Scheme and Syllabus

B.TECH. WEEKEND

Department of Electrical Engineering
Deenbandhu Chhotu Ram University of Science & Technology
Murthal (Sonepat), Haryana-131039

DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL, SONEPAT

B.TECH. WEEKEND PROGRAMME

SCHEME OF STUDIES & EXAMINATIONS

FIRST YEAR (FIRST SEMESTER) ELECTRICAL ENGINEERING

WITH EFFECT FROM 2010-2011

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Exam. Marks		Total Marks	Credits	Duration of Exam.
			L	P	Total Hrs.		Theory	Practical			
1	MATH-101	MATHEMATICS - III (Common for all Branches)	3	-	3	50	100	-	150	5	3
2	HUM(W)-101	ECONOMICS (Common for all Branches)	3	-	3	50	100	-	150	4	3
3	HUM(W)-103	FUNDAMENTALS OF MANAGEMENT (EE, ECE, ME)	3	-	3	50	100	-	150	4	3
4	EE(W)-101	ELECTRICAL ENGINEERING MATERIALS & SEMICONDUCTOR DEVICES	3	-	3	50	100	-	150	4	3
5	EE(W)-103	ELECTRO MAGNETIC THEORY (EE, ECE)	3	-	3	50	100	-	150	4	3
	TOTAL		**15**	**-**	**15**	**250**	**500**	**--**	**750**	**21**	

Note :

1. Students will be allowed to use non-programmable scientific calculator in the examination. However, sharing of calculator & other items is not permitted in the examination.

DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL, SONEPAT

B.TECH. WEEKEND PROGRAMME
SCHEME OF STUDIES & EXAMINATIONS
FIRST YEAR (SECOND SEMESTER) ELECTRICAL ENGINEERING
WITH EFFECT FROM 2010-2011

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Exam. Marks		Total Marks	Credits	Duration of Exam
			L	P	*Total* Hrs.		Theory	*Prac.*			
1.	MATH(W)-102	NUMERICAL METHODS (EE, ECE)	3	-	3	50	100	-	150	5	3
2.	EE(W)-102	NETWORK THEORY (EE, ECE)	3	-	3	50	100	-	150	4	3
3.	ECE(W)-102	ANALOG ELECTRONICS (ECE,EE)	3	-	3	50	100	-	150	4	3
4.	EE(W)-104	ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS	3	-	3	50	100	-	150	4	3
5.	MATH(W)-204	NUMERICAL METHODS LAB (EE, ECE)	-	2	2	25	-	25	50	2	3
6.	EE(W)-122	NETWORK THEORY LAB. (EE, ECE)	-	2	2	25	-	25	50	2	3
7.	ECE(W)-122	ANALOG ELECTRONICS LAB (ECE, EE)	-	2	2	25	-	25	50	2	3
8.	EE(W)-124	ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS LAB.	-	2	2	25	-	25	50	2	3
	TOTAL		**12**	**8**	**20**	**330**	**400**	**100**	**800**	**25**	

Note :

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DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL, SONEPAT

B.TECH. WEEKEND PROGRAMME
SCHEME OF STUDIES & EXAMINATIONS
SECOND YEAR (THIRD SEMESTER) ELECTRICAL ENGINEERING
WITH EFFECT FROM 2010-2011

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total Marks	Total Credits	Duration of Exam
			L	P	Total Hrs.		Theory	Prac.			
1.	EE(W)-201	ELECTRICAL MACHINES-I	3	-	3	50	100	-	150	4	3
2.	ECE(W)-201	DIGITAL ELECTRONICS (ECE, EE,CSE)	3	-	3	50	100	-	150	4	3
3.	EE(W)-203	POWER SYSTEMS-I	3	-	3	50	100	-	150	4	3
4.	ECE(W)-203	COMMUNICATION SYSTEMS (ECE, EE)	3	-	3	50	100	-	150	4	3
5.	EE(W)-221	ELECTRIC MACHINES-I LAB.	-	2	2	25	-	25	50	2	3
6.	EE(W)-221	DIGITAL ELECTRONICS LAB (ECE, EE,CSE)	-	2	2	25	-	25	50	2	3
7.	ECE(W)-223	COMMUNICATION SYSTEMS LAB (ECE, EE)	-	2	2	25	-	25	50	2	3
8.	EE(W)-223	ELECTRICAL WORKSHOP (EE, ECE)	-	2	2	25	-	25	50	2	3
	Total		12	8	20	300	400	100	800	24	

Note:
Students are allowed to use non-programmable scientific calculator in the examination. However, sharing of calculator & any other items is not permitted in the examination.

DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL, SONEPAT

B.TECH. WEEKEND PROGRAMME

SCHEME OF STUDIES & EXAMINATIONS

SECOND YEAR (FOURTH SEMESTER) ELECTRICAL ENGINEERING

WITH EFFECT FROM 2010-2011

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total Marks	Total Credits	Duration of Exam
			L	P	Total Hrs.		Theory	Prac.			
1.	EE(W)-202	ELECTRICAL MACHINES-II	3	-	3	50	100	-	150	4	3
2.	ECE(W)-204	ELECTRONIC MEASUREMENT AND INSTRUMENTATION (EE, ECE)	3	-	3	50	100	-	150	4	3
3.	EE(W)-206	POWER ELECTRONICS	3	-	3	50	100	-	150	4	3
4.	ECE(W)-206	ANALOG ELECTRONIC CIRCUITS (EE, ECE)	3	-	3	50	100	-	150	4	3
5.	EE(W)-222	ELECTRICAL MACHINES-II LAB.	-	2	2	25	-	25	50	2	3
6.	ECE(W)-224	ELECTRONIC MEASUREMENT & INSTRU-MENTATION LAB (EE, ECE)	-	2	2	25	-	25	50	2	3
7.	EE(W)-226	POWER ELECTRONICS LAB.	-	2	2	25	-	25	50	2	3
	TOTAL		12	7	19	275	400	75	750	22	

Note:

1. Students are allowed to use non-programmable scientific calculator. However, sharing of calculator & any other items is not permitted in the examination.

DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL, SONEPAT

B.TECH. WEEKEND PROGRAMME

SCHEME OF STUDIES & EXAMINATIONS

THIRD YEAR (FIFTH SEMESTER) ELECTRICAL ENGINEERING

WITH EFFECT FROM 2010-2011

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total Marks	Total Credits	Duration of Exam
			L	P	Total Hrs.		Theory	Prac.			
1.	EE(W)-301	CONVENTIONAL & CAD OF ELECTRIC MACHINES	3	-	3	50	100	-	150	4	3
2.	EE(W)-303	CONTROL SYSTEMS ENGG. (EE, ECE)	3	-	3	50	100	-	150	4	3
3.	EE(W)-305	ELECTRIC POWER GENERATION	3	-	3	50	100	-	150	4	3
4.	EE(W)-307	MICROPROCESSOR (8085), INTERFACING & APPLICATIONS	3	-	3	50	100	-	150	4	3
5.	EE(W)-321	CONVENTIONAL & CAD OF ELECTRIC MACHINES LAB	-	2	2	25	-	25	50	2	3
6.	EE(W)-323	CONTROL SYSTEMS ENGG. LAB (EE, ECE)	-	2	2	25	-	25	50	2	3
7.	EE(W)-327	MICROPROCESSOR (8085), INTERFACING & APPLICATIONS LAB.	-	2	2	25	-	25	50	2	3
		TOTAL	12	6	18	275	400	75	750	22	

Note:

1. Students are allowed to use non-programmable scientific calculator in the examination. However, sharing of calculator & any other items is not permitted in the examination.

DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL, SONEPAT

B.TECH. WEEKEND PROGRAMME

SCHEME OF STUDIES & EXAMINATIONS

THIRD YEAR (SIXTH SEMESTER) ELECTRICAL ENGINEERING

WITH EFFECT FROM 2010-2011

S. no.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total Marks	Total Credits	Duration of Exam
			L	P	Total Hrs.		Theory	Prac.			
1.	EE(W)-302	POWER SYSTEMS –II	3	-	3	50	100	-	150	4	3
2.	EE(W)-304	ADVANCED MICROPROCESSOR AND MICRO-CONTROLLER	3	-	3	50	100	-	150	4	3
3.	ECE(W)-304	DIGITAL SYSTEM DESIGN (EE, ECE, CSE)	3	-	3	50	100	-	150	4	3
4.	ECE(W)-308	DATA COMMUNICATION (EE, ECE)	3	-	3	50	100	-	150	4	3
5.	EE(W)-322	POWER SYSTEMS LAB	-	2	2	25	-	25	50	2	3
6.	EE(W)-324	ADVANCED MICROPROCESSOR AND MICRO-CONTROLLER LAB	-	2	2	25	-	25	50	2	3
7.	ECE(W)-328	DATA COMMUNICATION LAB (EE, ECE)	-	2	2	25	-	25	50	2	3
	TOTAL		12	6	18	275	400	75	750	22	

Note:

1. Students are allowed to use non-programmable scientific calculator in the examination. However, sharing of calculator & any other items is not permitted in the examination.

DEENBANDHU CHHOTU RAM UNIVERSITY OF SCIENCE & TECHNOLOGY, MURTHAL, SONEPAT

B.TECH. WEEKEND PROGRAMME

SCHEME OF STUDIES & EXAMINATIONS

FOURTH YEAR (SEVENTH SEMESTER) ELECTRICAL ENGINEERING

WITH EFFECT FROM 2010-2011

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total Marks	Total Credits	Duration of Exam
			L	P	Total Hrs.		Theory	Prac.			
1.	EE(W)-401	ELECTRIC DRIVES	3	-	3	50	100	-	150	4	3
2.	ECE(W)-401	DIGITAL SIGNAL PROCESSING (EE, ECE)	3	-	3	50	100	-	150	4	3
3.	EE(W)-403	POWER SYSTEM OPERATION AND CONTROL	3	-	3	50	100	-	150	4	3
		*OPEN ELECTIVE	3	-	3	50	100	-	150	4	3
4.	EE(W)-421	ELECTRIC DRIVES LAB.		2	2	25	-	25	50	2	3
5.	ECE(W)-421	DIGITAL SIGNAL PROCESSING LAB (EE, ECE)	-	2	2	25	-	25	50	2	3
8.	EE(W)-423	PROJECT	-	1	1	50	-	-	50	4	3
		TOTAL	12	5	17	300	400	50	750	24	

LIST OF OPEN ELECTIVES:

1.	HUM(W)-451	LANGUAGE SKILLS FOR ENGINEERS	8.	CSE(W)-401	MULTIMEDIA TECHNOLOGIES (OTHER THAN CSE)
2.	HUM(W)-453	HUMAN RESOURCE MANAGEMENT	9.	CSE(W)-204	PRINCIPLES OF OPERATING SYSTEM (OTHER THAN CSE)
3.	HUM(W)-455	ENTREPRENEURSHIP	10.	CSE(W)-409	ARTIFICIAL INTELLIGENCE & EXPERT SYSTEMS
4.	HUM(W)-457	BUSINESS COMMUNICATION	11.	CSE(W)-411	MANAGEMENT INFORMATION SYSTEM
5.	PHY(W)-451	NANO TECHNOLOGY	12.	EE(W)-455	INTELLIGENT INSTRUMENTATION FOR ENGINEERS
6.	PHY(W)-453	LASER TECHNOLOGY	13.	ECE(W)-403	EMBEDDED SYSTEMS DESIGN (OTHER THAN ECE)
7.	ME(W)-451	MECHATRONICS SYSTEMS	14.	CH(W)-453	POLLUTION & CONTROL

Note:

1. *Student will be permitted to opt for any one elective run by the other departments. However, the departments will offer only those electives for which they have expertise. The choice of the students for any elective shall not be a binding for the department to offer, if the department does not have expertise.
2. Project load will be treated as 1 hrs. per week for the project coordinator including his own guiding load of 1 hour, and 1 hour for each participating teacher irrespective of number of students / groups under him / her. Project will commence in VII Semester where the student will identify the project problem, complete the design, procure the material, start the fabrication, complete the survey, etc. depending upon the nature of the problem. Project will continue in VIII semester.
3. Students will be allowed to use non-programmable scientific calculator in the examination. However, sharing of calculator & any other items is not permitted in the examination.

B.TECH. WEEKEND PROGRAMME
SCHEME OF STUDIES & EXAMINATIONS
FOURTH YEAR (EIGHTH SEMESTER) ELECTRICAL ENGINEERING
WITH EFFECT FROM 2010-2011

S. No.	Course No.	Course Title	Teaching Schedule			Marks of Class Work	Examination Marks		Total Marks	Total Credits	Duration of Exam
			L	P	Total Hrs.		Theory	Prac.			
1.	EE(W)-402	ADVANCED CONTROL SYSTEMS	3	-	3	50	100	-	150	4	3
2.	EE(W)-408	COMPUTER APPLICATIONS TO POWER SYSTEM ANALYSIS	3	-	3	50	100	-	150	4	3
3.		DEPT. ELECTIVE – I	3	-	3	50	100	-	150	4	3
4.		DEPT. ELECTIVE – II	3	-	3	50	100	-	150	4	3
5.	EE(W)-428	COMPUTER APPLICATIONS TO POWER SYSTEM ANALYSIS LAB.	-	2	2	25	-	25	50	2	3
6.	EE(W)-412	SEMINAR	-	1	1	50	-	-	50	2	
7.	EE(W)-423	PROJECT	-	1	1	50	-	100	150	8	3
8.	GFEE(W)-402	GENERAL FITNESS FOR THE PROFESSION	-	-	-	-	-	100	100	4	
		TOTAL	12	4	16	325	400	225	950	32	

DEPT. ELECTIVE – I

EE(W)-424 FUZZY CONTROL SYSTEM (EE, ECE)
EE(W)-432 EHV AC/DC
EE(W)-434 ADVANCED INSTRUMENTATION
EE(W)-438 RECENT TRENDS IN DE-REGULATED POWER SYSTEMS
EE(W)-466 UTILIZATION OF ELECTRIC POWER & TRACTION

DEPT. ELECTIVE – II

EE(W)-426 COMPUTER-BASED INSTRUMENTATION & CONTROL
EE(W)-442 HIGH VOLTAGE ENGINEERING
EE(W)-444 ELECTRICAL POWER QUALITY
EE(W)-446 ARTIFICIAL INTELLIGENCE
EE(W)-450 POWER MANAGEMENT

Note:

1. Project load will be treated as 1 hrs. per week for the project coordinator including his own guiding load of 1 hour, and 1 hour for each participating teacher irrespective of number of students / groups under him / her. Project involving design, fabrication, testing, computer simulation, case studies etc., which has been commenced by students in VII semester will be completed in VIII semester.
2. For the subject EE(W)-412-Seminar, a student will select a topic from emerging areas of Engineering and Technology and study it independently. Student will give a seminar talk on the topic.
3. A team consisting of Dean of faculty, Chairperson of the department & an external examiner appointed by University shall carry out the evaluation of the student for his / her General Fitness for the Profession.
4. Students will be allowed to use the non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.

