C. Gonzalez Richard E Woods, "Digital Image Processing", Pearson, 3rd Ed. 2009.
2. Anil K Jain, "Fundamentals of Digital Image Processing", PHI.

B.Tech. Electrical and Electronics Engineering
VLSI DESIGN

Course Code: **L T P**
3 1 0

Unit-I **Hours-8**

Introduction: Overview of VLSI Design Methodologies, VLSI Design Flow, Design Hierarchy, Concepts of Regularity, Modularity and Locality. MOSFET Fabrication: Fabrication process flow, NMOS and CMOS fabrication, layout design rules, stick diagram and mask layout design.
MOS Transistor : MOS Structure, The MOS System under external bias, Operation of MOSFET, MOSFET - Current /Voltage Characteristics, Scaling and Small geometry effects and capacitances

Unit-II **Hours-8**

MOS Inverters: Introduction, Resistive Load Inverter, Inverters with n-type MOSFET load, CMOS Inverter. MOS Inverters - Switching Characteristics: Introduction, Delay – Time Definitions, Calculation of Delay Times, and Inverter Design with Delay Constraints

Unit-III **Hours-8**

Combinational MOS Logic Circuits: Introduction, MOS logic circuits with depletion NMOS Loads, CMOS logic circuits, complex logic circuits, CMOS transmission gates (pass gates) Sequential MOS Logic Circuits: Introduction, behaviour bistable elements, SR latch circuits, clocked latch and FF circuits, CMOS D latch and edge triggered FF.

Unit-IV **Hours-8**

Dynamic logic circuits: Introduction, basic principle of pass transistor circuits, synchronous dynamic circuit techniques, dynamic CMOS circuit techniques, domino CMOS logic. Semiconductor memories: Introduction, DRAM, SRAM, ROM, flash memory.

Unit-V **Hours-8**

Low – Power CMOS Logic Circuits: Introduction, Overview of Power Consumption, Low – Power Design through voltage scaling, Estimation and Optimization of switching activity, Reduction of Switched Capacitance and Adiabatic Logic Circuits. Design for Testability: Introduction, Fault Types and Models, Controllability and Observability, Ad Hoc Testable Design Techniques, Scan Based and BIST Techniques

Text Book:

1. Sung-Mo Kang & Yosuf Leblebici, “CMOS Digital Integrated Circuits: Analysis & Design”, TMH, 3rd Edition.

Reference Books:

2. D. A. Pucknell and K. Eshraghian, “Basic VLSI Design: Systems and Circuits”, PHI, 3rd Ed., 1994.
3. W.Wolf, Modern VLSI Design: System on Chip, Third Edition, Pearson, 2002.

B.Tech. Electrical and Electronics Engineering

NON CONVENTIONAL ELECTRICAL POWER GENERATION

Course Code:

L	T	P
3	1	0

Unit-I **Lectures -8**

Energy situation and renewable energy sources: Global Energy scenario, World Energy consumption, Energy in developing countries, fire wood crisis, Indian energy scene, Non conventional renewable energy sources, potential of renewable energy sources.

Unit-II **Lectures -8**

Wind Energy: Origin of wind, Basic principle of wind energy, conversion, component of wind energy conversion system, type of windmills, Wind electrical Generations in India.

Solar Energy: Introduction, solar radiation, solar energy collector, solar thermal power generation, low temperature application of solar energy.

Unit-III **Lectures -8**

Geo-thermal Power Plants: Introduction, Geothermal sources, comparison of Geo thermal energy with other energy forms, development of Geothermal power in India.

Physical and thermochemical methods of bioconversion: Introduction, biomass definition and potential, physical method of bio conversion, thermo chemical methods.

Unit-IV **Lectures -8**

Wave, Tidal and OTEC: Introduction, Basic principle of tidal power, Wave energy, component of Tidal power plant, Ocean Thermal Energy Conversions, advantages and disadvantages of tidal power generation.

Small and Mini Hydro power System: Introduction, site development, generation and electrical equipment, system of regulation of Hydroelectric Power in India.

Recommended books

1. Renewable Energy Sources by Maheshwar Dyal.
2. Small and mini Hydropower system by Tata Mc Graw Hill.
3. An Introduction to power plant technology by G.D.Rai.
4. Solar Energy by Suhas.P.Sukhatma, Tata Mc Graw Hill.
5. Modern Power Plant Engg. by Joel