B.TECH. WEEKEND SEMESTER- I

MATH-101(W): MATHEMATICS-III

(COMMON TO EE, ECE, CSE, ME, CE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 5

Part-A

Fourier Series and Fourier Transforms: Euler's formulae, conditions for a Fourier expansion, change of interval, Fourier expansion of odd and even functions, Fourier expansion of square wave, rectangular wave, saw-toothed wave, half and full rectified wave, half range sine and cosine series.

Fourier integrals, Fourier transforms, Shifting theorem (both on time and frequency axes), Fourier transforms of derivatives, Fourier transforms of integrals, Convolution theorem, Fourier transform of Dirac-delta function.

Part-B

Functions of Complex Variable: Definition, Exponential function, Trignometric and Hyperbolic functions, Logrithmic functions. Limit and Continuity of a function, Differentiability and Analyticity. Cauchy-Riemann equations, necessary and sufficient conditions for a function to be analytic, polar form of the Cauchy-Riemann equations. Harmonic functions, application to flow problems. Integration of complex functions. Cauchy-Integral theorem and formula.

Power series, radius and circle of convergence, Taylor's Maclaurin's and Laurent's series. Zeroes and singularities of complex functions, Residues. Evaluation of real integrals using residues (around unit and semi circle only).

Part-C

Probability Distributions and Hypothesis Testing: Conditional probability, Bayes theorem and its applications, expected value of a random variable. Properties and application of Binomial, Poisson and Normal distributions.

Testing of a hypothesis, tests of significance for large samples, Student's t-distribution (applications only), Chi-square test of goodness of fit.

Linear Programming: Linear programming problems formulation, Solving linear programming problems using (i) Graphical method (ii) Simplex method (iii) Dual simplex method.

TEXT BOOKS:

1. Advanced Engg. Mathematics: F Kreyszig.
2. Higher Engg. Mathematics: B.S. Grewal.

REFERENCE BOOKS:

1. Advance Engg. Mathematics: R.K. Jain, S.R.K.Iyenger.
2. Advanced Engg. Mathematics: Michael D. Greenberg.
3. Operation Research: H.A. Taha.
4. Probability and statistics for Engineers: Johnson, PHI.

Note: Examiner will set eight questions, taking two from Part-A, three from Part-B and three from Part-C. Students will be required to attempt five questions, taking at least one from each part.

B.TECH. WEEKEND SEMESTER- I
HUM(W)-101: ECONOMICS
(COMMON TO EE, ECE, CSE, ME, CE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

COURSE OBJECTIVES: The purpose of this course is to:

a) Acquaint the student in the basic economic concepts and their operational significance and
b) Stimulate him to think systematically and objectively about contemporary economic problems.

1. Definition of Economics - various definitions, Nature of Economic problem, Production possibility curve, Economic laws and their nature. Relationship between Science, Engineering, Technology and Economics.

2. Concepts & measurement of utility, Law of Diminishing Marginal Utility, Law of equi-marginal utility - its practical application and importance.

3. Meaning of Demand, Individual and Market demand schedule, Law of demand, shape of demand curve, Elasticity of demand,: measurement of elasticity of demand, factors effecting elasticity of demand, practical importance & applications of the concept of elasticity of demand.

4. Meaning of production & factors of production; Law of variable proportions, Returns to scale, Internal and External economies & diseconomies of scale.
Various concepts of cost ; Fixed cost, variable cost, average cost, marginal cost, money cost, real cost, opportunity cost. Shape of average cost, marginal cost, Total cost etc. in short run and long run.

5. Meaning of Market, Types of Market - Perfect Competition, Monopoly, Oligoply, Monoplistic Competition (Main features of these markets). Supply & Law of Supply, Role of Demand & Supply in Price Determination and effect of changes in demand & supply on prices.

6. Nature and characteristics of Indian economy (brief & elementary introduction), Privatization - meaning, merits and demerits. Globalization of Indian economy - merits and demerits. Elementary Concepts of VAT, WTO, GATT & TRIPS agreement.

Books Recommended:
TEXT BOOKS:

1. Principles of Economics: P.N. Chopra (Kalyani Publishers).
2. Modern Economic Theory – K.K. Dewett (S.Chand)

REFERENCE BOOKS:

1. A Text Book of Economic Theory Stonier and Hague (Longman's Landon)
2. Micro Economic Theory – M.L. Jhingan (S.Chand)
3. Micro Economic Theory - H.L. Ahuja (S.Chand)
4. Modern Micro Economics: S.K. Mishra (Pragati Publications)
5. Economic Theory - A.B.N. Kulkarni & A.B. Kalkundrikar (R.Chand & Co.)
6. Indian Economy: Rudar Dutt & K.P.M. Sundhram

NOTE: Eight questions are to be set; at least one question from each unit & the students will have to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- I
HUM(W)-103: FUNDAMENTALS OF MANAGEMENT
(COMMON FOR EE, ECE, ME)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **UNIT-I:** Meaning of management, Definitions of Management, Characteristics of management, Management Vs. Administration. Management-Art, Science & Profession. Importance of Management. Development of Management thoughts.

Principles of Management. The Management Functions, Inter-relationship of Managerial functions.

2. Nature and Significance of staffing, Personnel management, Functions of personnel management, Manpower planning, Process of manpower planning, Recruitment, Selection; Promotion - Seniority Vs. Merit. Training - objectives and types of training.

3. Production Management: Definition, Objectives, Functions and Scope, Production Planning and Control; its significance, stages in production planning and control. Brief introduction to the concepts of material management, inventory control: its importance and various methods.

4. Marketing Management - Definition of marketing, Marketing concept, objectives & Functions of marketing.

Marketing Research - Meaning; Definition; objectives; Importance; Limitations; Process. Advertising - meaning of advertising, objectives, functions, criticism.

5. Introduction of Financial Management, Objectives of Financial Management, Functions and Importance of Financial Management. Brief Introduction to the concept of capital structure and various sources of finance.

BOOKS RECOMMENDED:

TEXT BOOKS:

1. Principles and Practice of Management - R.S. Gupta, B.D.Sharma, N.S. Bhalla. (Kalyani Publishers)
2. Organisation and Management - R.D. Aggarwal (Tata Mc Graw Hill)

REFERENCE BOOKS:

1. Principles & Practices of Management – L.M. Prasad (Sultan Chand & Sons)
2. Management – Harold, Koontz and Cyrilo Donell (Mc.Graw Hill).
3. Marketing Management – S.A. Sherlikar (Himalaya Publishing House, Bombay).
4. Financial Management - I.M. Pandey (Vikas Publishing House, New Delhi)
5. Management - James A.F. Stoner & R.Edward Freeman, PHI.

NOTE: Eight questions are to be set; at least one question from each unit & students will have to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- I
EE(W)-101: ELECTRICAL ENGINEERING MATERIALS AND SEMICONDUCTOR DEVICES

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **UNIT 1 CONDUCTING MATERIALS:** Review of energy bands, description of materials, drift velocity, collision time, Mean free path, mobility, conductivity, relaxation time, factors affecting conductivity of materials, types of thermal conductivity, Wiedmann-Franz law, super conductivity, effect of magnetic field, conducting materials, applications.

2. **DIELECTRIC MATERIALS:** Behaviour of dielectric materials in static electric field, Dipole moments, Polarization, Dielectric constant, Polarizability, Susceptibility, mechanisms of polarization, behaviour in alternating field, dielectric loss, loss tangent, types of dielectric & insulating materials, electrostriction, Piezo-electricity, Applications.

3. **MAGNETIC MATERIALS:** Permeability, Magnetic susceptibility, magnetic moment, Magnetization, Dipole moment, types of magnetic materials, Magnetostriction, eddy current & hysteresis losses, applications.

4. **SEMICONDUCTORS:** Review of Si and Ge as semiconducting materials, Continuity Equation, P-N junction, Drift & Diffusion, Diffusion & Transition capacitances of P-N junction.

5. **CONSTRUCTION AND CHARACTERISTICS OF DEVICES:** Brief introduction to Planar Technology for device fabrication, metal -semiconductor junctions (ohmic and non-ohmic), breakdown mechanisms in p-n junction, zener diode, electrical and optical excitation in diodes, LED, solar cells and photo-detectors.

6. **BIPOLAR AND MOS DEVICES:** BJT, UJT, JFET, MOSFETS.

7. **POWER DEVICES:** Thyristor, Diac, Triac, GTO, IGBT, VMOS.

TEXT BOOKS:

1. Electrical Engineering Materials: A.J. Dekker; PHI.
2. Solid State Electronic Devices: StreetMan & Banerjee; Pearson.
3. Electronic Devices & Circuits: Millman & Halkias; MGH.

REFERENCE BOOKS:

1. Electrical Engineering Materials: S.P Seth & P.V Gupta; Dhanpat Rai.
2. Text Book of Power Electronics: H.C.Rai; Galgoitia Publications.
3. Electronic Devices & Circuit Theory: Boylestad & Nashelsky; Pearson.
4. Semiconductor devices: Jaspreet Singh; John Wiley.

NOTE: Eight questions are to be set in all by the examiner taking at least one question fromeach unit. Students will be required to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- I
EE(W)-103: ELECTROMAGNETIC THEORY
(COMMON TO EE, ECE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **STATIC ELECTRIC FIELDS:** Coulomb's Law, Gauss's Law, potential function, field due to a continuous distribution of charge, equi-potential surfaces, Gauss's Theorem, Poison's equation, Laplace's equation, method of electrical images, capacitance, electro-static energy, boundary conditions, the electro-static uniqueness theorem, far field of a charge distribution, Dirac-Delta representation for a point charge and an infinitesimal dipole.

2. **STEADY MAGNETIC FIELDS:** Faraday's law of Induction, 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), far field of a current distribution, equation of continuity.

3. **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).

4. **REFLECTION AND REFRACTION OF E M WAVES:** Reflection and refraction of plane waves at the surface of a perfect conductor & perfect dielectric (both normal incidence as well as oblique incidence), Brewester's angle and Total Marks 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.

5. **TRASMISSION LINE THEORY:** Transmission line as a distributed circuit, transmission line equation, travelling & standing waves, characteristic impedance, input impedance of terminated line, reflection coefficient, VSWR, Smith's chart and its applications.

TEXT BOOKS:
1. Electro-magnetic Waves and Radiating System: Jordan & Balmain, PHI.

REFRENCE BOOKS:
1. Engineering Electromagnetics: Hayt; TMH
2. Electro-Magnetics: Krauss J.DF; Mc Graw Hill.

NOTE: 8 questions are to be set, at least one from each unit. Students have to attempt any 5 questions.

B.TECH. WEEKEND SEMESTER- II
MATH(W)-102: NUMERICAL METHODS
(COMMON FOR EE, ECE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

Part-A:

1. **Interpolation and curve fitting:** Interpolation problem, Lagrangian polynomials, Divided differences, Interpolating with a cubic spline, Bezier curves and B-spline curves, Least square approximations.

2. **Non-Linear Equations:** Bisection method, Linear Interpolation methods, Newton's method, Muller's method, fixed-point method.

3. **Simultaneous Linear Equations:** Elimination method, Gauss and Gauss-Jordan method, Jacobi's method, Gauss-Seidal method, Relaxation method.

4. **Numerical Differentiation and Integration:** Derivatives from difference tables, Higher order derivatives, Extrapolation techniques, Newton-cotes integration formula, Trapezoidal rule, Simpson's rules, Boole's rule and Weddle's rule, Romberg's Integration.

Part-B:

5. **Numerical Solution of Ordinary Differential Equations:** Taylor series method, Euler and modified Euler method, Runge-Kutta methods, Milne's method, Adams-Moulton method, Power method for Eigen values by iteration.

6. **Numerial Solution of Partial Differential Equations:** Finite difference approximations of partial derivatives, solution of Laplace equation (Standard 5-point formula only), one-dimensional heat equation (Schmidt method, Crank-Nicolson method, Dufort and Frankel method) and wave equation.

TEXT BOOKS:

1. Applied Numerical Analysis: Curtis F. Gerald and Patrick G. Wheatley-Pearson, Education Ltd.
2. Numerical Method: E. Balagurusamy T.M.H.

REFERENCE BOOKS:

1. Numerical Methods for Scientific and Engg. Computations: M.K. Jain, S.R.K. Iyenger and R.K. Jain-Wiley Eastern Ltd.
2. Introductory Methods of Numerical Analysis S.S. Sastry,P.H.I.
3. Numerical Methods in Engg. & Science: B.S. Grewal.

Note: Examiner will set eight questions, taking four from Part-A and four from Part-B. Students will be required to attempt five questions taking at least two from each part.

B.TECH. WEEKEND SEMESTER- II
EE(W)-102: NETWORK THEORY
(COMMON TO EE, ECE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **TRANSIENT RESPONSE:** Transient Response of RC, RL, RLC Circuits to various excitation signals such as step, ramp, impulse and sinusoidal excitations using Laplace transform.

2. **NETWORK FUNCTIONS:** Terminal pairs or Ports, Network functions for one-port and two-port networks, poles and zeros of Network functions, Restrictions on pole and zero Locations for driving point functions and transfer functions, Time domain behavior from the pole-zero plot.

3. **CHARACTERISTICS AND PARAMETERS OF TWO PORT NETWORKS:** Relationship of two-port variables, short-circuit Admittance parameters, open circuit impedance parameters, Transmission parameters, hybrid parameters, relationships between parameter sets, Inter-connection of two port networks.

4. **TOPOLOGY:** Principles of network topology, graph matrices, network analysis using graph theory.

5. **TYPES OF FILTERS AND THEIR CHARACTERISTICS:** Filter fundamentals, high-pass, low-pass, band-pass, and band-reject Filters.

6. **NETWORK SYNTHESIS:** Positive real functions, synthesis of one port and two port networks, elementary ideas of Active networks.

TEXT BOOKS:

1. Network Analysis & Synthesis: Umesh Sinha; Satya Prakash Pub.
2. Network Analysis & Synthesis: F.F.Kuo; John Wiley & Sons Inc.

REFERENCE BOOKS:

1. Introduction to modern Network Synthesis: Van Valkenburg; John Wiley
2. Network Analysis: Van Valkenburg; PHI
3. Basic circuit theory:Dasoer Kuh; McGraw Hill.
4. A Course in Electrical Circuit Analysis by Soni & Gupta; Dhanpat Rai Publication.
5. Circuit Analysis: G.K. Mithal; Khanna Publication.
6. Networks and Systems: D.Roy Choudhury; New Age International
7. Engineering Circuit Analysis; Hayat & Kemmerley TMH.

NOTE: Eight questions are to be set in all by the examiner, taking at least one question fromeach unit. Students will be required to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- II
ECE(W)-102: ANALOG ELECTRONICS
(COMMON TO ECE, EE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **UNIT 1 SEMICONDUCTOR DIODE:** P-N junction and its V-I Characteristics, P-N junction as a rectifier, Switching characteristics of Diode.

2. **UNIT 2 DIODE CIRCUITS:** Diode as a circuit element, the load-line concept, half-wave and full wave rectifiers, clipping circuits, clamping circuits, filter circuits, peak to peak detector and voltage multiplier circuits.

3. **UNIT 3 TRANSISTOR AT LOW FREQUENCIES:** Bipolar junction transistor : operation, characteristics, Ebers-moll model of transistor, hybrid model, h-parameters (CE, CB, CC configurations), analysis of a transistor amplifier circuits using h-parameters, emitter follower, Miller's Theorem , frequency response of R-C coupled amplifier.

4. **UNIT 4 TRANSISTOR BIASING:** Operating point, bias stability, collector to base bias, self-bias, emitter bias, bias compensation, thermistor & sensistor compensation.

5. **UNIT 5 TRANSISTOR AT HIGH FREQUENCIES:** Hybrid P model, CE short circuit current gain, frequency response, alpha, cutoff frequency, gain bandwidth product, emitter follower at high frequencies.

6. **UNIT 6 FIELD EFFECT TRANSISTORS:** Junction field effect transistor, pinch off voltage, volt-ampere characteristics, small signal model, MOSFET Enhancement & Depletion mode, V-MOSFET.Common source amplifier, source follower, biasing of FET, applications of FET as a voltage variable resistor (V V R).

7. **UNIT 7 REGULATED POWER SUPPLIES:** Series and shunt voltage regulators, power supply parameters, three terminal IC regulators, SMPS.

TEXT BOOK:

1. 1 .Integrated Electronics: Millman & Halkias; McGrawHill
2. Electronic circuit analysis and design (Second edition): D.A.Neamen; TMH

REFERENCE BOOKS:

1. Electronics Principles: Malvino; McGrawHill
2. Electronics Circuits: Donald L. Schilling & Charles Belove; McGrawHill
3. Electronics Devices & Circuits: Boylestad & Nashelsky; Pearson.

NOTE: Eight questions are to be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- II
EE(W)-104: ELECTRICAL MEASUREMENTS & MEASURING INSTRUMENTS

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **UNITS STANDARDS & ERRORS:** S.I. units, Absolute standards (International, Primary, Secondary & Working Standards), True Value, Errors (Gross, Systematic, Random); Static Characteristic of Instruments (Accuracy, Precision, Sensitivity, Resolution & threshold).

2. **MEASURING SYSTEM FUNDAMENTALS:** Classification of Instruments (Absolute & Secondary Instruments; Indicating, Recording & Integrating instruments; Based upon Principle of operation), Generalized Instrument (Block diagram, description of blocks), Three forces in Electromechanical indicating instrument (Deflecting, controlling & damping forces), Comparison between gravity & spring controls; Comparison of damping methods & their suitability, bearing supports, pivot-less supports (Simple & taut-band), Scale information, Instrument cases (Covers).

3. **MEASURING INSTRUMENTS:** Construction, operating principle, Torque equation, Shape of scale, use as Ammeter or as Voltmeter (Extension of Range), Use on AC/DC or both, Advantages & disadvantages, Errors (Both on AC/DC) of PMMC types, Electrodynamic Type, Moving iron type (attraction, repulsion & combined types), Hot wire type & Induction type, Electrostatic type Instruments.

4. **WATTMETERS & ENEGRY METERS:** Construction, operating principle, Torque equation, Shape of scale, Errors, Advantages & Disadvantages of Electrodynamic & Induction type Wattmeters; & single phase induction type Energy meter, Compensation & creep in energy meter.

5. **POWER FACTOR & FREQUENCY METERS:** Construction, operation, principle, Torque equation, Advantages & disadvantages of Single phase power factor meters (Electrodynamic & Moving Iron types) & Frequency meters (Electrical Resonance Type, Ferrodynamic & Electrodynamic types).

6. **LOW & HIGH RESISTANCE MEASUREMENTS:** Limitations of Wheatstone bridge; Kelvin's double bridge method, Difficulties in high resistance measurements, Measurement of high resistance by direct deflection, loss of charge method, Megohm bridge & Meggar.

7. **A.C. BRIDGES:** General balance equation, Ckt. diagram, Phasor diagram, Advantages, disadvantages, applications of Maxwell's inductance, inducance-capacitance, Hays, Anderson, Owens, De-Sauty's, Schering & Wein's bridges, Shielding & earthing.

TEXT BOOK:

1. A Course in Elect. & Electronic Measurement & Instrumentation by A. K. Sawhney; Khanna Pub.

REFERENCE BOOKS:

1 Electrical Measurments by E.W. Golding
2 Electronic & Elect. Measurment & Instrumention by J.B.Gupta; Kataria & Sons.
3 Electronic Instrumentation & Measurment Technique, W.D. Cooper & A.D. Helfrick.
4 Measuring Systems by E.O. Doeblin; TMH.

NOTE: 5 out of 8 questions be attempted; at least 1 question may be set from each unit.

B.TECH. WEEKEND SEMESTER- II
MATH(W)-204: NUMERICAL METHODS LAB
(COMMON FOR EE, ECE)

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 2 Hrs
Credits	: 2

WRITE DOWN AND EXECUTE THE FOLLOWING PROGRAMS USING C/C++/MATLAB

1. To find the roots of non-linear equation using Bisection method.
2. To find the roots of non-linear equation using Newton's method.
3. Curve fitting by least - square approximations.
4. To solve the system of linear equations using Gauss-Elimination method.
5. To solve the system of linear equations using Gauss-Seidal iteration method.
6. To solve the system of linear equations using Gauss-Jorden method.
7. To Integrate numerically using Trapezoidal rule.
8. To Integrate numerically using Simpson's rules.
9. To find the largest eigen value of a matrix by power-method.
10. To find numerical solution of ordinary differential equations by Euler's method.
11. To find numerical solution of ordinary differential equations by Runge-Kutta method.
12. To find numerical solution of ordinary differential equations by Milne's method.
13. To find the numerical solution of Laplace equation.
14. To find numerical solution of wave equation.
15. To find numerical solution of heat equation.

BOOKS SUGGESTED:

1. Applied Numerical Analysis by Curtis F. Gerald and Patrick G. Wheatley-Pearson, Education Ltd.
2. Numerical Methods: E. Balagurusamy T.M.H.

Note: Ten experiments are to be performed out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed by the department as per the scope of the syllabus.

B.TECH. WEEKEND SEMESTER- II
EE(W)-122: NETWORK THEORY LAB
(COMMON TO EE, ECE)

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 2

LIST OF EXPERIMENTS:

1. Transient response of RC circuit.
2. Transient response of RL circuit.
3. To find the resonance frequency and Band width of RLC series circuit.
4. To calculate and verify "Z" parameters of a two port network.
5. To calculate and verify "Y" parameters of a two port network.
6. To determine equivalent parameter of parallel connections of two port network.
7. To plot the frequency response of low pass filter and determine half-power frequency.
8. To plot the frequency response of high pass filter and determine the half-power frequency.
9. To plot the frequency response of band-pass filter and determine the band-width.
10. To calculate and verify "ABCD" parameters of a two port network.
11. To synthesize a network of a given network function and verify its response.
12. Introduction of P-Spice.

NOTE: Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set up by the department as per the scope of the syllabus.

B.TECH. WEEKEND SEMESTER- II
ECE(W)-122: ANALOG ELECTRONICS LAB
(COMMON TO ECE, EE)

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 2

LIST OF EXPERIMENTS:

1. Study of Half wave & full wave rectifiers.
2. Study of power supply filters.
3. Study of Diode as clipper & clamper.
4. Study of Zener diode as a voltage regulator.
5. Study of CE amplifier for voltage, current & Power gains and input, output impedances..
6. Study of CC amplifier as a buffer.
7. To study the frequency response of RC coupled amplifier.
8. Study of 3-terminal IC regulator.
9. Study of transistor as a constant current source in CE configuration.
10. Study of FET common source amplifier.
11. Study of FET common Drain amplifier.
12. Graphical determination of small signal hybrid parameters of bipolar junction transistor.
13. Study & design of a d.c. voltage doubler.

NOTE: At least ten experiments are to be performed; at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the department as per the scope of the syllabus.

B.TECH. WEEKEND SEMESTER- II
EE(W)-124: ELECTRICAL MEASURMENTS & MEASURING INSTRUMENTS LAB

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 2

LIST OF EXPERIMENTS:

1. To identify the meters from the given lot.
2. To convert & calibrate a D'Arsonval type galvanometer into a voltmeter & into an ammeter.
3. To calibrate an energy meter with the help of a standard wattmeter & a stop watch.
4. To measure power & p.f. by 3-ammeter method.
5. To measure power & p.f. by 3-voltmeter method.
6. To measure power & p.f. in 3-phase circuit by 2-wattmeter method.
7. To measure capacitance by De-Sauty's bridge.
8. To measure inductance by Maxwell's bridge.
9. To measure frequency by Wien's bridge.
10. To measure the power with the help of C.T. & P.T.
11. To measure magnitude & phase angle of a voltage by rectangular type potentiometer.
12. To measure magnitude & phase angle of a voltage by polar type potentiometer.
13. To measure low resistance by Kelvin's double bridge.
14. To measure high resistance by loss of charge method.

Note: At least 7 experiments should be performed from above list. Remaining 3 experiments may either be performed from above list or designed & set up by department as per scope of syllabus.

B.TECH. WEEKEND SEMESTER- III
EE(W)-201: ELECTRICAL MACHINES – I

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

Part-A:

TRANSFORMERS: Principle, construction of core, winding, tank, operation, testing of single phase transformer, equivalent circuit, phasor diagram, parameters determination, P.U. representation of parameters, regulation, losses & efficiency, separation of iron losses.

Various types of connection of three phase transformer, their comparative features, Zig-Zag connection.

Parallel operation of single phase & three phase transformers.

Auto-transformer: Principle, construction, comparison with two winding transformers, application.

Nature of magnetizing current, plotting of magnetizing current from B-H curve, Inrush current, harmonics, effect of construction on input current, connection of three phase transformer.

Phase-Conversion: Three to two phase, three to six phase and three to twelve phase conversions.

Introduction to three winding, tap-changing & phase-shifting transformers.

Part-B:

D.C. MACHINES: Elementary DC machine, principle & construction of D.C. generator, simplex lap and wave windings, E.M.F. equation, armature reaction, compensating winding, commutation, methods of excitation, load characteristics, parallel operation.

Principle of DC Motors, torque and output power equations, load characteristics, starting, speed control, braking, testing, efficiency & applications.

TEXT BOOKS:

1. Electric Machines: I.J. Nagrath and D.P. Kothari, TMH, New Delhi.
2. Performance & Design of D.C. Machines: A.E.Clayton & N.N. Hancock; ELBS)

REF. BOOKS:

1. Electric Machinery, Fitzgerald & Kingsley, MGH.
2. Theory of alternating current machinery, A.S. Langsdorf, TMH.
3. Electrical Machines, P.S. Bhimbra, Khanna Publishers Delhi

NOTE: 4 questions are to be set from Unit-1 & 4 questions from Unit-2. Students have to attempt five questions with at-least two from each unit.

B.TECH. WEEKEND SEMESTER- III
ECE(W)-201: DIGITAL ELECTRONICS
(COMMON TO ECE, EE,CSE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **FUNDAMENTALS OF DIGITAL TECHNIQUES:** Digital signal, logic gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR, Boolean algebra. Review of Number systems. Binary codes: BCD, Excess-3, Gray, EBCDIC, ASCII, Error detection and correction codes.

2. **COMBINATIONAL DESIGN USING GATES:** Design using gates, Karnaugh map and Quine Mcluskey methods of simplification.

3. **COMBINATIONAL DESIGN USING MSI DEVICES:** Multiplexers and Demultiplexers and their use as logic elements, Decoders, Adders / Subtractors, BCD arithmetic circuits, Encoders, Decoders / Drivers for display devices.

4. **SEQUENTIAL CIRCUITS:** Flip Flops : S-R, J-K, T, D, master-slave, edge triggered, shift registers, sequence generators, Counters, Asynchronous and Synchronous Ring counters and Johnson Counter, Design of Synchronous and Asynchronous sequential circuits.

5. **DIGITAL LOGIC FAMILIES:** Switching mode operation of p-n junction, bipolar and MOS devices. Bipolar logic families: RTL, DTL, DCTL, HTL, TTL, ECL, MOS, and CMOS logic families. Tristate logic, Interfacing of CMOS and TTL families.

6. **A/D AND D/A CONVERTERS:** Sample and hold circuit, weighted resistor and R -2 R ladder D/A converters, specifications for D/A converters. A/D converters: Quantization, parallel -comparator, successive approximation, counting type, dual-slope ADC, specifications of ADCs.

7. **PROGRAMMABLE LOGIC DEVICES:** ROM, PLA, PAL, FPGA and CPLDs.

TEXT BOOK:

1. Modern Digital Electronics (Edition III): R. P. Jain; TMH

REFERENCE BOOKS:

1. Digital Integrated Electronics: Taub & Schilling; MGH
2. Digital Principles and Applications: Malvino & Leach; McGraw Hill.
3. Digital Design : Morris Mano; PHI.

NOTE: Eight questions are to be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- III
EE(W)-203: POWER SYSTEMS-I

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **INTRODUCTION:** Structure of a power system, **i**ndoor and outdoor substations, equipment for substations, layout, auxiliary supply.

2. **DISTRIBUTION SYSTEMS:** Radial, ring mains and network distribution system, comparison of various types of ac and dc systems.

3. **TRANSMISSION LINES:** Calculation of line parameters, Ferranti effect, proximity effect.

4. **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.

5. **MECHANICAL DESIGN:** Sag and stress calculations, effect of ice and wind on sag, dampers.

6. **INSULATORS:** Types, insulating materials, voltage distribution over insulator string, equalizer ring.

7. **CABLES:** Types of LV and HV cables, grading of cables, capacitance, ratings.

8. **CORONA:** Phenomenon, critical voltage, power loss, reduction in losses, radio-interference, HVDC transmission – types of links, advantages and limitations.

TEXT BOOKS:

1. Power System Engg: I.J. Nagrath and D.P. Kothari (TMH)
2. A Course in Electrical Power: Gupta, Soni & Bhatnagar (Dhanpat Rai & Sons).
3. Power System Engineering: S.K.Gupta (Umesh Publication)

REF. BOOKS:

1. Elements of Power System Analysis: W.D. Stevenson (MGH)
2. Electric Power: S.L.Uppal (Khanna Pub.)
3. Electrical Power: J.B.Gupta (S.K. Kataria & Sons).
4. Power System Engineering: B.R. Gupta.
5. Electric Power System: B.M. Weedy, John Wiley & Sons.
6. Transmission & Distribution of Electrical Engineering: H. Cotton.
7. Transmission & Distribution of Electrical Engineering: Westing House & Oxford Univ. Press, New Delhi.

NOTE: 8 questions are to be set –one from each unit. Students have to attempt any 5 questions.

B.TECH. WEEKEND SEMESTER- III
ECE(W)-203: COMMUNICATION SYSTEMS
(COMMON TO ECE, EE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **INTRODUCTION TO COMMUNICATION SYSTEMS:** The essentials of a Communication system, modes and media's of Communication, Classification of signals and systems, Fourier Analysis of signals.

2. **AMPLITUDE MODULATION:** Amplitude modulation, Generation of AM waves, Demodulation of AM waves, DSBSC, Generation of DSBSC waves, Coherent detection of DSBSC waves, single side band modulation, generation of SSB waves, demodulation of SSB waves, vestigial sideband modulation (VSB).

3. **ANGLE MODULATION:** Basic definitions: Phase modulation (PM) & frequency modulation (FM), narrow band frequency modulation, wideband frequency modulation, generation of FM waves, Demodulation of FM waves.

4. **PULSE ANALOG MODULATION:** Sampling theory, time division (TDM) and frequency division (FDM) multiplexing, pulse amplitude modulation (PAM), pulse time modulation.

5. **PULSE DIGITAL MODULATION:** Elements of pulse code modulation, noise in PCM systems, Measure of information, channel capacity, channel capacity of a PCM system, differential pulse code modulation (DPCM). Delta modulation (DM)

6. **DIGITAL MODULATION TECHNIQUES:** ASK, FSK, BPSK, QPSK, M-ary PSK.

7. **INTRODUCTION TO NOISE:** External noise, Internal noise, S/N ratio, noise figure.

TEXT BOOKS:

1. Communication systems (4th edn.): Simon Haykins; John wiley & sons.
2. Communication systems: Singh & Sapre; TMH.
3. Analog Communication : Manoj Duhan; I.K.International

REFERENCE BOOKS:

1. Electronic Communication systems: Kennedy; TMH.
2. Communication Electronics: Frenzel; TMH.
3. Communication system: Taub & Schilling; TMH.
4. Communication systems: Bruce Carlson.

NOTE: Eight questions are to be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- III
EE(W)-221: ELECTRICAL MACHINES-I LAB

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 2

LIST OF EXPERIMENTS:

1. To find turns ratio & polarity of a 1-phase transformer.
2. To perform open & short circuit tests on a 1-phase transformer.
3. To perform Sumpner's back to back test on 1-phase transformers.
4. Parallel operation of two 1-phase transformers.
5. To convert three phase to two-phase By Scott-connection.
6. To perform load test on DC shunt generator.
7. Speed control of DC shunt motor.
8. Swinburne's test of DC shunt motor.
9. Hopkinson's test of DC shunt machines.
10. Ward Leonard method of speed control of D.C.motor.

NOTE: At least 10 experiments are to be performed in the semester. At least seven experiments should be performed from the above list. Remaining 3 experiments may either be performed from the above list or designed & set up by the department.

Books:

1. Experiments in basic Electrical Engineering – S.K.Bhattacharya & K.M.Rastogi (New Age International,Publishes).
2. Practicals in Electrical Engineering – N.K.Jain (Dhanpat Rai Publishing Company Pvt. Ltd.)

B.TECH. WEEKEND SEMESTER- III
EE(W)-221: DIGITAL ELECTRONICS LAB
(COMMON TO ECE, EE,CSE)

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 2

LIST OF EXPERIMENTS:

1. Study of TTL gates – AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
2. Design & realize a given function using K-maps and verify its performance.
3. To verify the operation of multiplexer & Demultiplexer.
4. To verify the operation of comparator.
5. To verify the truth tables of S-R, J-K, T & D type flip flops.
6. To verify the operation of bi-directional shift register.
7. To design & verify the operation of 3-bit synchronous counter.
8. To design and verify the operation of synchronous UP/DOWN decade counter using J K flip-flops & drive a seven-segment display using the same.
9. To design and verify the operation of asynchronous UP/DOWN decade counter using J K flip-flops & drive a seven-segment display using the same.
10. To design & realize a sequence generator for a given sequence using J-K flip-flops
11. 11.Study of CMOS NAND & NOR gates and interfacing between TTL and CMOS gates.
12. 12.Design a 4-bit shift-register and verify its operation. Verify the operation of a ring counter and a Johnson counter.

NOTE: At least ten experiments are to be performed; at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set up by the department as per the scope of the syllabus.

B.TECH. WEEKEND SEMESTER- III
ECE(W)-223: COMMUNICATION SYSTEMS LAB
(COMMON TO ECE, EE)

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 2

LIST OF EXPERIMENTS:

1. Study of Amplitude Modulation and determination of Modulation index.
2. Study of Frequency Modulation and determination of Modulation index.
3. Study of Phase Modulation.
4. Study of Pulse Amplitude Modulation.
5. Study of Pulse Width Modulation.
6. Study of Pulse Frequency Modulation.
7. Study of Pulse Code Modulation.
8. Study of frequency Shift Keying.
9. Study of ASK and QASK.
10. Study of PSK and QPSK.
11. Project related to the scope of the course.

NOTE: At least ten experiments are to be performed; at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the department as per the scope of the syllabus.

B.TECH. WEEKEND SEMESTER- III
EE(W)-223: ELECTRICAL WORKSHOP
(COMMON TO EE, ECE)

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 2

LIST OF EXPERIMENTS:

1. Introduction of tools, electrical materials, symbols and abbreviations.
2. To study and make stair case wiring connections.
3. To study house wiring i.e., batten, cleat, casing-caping and conduit wirings.
4. To study & make fluorescent tube light connections.
5. To study high pressure mercury vapour lamp (H.P.M.V).
6. To study Sodium lamp.
7. To study repairing of home appliances such as heater, electric iron, fans etc.
8. To study construction of moving iron, moving coil, electrodynamic & induction type meters.
9. To design & fabricate single phase transformer.
10. To study fuses, relays, contactors, MCBs and circuit breakers.
11. Insulation testing of electrical equipments.
12. To design and fabricate a PCB for a circuit, wire-up and test.

NOTE: Ten experiments are to be performed, out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set up by the department.

B.TECH. WEEKEND SEMESTER- IV
EE(W)-202: ELECTRICAL MACHINES – II

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **INDUCTION MACHINES:** Poly-phase Induction Machine: Constructional features, production of rotating field, induction motor action, torque production, testing, development of equivalent circuit, performance characteristics, circle diagram, starting methods, methods of speed control - stator voltage control, stator resistance control, frequency control, rotor resistance control, slip power recovery control, double cage and deep bar motors, grid excited and self excited induction generators.

   Single phase Motors: Double revolving field theory, cross field theory, different types of single phase induction motors, circuit model of single phase induction motor.

2. **SYNCHRONOUS MACHINES:** Principle, construction of cylindrical rotor and salient pole machines, winding, EMF equation, Armature reaction, testing, model of the machine, regulation -- synchronous reactance method, Rothert's mmf method, Potier triangle method. Output power equation, power angle curve, two reactance theory, slip test, transient and sub-transient reactances, synchronization, parallel operation. Principles of synchronous motor, power angle curve, V-curve, starting, damper winding, synchronous condenser, applications.

TEXT BOOKS:

1. Electric Machines**:** I.J. Nagrath and D.P. Kothari, TMH, New Delhi.
2. Electric Machinery, Fitzgerald and Kingsley, MGH.
3. Electrical Machines, P.S. Bhimbra, Khanna Publishers Delhi

REF. BOOKS:

Theory of alternating current machinery: A.S. Langsdorf (TMH)
Generalized theory of Electrical Machines: P.S. Bhimbra (Khanna Pub.)

NOTE: 8 questions are to be set; four from each unit. Students are to attempt 5 questions with at least 2 from each unit.

B.TECH. WEEKEND SEMESTER- IV
ECE(W)-204: ELECTRONIC MEASUREMENT AND INSTRUMENTATION
(Common to ECE, EE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

OSCILLOSCOPE: Block diagram, study of various stages in brief, high frequency CRO considerations. Sampling and storage oscilloscope.

ELECTRONIC INSTRUMENTS: Instruments for measurement of voltage, current & other circuit parameters, Q-meters, R.F. power measurements, introduction to digital meters.

GENERATION & ANALYSIS OF WAVEFORMS: Block diagram of pulse generators, signal generators, function generators wave analysers, distortion analysers, spectrum analyser, Harmonic analyser, introduction to power analyser.

FREQUENCY & TIME MEASUREMENT: Study of decade counting Assembly (DCA), frequency measurements, period measurements, universal counter, introduction to digital meters.

DISPLAY DEVICES: Nixie tubes, LED's LCD's, discharge devices.

TRANSDUCERS: Classification, Transducers of types: RLC photocell, thermocouples etc. basic schemes of measurement of displacement, velocity, acceleration, strain, pressure, liquid level & temperature.

INTRODUCTION TO SIGNAL CONDITIONING: DC signal conditioning system, AC signal conditioning system, data acquisition and conversion system.

TEXT BOOK:

A course in Electrical & Electronics Measurements & Instrumentation : A.K. Sawhney; Dhanpat Rai & Sons.

REFERENCE BOOKS:

1. Electronics Instrumentation & Measurement Techniques: Cooper; PHI.

NOTE: Eight questions are to be set – at least one from each unit. Students have to attempt five questions in all

B.TECH. WEEKEND SEMESTER- IV
EE(W)-206: POWER ELECTRONICS

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **UNIT1. INTRODUCTION :** Role of power electronics, review of construction and characteristics of power diode, Shottky diode, power transistor, power MOSFET, SCR, DIAC, Triac, GTO, IGBT & SIT.

2. **UNIT2. SCR:** Ratings and protections, series and parallel connections, R, RC and UJT firing circuit and other firing circuits based on ICs and microprocessors; pulse transformer and opto-coupler, commutation techniques.

3. **UNIT3. AC REGULATORS:** Types of regulator, equation of load current, calculation of extinction angle, output voltage equation, harmonics in load voltage and synchronous tap changer, three phase regulator.

4. **UNIT4. CONVERTERS:** One, two, three, six and twelve pulse converters, fully and half controlled converters, load voltage waveforms, output voltage equation, continuous and discontinuous modes of operation, input power factor of converter, reactive power demand, effect of source inductance, introduction to four quadrant / dual converter, power factor improvement techniques, forced commutated converter, MOSFET and transistor based converters.

5. **UNIT5. INVERTERS:** Basic circuit, 120 degree mode and 180 degree mode conduction schemes, modified McMurray half bridge and full bridge inverters, McMurray -Bedford half bridge and bridge inverters, brief description of parallel and series inverters, current source inverter (CSI), transistor and MOSFET based inverters.

6. **UNIT6. CHOPPERS:** Basic scheme, output voltage control techniques, one, two, and four quadrant choppers, step up chopper, voltage commutated chopper, current commutated chopper, MOSFET and transistor based choppers.

7. **UNIT7. CYCLOCONVERTERS:** Basic principle of frequency conversion, types of cycloconverter, non-circulating and circulating types of cycloconverters.

8. **UNIT8. DRIVES:** Introduction to electric drives: DC drives – converter and chopper fed dc drives, ac drives - stator voltage control, V/f control, rotor resistance control, static Scherbius system and static Kramer systems.

TEXT BOOK:

1. Power Electronics : MH Rashid; PHI

REFERENCE BOOKS :

1. Power Electronics : P.C. Sen: TMH
2. Power Electronics : H.C. Rai: Galgotia
3. Thyristorised Power Controllers: G.K. Dubey, PHI
4. Power Electronics: P.S. Bhimbra.

NOTE : Eight questions are to be set –one from each unit. Students have to attempt any five questions.

B.TECH. WEEKEND SEMESTER- IV
ECE(W)-206: ANALOG ELECTRONIC CIRCUITS
(Common to ECE, EE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **SINGLE AND MULTISTAGE AMPLIFIERS:** Classification of amplifiers, distortion in amplifiers, frequency response of an amplifier, step response of an amplifier, pass-band of cascaded stages, RC-coupled amplifier, low frequency response of RC coupled stage, effect of an emitter bypass capacitor on low Frequency response, multistage CE amplifier.

2. **FEEDBACK AMPLIFIERS:** Feedback concept, transfer gain with feedback, general characteristics of negative feedback amplifiers, input resistance, output resistance, voltage series feedback, current series feedback, current shunt feedback, voltage shunt feedback.

3. **OSCILLATORS:** Sinusoidal oscillators, Barkhausen criteria, R-C phase shift oscillator, general form of oscillator circuit, Wien-bridge oscillator, crystal oscillator.

4. **POWER AMPLIFIERS:** Class A, B, and C operations; Class A large signal amplifiers, higher order harmonic distortion, efficiency, transformer coupled power amplifier, class B amplifier : efficiency & distortion; class A and class B push-pull amplifiers; class C power amplifier.

5. **OPERATIONAL AMPLIFIERS:** Ideal and practical operational amplifiers, inverting and non-inverting amplifier, differential amplifier, emitter coupled differential amplifier, transfer characteristics of a differential amplifier, offset error: voltage and current, common mode rejection ratio (CMRR)

6. **LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIERS:** Scale changer, phase shifter, adder, voltage to current converter, current to voltage converter, DC voltage follower, Bridge amplifier, AC coupled amplifier, AC voltage follower, Integrator, differentiator.

7. **NON-LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIERS:** Comparators, sample & hold circuits, Logarithmic amplifier, anti-log amplifier, logarithmic multiplier, waveform generators , Miller & Bootstrap sweep generators, regenerative comparator (Schmitt Trigger), multivibrators, ADC.

TEXT BOOK:
1. Integrated Electronics: Milman Halkias, TMH.
2. Microelectronic Circuits: Sedra & Smith.

REFERENCE BOOKS:
1. Operational Amplifiers: Gaikwad
2. Electronic Circuit Analysis and Design (Second edition) : D.A. Neamen; TMH

NOTE: Eight questions are to be set – at least one from each unit. Students have to attempt five questions.

B.TECH. WEEKEND SEMESTER- IV
EE(W)-222: ELECTRICAL MACHINES-II LAB

L	T	P

Class-work Marks	: 25

-	-	2	Exam Marks : 25 Total Marks : 50 Duration of Exam : 3 Hrs Credits : 02

LIST OF EXPERIMENTS:

1. To perform the open circuit test and block rotor test on 3 phase induction motor and draw the circle diagram.
2. Speed control of induction motor by rotor resistance control.
3. To conduct the load test to determine the performance characteristics of the I.M.
4. To compute the torque v/s speed characteristics for various stator voltages.
5. To perform the open circuit test and block rotor test on single-phase induction motor and determine equivalent circuit parameters.
6. To perform load test on a universal motor and determine the performance with dc/ac supply voltage.
7. To draw Voltage Vs load Characteristics of 3 phase synchronous generator, and draw input vs. Output power.
8. To perform O.C. test on synchronous generator. And determine the full load regulation of a three phase synchronous generator by synchronous impedance method
9. Determination of direct axis and quadrature axis reactances of synchronous machines.
10. To plot V- Curve of synchronous motor.
11. To study the parallel operation of synchronous generators.
12. Determination of sequence impedances of synchronous machine for various stator voltages.

NOTE: At least 10 experiments are to be performed with at least 7 experiments from the above list; remaining 3 experiments may either be performed from the above list or designed & set by the department as per the scope of syllabus.

Books:

1. Practicals in Electrical Engineering – Dr. N.K.Jain (Dhanpat Rai Publishing Company)
2. Experiments in basic Electrical Engineering –Bhattacharya & Rastogi

B.TECH. WEEKEND SEMESTER- IV
ECE(W)-224: ELECTRONIC MEASUREMENT AND INSTRUMENTATION LAB
(Common to ECE, EE)

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 2

LIST OF EXPERIMENTS:

1. Measurement of displacement using LVDT.
2. Measurement of distance using LDR.
3. Measurement of temperature using R.T.D.
4. Measurement of temperature using Thermocouple.
5. Measurement of pressure using Strain Guage.
6. Measurement of pressure using Piezo-Electric Pick up.
7. Measurement of distance using Capacitive Pick up.
8. Measurement of distance using Inductive Pick up.
9. Measurement of speed of DC Motor using Magnetic Pick up.
10. Measurement of speed of DC Motor using Photo Electric Pick up.

NOTE: At least 10 experiments are to be performed with at least 7 experiments from the above list; remaining 3 experiments may either be performed from the above list or designed & set up by the department as per the scope of syllabus.

B.TECH. WEEKEND SEMESTER- IV
EE(W)-226: POWER ELECTRONICS LAB

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 2

LIST OF EXPERIMENTS:

1. Study & plot of characteristics of diode, thyristor and triac.
2. Study & plot of characteristics of transistor and MOSFET.
3. Study & experimentation of firing angle control of R and R-C firing circuits.
4. Study & firing angle control of UJT firing circuit.
5. Study & execution of complementary voltage commutation using a lamp flasher.
6. Study & execution of complementary voltage commutation using ring counter.
7. Study & experimentation of thyristorised d-c circuit breaker.
8. Study & execution of A.C. phase control.
9. Study & execution of full wave converter.
10. Study & execution of dc chopper.
11. Study & execution of series inverter.
12. Study & execution of bridge inverter.
13. Study & experimentation of single phase cycloconverter.

NOTE: At least 10 experiments are to be performed with at least 7 experiments from the above list; remaining 3 experiments may either be performed from the above list or designed & set up by the department as per the scope of syllabus.

B.TECH. WEEKEND SEMESTER- V
EE(W)-301: CONVENTIONAL AND CAD OF ELECTRIC MACHINES

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

1. **GENERAL:** General features and limitations of electrical machine design. Types of enclosures, heat dissipation, temperature rise heating and cooling cycles and ratings of machine machines. Cooling media used.

2. **BASIC DESIGN PRINCIPLES:** Output equation and output coefficient, Specific electric and magnetic loading. Effect of size and ventilation.

3. **MAGNETIC CIRCUITS:** MMF calculation for air gun and iron parts of electrical machines, gap contraction coefficient. Real and apparent flux densities. Estimation of magnet current of transformers and rotating machines, no load current of transformers and induction motors. Leakage flux and reactance calculations for transformers and rotating machines, Design of field magnet.

4. **DETAILED DESIGN:** Design of transformer, D.C. machines induction motor and synchronous machine and their performance calculations.

5. **COMPUTER AIDED DESIGN:** Computerization of design Procedures. Development of Computer program and performance prediction. Optimization techniques and their applications to design Problems.

TEXT BOOKS:

1. A course in Electrical Machine Design by A.K. Sawhney, Khanna Pub.

REFERENCE BOOKS:

1. Theory, performance and Design of alternating current machines by M.G. Say, ELBS, 15th Ed. 1986.
2. Theory, Performance and Design of Direct Current machines by A.E. Clayton, 3rd Ed. 1967.
3. Optimization Techniques, S.S. Rao

NOTE: 8 questions are to be set – at least one from each unit. Students have to attempt any 5 Questions.

B.TECH. WEEKEND SEMESTER- V
EE(W)-303: CONTROL SYSTEMS ENGINEERING
(COMMON TO EE, ECE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

1. **INTRODUCTORY CONCEPTS:** System/Plant model, types of models, illustrative examples of plants and their inputs and outputs, controller, servomechanism, regulating system, linear time-invariant (LTI) system, time-varying system, causal system, open loop control system, closed loop control system, illustrative examples of open-loop and feedback control systems, continuous time and sampled data control systems. Effects of feedback on sensitivity (to parameter variations), stability, external disturbance (noise), overall gain, etc. Introductory remarks about non-linear control systems.

2. **MATHEMATICAL MODELLING:** Concept of transfer function, relationship between transfer function and impulse response, order of a system, block diagram algebra, signal flow graphs: Mason's gain formula & its application, characteristic equation, derivation of transfer functions of electrical and electromechanical systems. Transfer functions of cascaded and non-loading cascaded elements. Introduction to state variable analysis and design.

3. **TIME DOMAIN ANALYSIS:** Typical test signals, time response of first order systems to various standard inputs, time response of 2nd order system to step input, relationship between location of roots of characteristics equation, ω and ω_n, time domain specifications of a general and an under-damped 2nd order system, steady state error and error constants, dominant closed loop poles, concept of stability, pole-zero configuration and stability, necessary and sufficient conditions for stability, Hurwitz stability criterion, Routh stability criterion and relative stability.

4. **ROOT LOCUS TECHNIQUE:** Root locus concept, development of root loci for various systems, stability considerations.

5. **FREQUENCY DOMAIN ANALYSIS:** Relationship between frequency response and time-response for 2nd order system, polar, Nyquist, Bode plots, stability, Gain-margin and Phase Margin, relative stability, frequency response specifications.

6. **COMPENSATION:** Necessity of compensation, compensation networks, application of lag and lead compensation, basic modes of feedback control, proportional, integral and derivative controllers, illustrative examples.

7. **CONTROL COMPONENTS:** Synchros, AC and DC tacho-generators, servomotors, stepper motors, & their applications, magnetic amplifier.

TEXT BOOK :

1. Control System Engineering: I.J. Nagrath & M. Gopal; New Age Publishers.

REFERENCE BOOKS:

1. Automatic Control Systems: B.C. Kuo, PHI. Publishers.
2. Modern Control Engg: K. Ogata; PHI. Publishers.
3. Control Systems - Principles & Design: Madan Gopal; Tata Mc Graw Hill. Publishers.
4. Modern Control Engineering, R.C. Dorf & Bishop; Addison-Wesley Publishers.

NOTE: Eight questions are to be set - at least one from each unit. Students have to attempt five questions.

B.TECH. WEEKEND SEMESTER- V
EE(W)-305: ELECTRIC POWER GENERATION

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

1. **INTRODUCTION:** Energy sources, their availability, Recent trends in Power Generation, Interconnected Generation of Power Plants.

2. **POWER GENERATION PLANNING:** Load forecasting, load curves, load duration curve, Base load and Peak load Power Plants, connected Load, maximum demand, demand factor, Group diversity factor, load factor, significance of load factor, plant factor, capacity factor, selection of unit size, No. of Units, reserves, cost of power generation, Depreciation, tariff.

3. **CONVENTIONAL ENERGY SOURCES:** Selection of site, capacity calculations, classification, Schematic diagram and working of Thermal Power Stations, Hydro Electric Plant, Nuclear Power Plant and Diesel Power Stations.

4. **NON-CONVENTIONAL ENERGY SOURCES:** Wind, Solar, Tidal, Ocean, and Geothermal sources of Energy, fuel cell, Magneto Hydro Dynamic (MHD) system.

5. **ELECTRIC ENERGY CONSERVATION & MANAGEMENT:** Energy management, Energy Audit, Energy Efficient Motors, Co-generation.

TEXT BOOKS:

1. Electric Power Generation, B.R. Gupta
2. Power Generation, Operation and Control, Wood and Wollenberg, John Wiley & Sons,1984.
3. Power System Engineering : S.K.Gupta (Umesh Publications)

REF. BOOKS:

1. A Course in Electric Power System, Soni, Gupta, Bhatnagar, Dhanpat Rai & Sons
2. Power System Engineering, Nagrath & Kothari, Tata Mc-Graw Hill, New Delhi
3. Power Plant Engg: G.D. Rai
4. Electric Power: S.L. Uppal (Khanna Publishing)

NOTE: 8 questions are to be set, at least one from each unit. Students have to attempt any five questions.

B.TECH. WEEKEND SEMESTER- V
EE(W)-307: MICROPROCESSOR (8085), INTERFACING & APPLICATIONS

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **Introduction:** Overview; History of microprocessors.

2. **The 8085 Processor:** Pin Configuration, Architecture, Addressing modes, instruction set, Timing diagrams & simple examples, including loops & nested loops, interrupts.

3. **The 8255 PPI chip:** Architecture, control word, modes & simple examples.

4. **Introduction to other chips:** Introduction to DMA process & its controller chip 8257, & a few other chip such as programmable interrupt controller, programmable interval timer.

5. **Interfacing & application of 8085 Microprocessor:** Interfacing issues, Interfacing ADC & DAC, Interfacing memory, Microprocessor-based voltage, current, frequency, power measurement schemes.

TEXT BOOKS:

1. Ramesh S. Gaonkar, "Microprocessor Architecture, Programming & Applications with 8085/8086 A", Wiley Eastern Ltd.

REF. BOOKS:

1. B.Ram, "Fundamentals of Microprocessors & Microcomputers", Dhanpat Rai & Sons, Delhi.
2. Michael Andrews, "Programming Microprocessor Interfaces for control & instrumentation", Prentice Hall Inc., Engle Wood Clifs, New Jersey.
3. S.I. Ahson, "Microprocessors with Application in Process Control", TMH, New Delhi.

Note: 8 questions are to be set, at least one question from each unit. Students have to attempt any 5 questions.

B.TECH. WEEKEND SEMESTER- V
EE(W)-321: CONVENTIONAL AND CAD OF ELECTRIC MACHINES LAB

L	T	P		
-	-	2		
		: 25		

Class-work Marks :25
Exam Marks

Total Marks : 50
Duration of Exam : 3 Hrs
Credits : 02

LIST OF EXPERIMENTS:

Draw a flow chart & write a program (using a high level language such as C / C++ / MATLAB, etc.) for:

1. Yoke design of a transformer.
2. L.V. & H.V. windings design of a transformer.
3. Calculation of losses & efficiency of a transformer.
4. Stator design of an induction motor.
5. Rotor design of an induction motor.
6. Calculation of losses & efficiency of an induction motor.
7. Stator design of a synchronous machine.
8. Rotor design of a synchronous machine.
9. Calculation of losses & efficiency of a synchronous machine.
10. Armature winding & field winding design of a D.C. motor.
11. Armature core design of a D.C. motor.
12. Calculation of losses & efficiency of a D.C. motor.

NOTE: At least 10 experiments are to be performed with at least 7 from the above list; remaining 3 may either be performed from the above list or designed & set up by the department as per the scope of syllabus.

B.TECH. WEEKEND SEMESTER- V
EE(W)-323: CONTROL SYSTEMS ENGG. LAB
(Common to EE, ECE)

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 02

LIST OF EXPERIMENTS:

1. To study A.C. servo motor and to plot its torque-speed characteristics.
2. To study D.C. servo motor and to plot its torque speed characteristics.
3. To study the magnetic amplifier and to plot its load current v/s control current characteristics for:
   a. series connected mode
   b. parallel connected mode.
4. To plot the load current v/s control current characteristics for self exited mode of the magnetic amplifier.
5. To study the synchro & to:
   a. Use the synchro pair (synchro transmitter & control transformer) as an error detector.
   b. Plot stator voltage v/s rotor angle for synchro transmitter i.e. to use the synchro transmitter as position transducer.
6. To use the synchro pair (synchro transmitter & synchro motor) as a torque transmitter.
   a. To demonstrate simple motor-driven closed-loop position control system.
   b. To study and demonstrate simple closed-loop speed control system.
7. To study the lead, lag, lead-lag compensators and to draw their magnitude and phase plots.
8. To study a stepper motor & to execute microprocessor or computer-based control of the same by changing number of steps, direction of rotation & speed.
9. To implement a PID controller for level control of a pilot plant.
10. To implement a PID controller for temperature control of a pilot plant.
11. To study the MATLAB package for simulation of control system design.

NOTE: At least 10 experiments are to be performed with at least 7 experiments from the above list; remaining 3 experiments may either be performed from the above list or designed & set up by the department as per the scope of syllabus.

B.TECH. WEEKEND SEMESTER- V
EE(W)-327: MICROPROCESSOR (8085), INTERFACING & APPLICATIONS LAB

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 2

LIST OF EXPERIMENTS:

1. Study architecture of 8085 & familiarization with its hardware, commands & operation of Microprocessor kit.
2. Write a well-documented program for:
    a. addition of two 8-bit numbers (provision for carry)
    b. addition of two 8-bit numbers.
3. Write a well-documented program for:
    a. subtraction of two 8-bit numbers (display of borrow)
    b. subtraction of two 16-bit numbers (display of borrow)
4. Write a well documented program for:
    a. Multiplication of two 8-bit numbers by repeated addition method. Check for minimum number of addition and also test for typical data.
5. Write a well-documented program for:
    b. Multiplication of two 8-bit numbers by bit rotation method.
6. Write a well-documented program for: Division of two 8-bit numbers by repeated subtraction method. Test for typical data.
7. Write a well-documented program for Dividing two 8-bit numbers by bit rotation method. Test for typical data.
8. Write a well-documented program for:
    a. Finding a largest number from an array.
    b. Finding a smallest number from an array.
9. Write a well-documented program for arranging an array of numbers in descending order.
10. Write a well-documented program for arranging an array of numbers in ascending order.
11. Write a well-documented program for finding square of a number using Look-up table.
12. Identification of input & output pins of port 8255, for various control words.
13. To measure an electrical quantity using microprocessor & 8255.
14. Write a program to interface a 2-digit number using seven-segment LEDs. Use 8085 microprocessor and 8255 PPI chip.
15. Write a program to control the operation of stepper motor using 8085 microprocessor & 8255 PPI chip.

NOTE: At least 10 experiments are to be performed with at least 7 experiments from the above list; remaining 3 experiments may either be performed from the above list or designed & set by the department as per the scope of syllabus.

B.TECH. WEEKEND SEMESTER- VI
EE(W)-302: POWER SYTEMS - II

L	T	P		
3	-	-	Class-work Marks	: 50
			Exam Marks	: 100
			Total Marks	: 150
			Duration of Exam	: 3 Hrs
			Credits	: 4

1. **SYMMETRICAL FAULT ANALYSIS:** Transients on a transmission line, short circuit of synchronous machine at no load and at full load.

2. **SYMMETRICAL COMPONENTS:** Symmetrical component transformation, phase shift in star-delta transformation, sequence impedances.

3. **UNSYMMETRICAL FAULT ANALYSIS:** Single line to ground fault, line to line fault, double line to ground fault, open conductor fault.

4. **CIRCUIT BREAKERS:** Theory of arc interruption, circuit breaker, circuit breaker ratings, restriking voltage, transients, current chopping, duties of switch gear, automatic switch, air circuit breaker, bulk oil CB, minimum oil CB, air blast CB, SF6 CB, vacuum and DC circuit breakers.

5. **PROTECTIVE RELAYS:** Nature and causes of faults, consequences, zone of protection, essential qualities, primary and backup protections, relay classification, principal types of electromagnetic relays, i.e., attracted armature, induction disc, induction cup types.

6. **RELAY APPLICATION AND CHARACTERISTICS:** Over -current, instantaneous over current, IDMT, directional and differential relays, distance relays, plain impedance relay, mho relay, reactance relay, offset mho type relay , transmission line & feeder protection, introduction, over-current, distance, pilot wire and carrier current protection, neutral grounding.

7. **APPARATUS PROTECTION:** Transformer, generator, motor and bus zone protection.

8. **STATIC & DIGITAL RELAYS:** Classification of static relays, amplitude and phase comparators, block-spike and block-average comparators, rectifier type relays, Introduction to digital relay: basic principles, Application of microprocessors and computers - recent Trends, Travelling wave relay, relaying schemes based on microwave and optical fiber link.

TEXT BOOKS:

1. Power System Protection and Switchgear – B. Ram, D.N.Vishvakarma: (TMH.)
2. Switchgear and Protection - S.S. Rao: (Khanna Pub.)
3. Power System Engineering: S.K.Gupta (Umesh Publications)

REF. BOOKS:

1. Protective Relays -Their Theory and Practice Vol. I & II: W. Van Warrington.
2. Advanced Power System Analysis and Dynamics: L.P. Singh, Wiley Eastern N. Delhi.
3. Digital Protection: Protective relay from Electro Mechanical to Microprocessor - L.P.Singh, Wiley Eastern.
4. Power System Protection and Switchgear - B.Ravinder Nath and M. Chander, Wiley Eastern, N.Delhi.
5. A course in Electrical Power - Soni, Gupta and Bhatnagar - Dhanpat Rai & Sons.
6. Power System Engg: I.J. Nagrath and D.P. Kothari(TMH).
7. Power System Engineering: V. K. Mehta.

Note: 8 questions are to be set –one from each unit. Students have to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- VI
EE(W)-304: ADVANCED MICROPROCESSOR & MICROCONTROLLER

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **THE 8086 ARCHITECTURE:** Pin diagram of 8086 and description of various signals. Architecture block diagram of 8086 & description of sub-blocks such as EU & BIU & of various registers; Description of address computations & memory segmentation; Program relocation; Addressing modes; Instruction formats.

2. **INSTRUCTION SET OF 8086:** Instruction execution timing, Assembler instruction format; Data transfer instructions, Arithmetic instructions, Branch instructions, Looping instructions, NOP & HLT instructions, Flag manipulation instructions, Logical instructions, Shift & Rotate instructions, Directives & operators, simple example such as copying a block of data, finding maximum from an array of numbers, using look up table technique etc.

3. **MICROCONTROLLERS:** comparison between Microcontrollers & Microprocessors. Block diagram of 8051, Pin diagram & details, I/O structure, Memory organization. Special function registers. External memory, 8032/8052 Enhancements, Reset operation.

   Instruction Set: Addressing modes, arithmetic, Logical. Data transfer. Boolean variable, program branching instructions.

4. **Timer Operation:** Timer Mode register, Timer Control register. Timer modes & Overflow flag, clocking sources, Starting, Stopping & controlling the timers. Programs for generating Square waves of various frequencies.

   Serial Port Operation: Serial port control register, Modes & operation. Serial port baud rate. Multi-processor communication. Initialization & programming of serial port.

   Interrupt: Organization, processing interrupts, program design using interrupts. Serial port interrupts, External interrupts.

TEXT BOOKS:
1. The 8051 Microcontroller; Scott Mackenizie, Prentice Hall, Enagle Wood Cliffs
2. Yu-Chang Liu & Glenn A Gibson Microcomputer Systems: The 8086 / 8088 Family: Architecture, Programming & Design.

REFERENCE BOOKS:
1. Brey, "Intel Microprocessors, 8086, 8088, 80186, 80286 / Pentium
2. Triekel & Singh,"The 8088 & 8086 Microprocessors - Programming, Interfacing,
3. Bhupinder Singh Chabra, "The Intel 8086/8088 Microprocessors Architecture Programming, Design & Interfacing," Dhanpat Rai & Sons.
4. Kenneth J. Ayala, "8051 Microcontroller Architecture, programming & Applications", 2nd edition 1996, Penram International Publishers, India.
5. Website: www.atmel.com.

NOTE: 8 questions are to be set – at least one from each unit. Students have to attempt any 5 Questions.

B.TECH. WEEKEND SEMESTER- VI
ECE(W)-304: DIGITAL SYSTEM DESIGN
(COMMON TO ECE, EE, CSE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

1. **INTRODUCTION:** Introduction to Computer-aided design tools for digital systems. Hardware description languages; introduction to VHDL, data objects, classes and data types, Operators, Overloading, logical operators. Types of delays Entity and Architecture declaration. Introduction to behavioural, dataflow and structural models.

2. **VHDL STATEMENTS:** Assignment statements, sequential statements and process, conditional statements, case statement Array and loops, resolution functions, Packages and Libraries, concurrent statements. Subprograms: Application of Functions and Procedures, Structural Modelling, component declaration, structural layout and generics.

3. **COMBINATIONAL CIRCUIT DESIGN:** VHDL Models and Simulation of combinational circuits such as Multiplexers, De-multiplexers, encoders, decoders, code converters, comparators, implementation of Boolean functions etc.

4. **SEQUENTIAL CIRCUITS DESIGN:** VHDL Models and Simulation of Sequential Circuits Shift Registers, Counters etc.

5. **DESIGN OF MICROCOMPUTER:** Basic components of a computer, specifications, architecture of a simple microcomputer system, implementation of a simple microcomputer system using VHDL.

6. **DESIGN WITH CPLDs AND FPGAs:** Progr ammable logic devices: ROM, PLAs, PALs, GAL, PEEL, CPLDs and FPGA. Design implementation using CPLDs and FPGAs

REFERENCE BOOKS:

1. IEEE Standard VHDL Language Reference Manual (1993).
2. Digital Design and Modelling with VHDL and Synthesis : KC Chang; IEEE Computer Society Press.
3. "A VHDL Primmer": Bhasker; Prentice Hall 1995.
4. "Digital System Design using VHDL" : Charles. H.Roth ; PWS (1998).
5. "VHDL-Analysis & Modelling of Digital Systems" : Navabi Z; McGraw Hill.
6. VHDL-IV Edition: Perry; TMH (2002)
7. "Introduction to Digital Systems": Ercegovac. Lang & Moreno; John Wiley (1999).
8. Fundamentals of Digital Logic with VHDL Design: Brown and Vranesic; TMH (2000)
9. Modern Digital Electronics- III Edition: R.P Jain; TMH (2003).

NOTE : Eight questions are to be set - at least one question from each unit. Students will be required to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- VI
ECE(W)-308: DATA COMMUNICATION
(COMMON TO ECE, EE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **DIGITAL COMMUNICATION:** Introduction, digital communication, Shannon limit for information capacity, digital radio, digital amplitude modulation, frequency shift keying (FSK), phase shift keying (PSK), quadrature amplitude modulation (QAM), band width efficiency, carrier recovery, differential phase shift keying, (DPSK), clock recovery, probability of error & bit error rate, trellis encoding.

2. **DATA COMMUNICATIONS:** Introduction, history of data communication, standard organization for data communication, data communication circuits, data communication codes, error control, synchronization, data communications hardware, serial interfaces: RS-232, RS-449 & RS-530, CCITT X.21, parallel interfaces: centronics parallel interfaces. The telephone network: DDD network, private- line service, the telephone circuit, data modems: synchronous modems, asynchronous modems, modem synchronization.

3. **DATA COMMUNICATIONS PROTOCOLS AND NETWORK CONFIGURATIONS:** Introduction, open system interconnection (OSI), data transmission mode, asynchronous protocols, synchronous protocols, public data network, integrated services digital network (ISDN), local area networks, token pass ring, Ethernet.

4. **MULTIPLEXING:** Introduction, time division multiplexing, T1 digital carrier system, CCITT time division multiplexed carrier systems, CODECS, COMBO chips, line encoding, T-CARRIERS, frame synchronization, bit interleaving VS word interleaving, frequency division multiplexing, AT&T's FDM hierarchy, composite base band signal, formation of a master group.

5. **INTERNET AND TCP/IP:** Introduction, history, use of Internet, accessing the Internet, Internet addresses, security on the internet, authentication, firewalls, intranet and extranet, TCP/IP reference model, domain name service, world wide web.

TEXT BOOK:

1. Electronic Communications Systems (4^{th} Ed.) : Wayne Tomasi; Pearson Pub.
2. Data Communication and Networking (2^{nd} -edition): Forauzan;

NOTE: Eight questions are to be set at-least one from each unit. Students have to attempt any five questions.

B.TECH. WEEKEND SEMESTER- VI
EE(W)-322: POWER SYSTEMS LAB

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 2

LIST OF EXPERIMENTS:

1. To draw the operating characteristics of an IDMT relay.
2. To draw the operating characteristics of differential relay.
3. To study Bucholtz relay.
4. To determine the dielectric strength of given transformer oil with the help of standard testing equipment.
5. To measure A B C D parameters of a transmission line model.
6. To study Ferranti effect in a transmission line model.
7. To study the plain impedance relay and plot its tripping characteristics.
8. To study the MHO relay and plot its tripping characteristics
9. To study the power control by phase shifting transformer.
10. To plot annual / monthly / daily load curve of nearby area.
11. To draw single line diagram of distribution system of HVPNL of nearby area of the college concerned.
12. To study 11 KV substation.

NOTE: At least 10 experiments are to be performed with at least 7 experiments from the above list; remaining 3 experiments may either be performed from the above list or designed & set up by the department as per the scope of syllabus.

B.TECH. WEEKEND SEMESTER- VI
EE(W)-324: ADVANCED MICROPROCESSOR & MICROCONTROLLER LAB

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 02

LIST OF EXPERIMENTS:

1. Study of 8086 microprocessor kit, its operation & commands.
2. Write a well-documented program for copying 12 bytes from source to destination, on 8086 microprocessor kit.
3. Write a program for 8086 for division of a defined double word (stored in a data segment) by another double word and verify.
4. Write a well-documented program for finding the square root of a given number, on 8086, microprocessor kit.
5. Write a program using 8086 for finding the square of a given number and verify.
6. Write a program using 8086 and verify for:
    a. Finding the largest number from an array.
    b. Finding the smallest number from an array.
7. Write a program using 8086 for arranging an array of numbers in descending order and verify.
8. Write a program using 8086 for arranging an array of numbers in ascending order and verify.
9. Write a program for 8086 for finding square of a number using look-up table and verify.
10. Write a program to interface a two digit number using seven-segment LEDs. Use 8086 microprocessor and 8255 PPI.
11. Write a program to control the operation of stepper motor using 8086 microprocessor and 8255 PPI.
12. Write an ALP to generate square wave of 10 KHz frequency using 8051 microcontroller.
13. To study the architecture of 8051 microcontroller.
14. Write an ALP to interface LED with 8051 microcontroller.
15. Write a program to find largest number from an array using 8051 microcontroller.
16. Write a program to generate square wave of 50 Hz frequency using 8051 microcontroller.
17. Write a program to find smallest number from an array using 8051 microcontroller.
18. Write a program for addition and subtraction of two 8-bit numbers using 8051 microcontroller.

NOTE: At least 10 experiments are to be performed with at least 7 experiments from the above list; remaining 3 experiments may either be performed from the above list or designed & set up by the department as per the scope of syllabus.

B.TECH. WEEKEND SEMESTER- VI
ECE(W)-328: DATA COMMUNICATION LAB
(COMMON TO EE, EL)

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 2

LIST OF EXPERIMENTS:

1. To study different types of transmission media
2. To study Quadrature Phase Shift Keying Modulation.
3. To study Quadrature Amplitude Modulation.
4. To Study 16 Quadrature Amplitude Multiplexing.
5. To Study Serial Interface RS-232 and its applications.
6. To study the Parallel Interface Centronics and its applications.
7. To configure the modem of a computer.
8. To make inter-connections in cables for data communication in LAN.
9. To install LAN using Tree topology.
10. To install LAN using STAR topology.
11. To install LAN using Bus topology.
12. To install LAN using Token-Ring topology.
13. To install WIN NT.
14. To configure a HUB / Switch.

NOTE: At least 10 experiments have to be performed in the semester; at least 7 experiments should be performed from above list. Remaining 3 experiments may either be performed from the above list or designed & set up by the department as per scope of the syllabus.

B.TECH. WEEKEND SEMESTER- VII
EE(W)-401: ELECTRIC DRIVES

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

1. **ELECTRICAL DRIVES:** Introduction, Classification, advantages, Characteristics of Electric Motors, choice of electrical drive machines, status of ac and dc drives.

2. **CONTROL OF ELECTRICAL DRIVES:** Modes of operation, closed loop control of drives, sensing of current and speed, Microprocessor based control of electric drives.

3. **DYNAMICS OF ELECTRICAL DRIVES:** Fundamental torque equations, multi-quadrant operation, equivalent values of drive parameters, load torque components, types of loads.

4. **SELECTION OF MOTOR POWER RATING:** Heating and cooling, determination of motor rating, continuous, short time and intermittent duty rating, load equalization and determination of moment of inertia of the flywheel.

5. **DC MOTOR DRIVES:** Starting, Acceleration control, braking, transient analysis, Converter fed dc drive & chopper fed dc drive.

6. **INDUCTION MOTOR DRIVES:** Starting, Acceleration control, braking, transient analysis, Static control techniques- stator frequency control, stator voltage control, rotor resistance control. Static Scherbius system & Static Kramer system, Vector control.

7. **PMBLDC & PMSAC DRIVES:** Permanent Magnet Brushless D.C. drive, Permanent Magnet Sine-fed drives, Switched Reluctance Machine Drives.

TEXT BOOKS:

1. Fundamentals of Electrical Drives:- by G.K. Dubey, Narosa Publishing House, New Delhi, 1995.
2. Electric drives: Concepts and applications, V. Subrahmaniyam, TMH, New Delhi.

REFERENCE BOOKS:

1. Power Semiconductor Controlled Drives; by G.K.Dubey, Prentice Hall.
2. Kusko, A., Solid State DC Motor Drives, MIT Press, Cambridge, Mass.USA,1969
3. Pillai S.K., A First course in elecric drives, Wiley Eastern, New Delhi.
4. Chillikan, M., Electric Drives, Mir Publishers, Moscow, 1970.
5. Bose B.K., Power Electronics & AC Drives, Prentice Hall, New Delhi, 1991.

NOTE: 8 questions are to be set – at least one from each unit. Students have to attempt any 5 questions.

B.TECH. WEEKEND SEMESTER- VII
ECE(W)-401: DIGITAL SIGNAL PROCESSING
(COMMON TO ECE, EE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **DISCRETE-TIME SIGNALS:** Signal classifications, frequency domain representation, time domain representation, representation of sequences by Fourier transform, properties of Fourier transform, discrete time random signals, energy and power theorems.

2. **DISCRETE-TIME SYSTEMS:** Classification, properties, time invariant system, finite impulse Response (FIR) system, infinite impulse response (IIR) system.

3. **SAMPLING OF TIME SIGNALS:** Sampling theorem, application, frequency domain representation of sampling, reconstruction of band limited signal from its samples. Discrete-time processing of continuous time signals, changing the sampling rate using discrete time processing.

4. **Z-TRANSFORM:** Introduction, properties of the region of convergence, properties of the Z-transform, inversion of the Z-transform, applications of Z-transform.

5. **BASICS OF DIGITAL FILTERS:** Fundamentals of digital filtering, various types of digital filters, design techniques of digital filters: window technique for FIR, bi-linear transformation and backward difference methods for IIR filter design, analysis of finite word length effects in DSP, DSP algorithm implementation consideration. Applications of DSP.

6. **MULTIRATE DIGITAL SIGNAL PROCESSING:** Introduction to multirate digital signal processing, sampling rate conversion, filter structures, multistage decimator and interpolators, digital filter banks.

TEXT BOOKS :
1. Digital Signal Processing : Proakis and Manolakis; PHI Pub.
2. Digital Signal Processing: Salivahanan, Vallavaraj and Gnanapriya;TMH Pub.

REFERENCE BOOKS:
1. Digital Signal Processing: Alon V. Oppenhelm; PHI Pub.
2. Digital Signal Processing (II-Edition): Mitra, TMH Pub.

NOTE: Eight questions are to be set - at least one from each unit. Students have to attempt five questions.

B.TECH. WEEKEND SEMESTER- VII
EE(W)-403: POWER SYSTEM OPERATION AND CONTROL

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

1. **AUTOMATIC GENERATION CONTROL:** Load frequency control (single area case), load frequency control and economic dispatch, optimal load frequency control, Load Management.

2. **ECONOMIC LOAD DESPATCH:** Introduction, Optimal Operation of Generators of Bus bar, Unit Commitment, Reliability Considerations, Optimal Generation Schedule Hydro thermal optimal scheduling.

3. **POWER SYSTEM STABILITY:** Steady state, transient & dynamic stabilities, equal area criteria, effect of fault clearing time on transient stability, dynamics of synchronous machine, factors affecting transient stability.

4. **AUTOMATIC VOLTAGE CONTROL & EXCITATION SYSTEMS:** AVRs, role of AVR on transient stability of system, type 0 & 1 excitation system, power system stabilizers.

5. **VOLTAGE STABILITY:** Basic concept, Voltage collapse, Modelling & prevention.

TEXT BOOKS:

1. Power System Engineering: I.J. Nagrath & D.P. Kothari: TMH
2. Power System Stability Volume-I: E.W. Kimbark, John Wiley & Sons.
3. Power System Engineering: S.K.Gupta (Umesh Publications)

REF. BOOKS:

1. Voltage Stability by Taylor
2. Power System Control and Stability: P. Kundur: Mc Graw Hill Pub.
3. Electric Energy System Theory: O.I. Elgerd: TMH
4. Computer Aided Power System Analysis: S.I. Ahson, D.P.Kothari & A.K. Mahalanabis, TMH.
5. Power System Analysis & Design: B.R. Gupta, Wheelers Publication,
6. EHV-AC/DC Transmission System: S. Rao: Khanna Pub.
7. PGO & C: Wood & Wallenberg, John Wiley & Sons.

NOTE: 8 questions are to be set – at least one from each unit. Students have to attempt any five questions.

B.TECH. WEEKEND SEMESTER- VII
EE(W)-421: ELECTRIC DRIVES LAB

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 02

LIST OF EXPERIMENTS:

1. Speed control of dc motor using dc chopper.
2. Speed control of dc motor using single-phase converter.
3. Speed control of dc motor using 3-phase converter.
4. Speed control of dc motor using single- phase dual converter.
5. Inverter fed single-phase induction motor drive.
6. CSI fed induction motor drive.
7. Speed control of single- phase induction motor using ac regulator.
8. Regenerative braking of dc motor using single- phase converter.
9. Speed control of single-phase induction motor using cycloconverter.
10. Static rotor resistance control method.

NOTE: At least 10 experiments have to be performed with at least 7 from above list, remaining 3 may either be performed from above list or designed & set by the department as per scope of syllabus.

B.TECH. WEEKEND SEMESTER- VII
ECE(W)-421: DIGITAL SIGNAL PROCESSING LAB
(COMMON TO ECE, EE)

L	T	P
-	-	2

Class-work Marks	: 25
Exam Marks	: 25
Total Marks	: 50
Duration of Exam	: 3 Hrs
Credits	: 2

LIST OF EXPERIMENTS:

Perform the following experiments using MATLAB:

1. To represent basic signals (Unit step, unit impulse, ramp, exponential, sine and cosine).
2. To develop program for discrete convolution.
3. To develop program for discrete correlation.
4. To understand stability test.
5. To understand sampling theorem.
6. To design analog filter (low-pass, high pass, band-pass, band-stop).
7. To design digital IIR filters (low-pass, high pass, band-pass, band-stop).
8. To design FIR filters using windows technique.
9. To design a program to compare direct realization values of IIR digital filter
10. To develop a program for computing parallel realization values of IIR digital filter.
11. To develop a program for computing cascade realization values of IIR digital filter
12. To develop a program for computing inverse Z-transform of a rational transfer function.

NOTE: At least 10 experiments have to be performed in the semester; out of which at least 7 experiments should be performed from above list. Remaining 3 experiments may either be performed from the above list or designed & set up by the department.

B.TECH. WEEKEND SEMESTER- VII
EE(W)-423: PROJECT

L	T	P
-	-	1

Class-work Marks	: 50
Total Marks	: 50
Credits	: 04

The primary objective of this course is to develop in students the professional quality of synthesis employing technical knowledge obtained in the field of Engineering & Technology through a project work involving design, analysis augmented with creativity, innovation and ingenuity.

Project involving design/ fabrication/ testing/ computer simulation/ case studies,etc. which commences in the VII Semester will be completed in VIII Semester and will be evaluated through a panel of examiners consisting of the following:

Chairman of Department	: Chairperson
Project coordinator	: Member Secretary
Respective project supervisor	: Member

The student will be required to submit two copies of his / her project report to the department for record (one copy each for the department and one for participating teacher).

Project coordinator will be assigned the project load of maximum of 1 hrs. per week including his/her own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students / groups under him / her.

The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

B.TECH. WEEKEND SEMESTER- VII
HUM-451(W): LANGUAGE SKILLS FOR ENGINEERS
(Common for all branches)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

The real challenge before the students starts when they cross the threshold of the college after completing their degree. They, all of a sudden, find themselves competing for job / P.G. Degrees, through various entrance tests and interviews. Verbal ability forms a major portion of these tests. Without sound language skills and its semantic-syntactic know-how, the students with engineering background find themselves almost under-prepared for such tests. With this difficulty of students in mind, this course is proposed to make them technically proficient in handling the language skills required in competitive exams. The course would expose students to almost all variety of items, the common run of such tests as CAT, GMAT, etc. And in the context of LPG, this cutting edge competence becomes imperative, and no professional education can afford to overlook this aspect.

1. **Remedial English:** Parts of speech; Gerunds, participles and infinitives; Clauses; Sentence-constructions (unity; avoidance of choppy and rambling sentences, logic and consistency, conciseness, sequencing of ideas); Sentence errors - agreement between verb and subject, pronoun and antecedents, sequence of tenses, problems involving modifiers (dangling and misplaced modifiers); Shifts in point of view - consistency of number and person, tense, mood, voice and subject; Parallelism; Omissions and mixed constructions.

2. **Vocabulary:** Methods of building vocabulary - etymological roots, prefixes and suffixes; Commonly used foreign words and phrases; spelling; words often confused; synonyms and homonyms; one word substitutes; verbal idioms.

3. **Punctuation and Mechanics:** End Punctuation; Internal Punctuation; Word Punctuation.

4. **Comprehension:** Abstracting; Summarizing; Observations, Findings and Conclusions; Illustration and Inductive Logic; Deduction and Analogy.

5. **Presentation:** Oral presentation - Extempore, discussion on topics of contemporary relevance, interviews.

Note: Eight questions will be set & students will be required to attempt five questions in all.

SUGGESTED READING:

1. Working with Words by R. Gairns and S. Redman, Cambridge University Press, London.
2. Meanings into Words – Upper Intermediate Students Book, Doff / jones, Foundation Books (Cambridge University Press), Delhi.
3. A Practical English Grammar by A.J. Thomson and A.V. Martinet, OUP, Delhi.
4. Examine your English by Margaret M. Maison, Orient Longman, New Delhi.
5. A Practical Guide to Colloquial Idiom by W.J. Ball, Longman.
6. A Guide to Correct English by L.A. Hill, Oxford.
7. Structural Essentials of English by H. Whitehall, Longman.
8. Advanced English Practice by B.D. Graver, OUP. Delhi.
9. Public Speaking, Sudha Publication Pvt. Ltd., New Delhi.
10. Group Discussion, Sudha Publication Pvt. Ltd., New Delhi.

B.TECH. WEEKEND SEMESTER- VII
HUM(W)-453: HUMAN RESOURCE MANAGEMENT
(Common for all branches)

L	T	P		
3	-	-	Class-work Marks	: 50
			Exam Marks	: 100
			Total Marks	: 150
			Duration of Exam	: 3 Hrs
			Credits	: 4

1. Understanding Organisational Behaviour: Definition, Goals of Organisational behavior, Key forces affecting Organisational Behaviour, Fundamental Concepts of Organisational Behaviour.

2. Motivation: Meaning, Objectives and importance of motivation, Theories of Motivation, Maslow's theory, Mc Greger's Theory, Herzberg's theory.
   Morale: Meaning; Factors affecting morale, types of morale morale, and productivity, Evaluation of morale, improving morale.

3. Communication: Definition & importance of Communcation; Formal & informal communication, Barriers in communication.

4. Leadership: Definition & importance, Nature of leadership various approaches to leadership styles.

5. Importance of human resources in industry, Definition of human resource management, mechanical approach towards personnel, Paternalism, Social system approach.

6. Need for human resource planning, process of human resource planning, Methods of recruitment, Psychological tests and interviewing, Meaning and importance of placement, Meaning and techniques of induction. Training and development: Concepts of training and development, Importance of training and development, Management development: its nature, purpose and method.

7. Significant factors affecting compensation, Methods of wage payment, Wage differentials, Causes of difference in Wages, Types of wage differentials, Wage incentives, Meaning, Objectives, types of incentive plans.

Recommended Books :

Text Books:

1. Human Resource and Personnel Management – K. Aswathappa – Tata McGraw Hill Pub. Co. Ltd.
2. Personnel Management : C.B. Mamoria, Himalaya Publishing House.
3. Organisational Behaviour – Dr. L.M. Prasad (Sultan Chand & Sons).

Reference Books:

1. Personnel Management & Industrial Relations : Dr. T.N. Bhagoliwal: Sahitya Bhawan Agra.
2. Personnel Management : V.G. Karnik, Jaico Publishing House.
3. Personnel management & Industrial Relation: Tripathi: Sultan Chand & Sons.
4. Personnel Management – Arun Monappa & Mirza Saiyadain – Tata McGraw Hill Publishing Co. Ltd.
5. Personnel Management and Industrial Relations – D.C. Sharma & R.C. Sharma S.J. Publications.
6. Principles of Personnel Management – Edwin B. Flippo (McGraw Hill).
7. Organisational Behaviour – K. Adwathappa.
8. Organizational Behaviour – John W. Newsstorn & Keith Davis, Tata McGraw -Hill Pub. Co. Limited, N. Delhi.

Note: Eight questions are to be set at least one question from each unit and the students will have to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- VII
HUM(W)-455: ENTREPRENEURSHIP
(Common for all branches)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **Promotion of Entrepreneurship**: Meaning, definition and functions of an entrepreneur, qualities of a good entrepreneur; Role of Entrepreneur in economic development, Government measures for the promotion of small scale industries with special reference to Haryana, Cultural factors in developing entrepreneurship.

2. **Ownership and Location of Industrial Units:** Different forms of Industrial Organization, theories of Industrial location. Process of preparing project reports.

3. **Size of Firm and Pricing**:Concept of optimum firm, factors determining Optimum size, Technical, Managerial, Marketing Uncertainties and risk. Pricing Methods, Policies and procedures.

4. **Financing of Small Industries**: Importance and need: Commercial Banks and term lending in India; Banks and under-writing of capital issues; Brief description about the role of other financial agencies viz; Industrial Finance Corporation of India. State Financial Corporation, Industrial Development Bank of India, Unit Trust of India.

5. **Problems Faced by Small Enterprises**: Problems connected with Marketing, Management of New Products, Power, Finance, Raw Material, Under-utilization of capacity, Causes of under – utilization; Rehabilitation of Sick Mills.

6. **Government and Business**
   (a) Highlights of Industrial Policy and Licensing Policy.
   (b) International Marketing with special reference to export documentation.

Recommended Books:

1. Entrepreneurship of Small Scale Industries – Deshpande Manohar D.(Asian Publishers, New Delhi)
2. Environment and Entrepreneur – Tandon B.C. (Asian Publishers, New Delhi).
3. The Industrial Economy of India – Kuchhal S.C. (Chaitanya, Allahabad).
4. Emerging Trends in Entrepreneurship Development Theories & Practices – Singh P.Narendra (International Founder, New Delhi)
5. Entrepreneur, Banker & Small Scale Industries – Bhattacharya Hrisnikes.
6. Entrepreneurship & Growth of Enterprise in Industrial Estates – Rao Gangadhara N.

NOTE: Eight questions are to be set at least one question from each unit and the students will have to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- VII
HUM(W)-457: BUSINESS COMMUNICATION
(Common for all branches)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

The course proposes to help students develop business and technical communication competence. It focuses on writing skills and strategies for specific purposes. The inevitability of introducing this course to Engineering students is embodied in that it has comparatively a high concentration of certain complex writing techniques and procedures.

1. **Business correspondence:** Characteristics and Formats of Business letter; Quotations, Orders, Tenders, Sales letters, claim and adjustment letters, Credit and Collection letters, Application Letters for vacant situations with emphasis on Resumes and Curriculum Vitae; E-mail and Netiquette – format, style and tone.

2. **Business Reports and Proposals:** Importance, Function, Pattern and formats of Reports, Typical Business Reports, Report Organisation and Presentation, and Formal Reports; Proposal Formats, Writing problem-Solving Proposals, Executive Summary Proposals and project Proposals.

3. **Meetings:** Writing of Memorandum, Notes, Agenda and Minutes of Meeting.

4. **Public Relations and Advertising Documents:** Press Releases, Public Service Announcements, Advertising Strategy and its objective, Designing of Classified and Display Advertising copies.

SUGGESTED READING:

1. Business Communication: Process & Product by Hary Ellen Guffey, IV Edition, South-Western College Publishing, Cincinnati.
2. Business Correspondence and Report Writing by R.C. Sharma & Krishna Mohan, Tata Mcgraw Hill Publication, New Delhi.
3. Effective Business English and Correspondence by M.S. Ramesh and C.C. Pattanshetti, R. Chand & Co., New Delhi.
4. Effective Letters in Business by Robert by C. Shruter, Tata Mcgraw Hill, New Delhi.
5. English Business Letters by F.W. Wing & D. Anncree, Orient Longman.
6. Written Communication in English by Sarah Freeman, Orient Longman.
7. International Business English by Leo Jones & Richard Alexander, Cambridge University Press.
8. General and Business English by Sweet Stephen, Sir Issac Pitman & Sons Ltd., London.
9. How to Write and Present Technical Information, Charles H. Sides, Cambridge University Press, U.K.
10. Strategies for Engineering communication, Susan Stevenson / Steve Whitmore, John Wiley and Sons, Inc. Printed in India by Replika Press Pvt. Ltd., Delhi.

Note: Eight questions will be set and students will be required to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- VII
PHY(W)-451: NANO TECHNOLOGY
(Common for all branches)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

1. **INTRODUCTION TO NANOTECH:** Crystalline-Non crystalline materials, Fundamental of Nanotechnology and Nanomaterials in Metals, other Materials, & Bio-system, Molecular Recognition, Quantum Mechanics and Quantum Ideas in Nanotechnology. Semiconductor Nanoparticles.

2. **PREPARATION AND CHARACTERIZATION OF NANOPARTICLES:** Nanoscale Lithography, Dip Pen Lithography, E-Beam LIthography, Nanosphere Life off, Lithography; Molecular Synthesis, Nanoscale Crystal Growth, Polymerization Nanobricks and Building blocks:Tools for Measuring Nanostructures – Scanning Probe Instrument, Spectroscopy, Electrochemistry, Election Microscope Tools to Make Nanostructure.

3. **PROPERTIES & APPLICATION OF NANO CRYSTALLINE MATERIALS:** Application in Sensors, Nanoscale Biostructure Electronics, Magnets, Optics, Fabrication Biomedical Applications, Smart Materials – Self Healing Structures, Heterogenous Nanostructure and composites En Capsulation, Carbon Nanotubes.

4. Synthesis of semiconductor Nanoclusters, Processing of Nanomaterials, Nanobusiness – Boom, Bust and Nano Tech. NanoEthics

REFERENCES:

1. Camarata, R.C. Nanomaterials synthesis, properties and application Institute of Physics Publication
2. Madou, Fundamentals of microfabrication, Mcgraw Hill.
3. Sibelia, J.P., A Guide to material characterization, Prentice Hall.
4. Mark Ratner, Daniel Ratner – NanoTechnology – A Gentle Introduction to the Next Big Idea.

Note: The question paper will contain 8 questions in all. The student will be required to answer any five. At the most one question will be set from each section.

B.TECH. WEEKEND SEMESTER- VII
PHY(W)-453: LASER TECHNOLOGY
(Common for all branches)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

Conditions for Producing Laser, Concept of coherence – Special and temporal, Population Inversions, Einstein coefficient, Gain and Gain saturation, Saturation intensity, Development and Growth of a Laser Beam, Exponential Growth factor, Threshold Requirement for a Laser.

Inversions and two-level systems, steady-state inversions and three and four-level systems. Transient Population Inversions, Factors effecting population inversion, Laser Amplifiers.

Excitation or Pumping Threshold Requirements, Pumping Pathways, Specific Excitation Parameters Associated with Optical and particle pumping.

Helium-Neon Laser, Co_2 Laser, Ruby Laser, Semiconductor Diode Laser.

RECOMMENDED BOOKS:

1. Laser Fundamentals by William T. Silfvast Cambridge University, press.
2. Introductory University Optics by John Beynon, (PHI)
3. Laser – B.B. Laud.
4. Optics – A.K. Ghatak (TMH)

Note: Eight questions will be set and students will be required to attempt any five questions in all. All questions will carry equal marks.

B.TECH. WEEKEND SEMESTER- VII
ME(W)-451: MECHATRONIC SYSTEMS
(Common for all branches)

L	T	P		
3	-	-	Class-work Marks	: 50
			Exam Marks	: 100
			Total Marks	: 150
			Duration of Exam	: 3 Hrs
			Credits	: 4

1. Introduction to Mechatronics, Integrated design issues in Mechatronics, Conceptual design, Possible design solutions, Integrated approach for combining sensors, actuators, computer and the product. Some examples - like auto focus camers, engine combustion control, washing machine, vehicle suspensions, electro-mechanical brakes, manufacturing machine, industrial robots, air conditioning systems, etc.

2. Classification of sensors of various types, resistive, strain gage, thermistor, inductive, capacitive, piezo-electric, optical, photodetectors, encoders, ultrasonic types Silicon sensors, Micro-sensors for various measurements. Consideration for choice of sensors for a given application.

3. Signal conditioning and data acquisition using computers. A/D and D/A converters. Use of plus-in-cards and software for acquiring data from several sensors.

4. Mechanical actuation systems – kinematic chains, cams, gear trains, beld and chains drive, ratchet and prawl, bearing, guideways, ball screw and nut, etc. Electrical actuation systems: Operational characteristic and application of electrical actuation components for application like, AC/DC motors, stepper motors, relays, push buttons, switches, solenoids etc.

5. Introduction to semiconductor electronics, junction diode, bipolar junction transistor, field effect transistors, digital logic, number systems, Logic gates Boolean algebra, Application of logic gates, Combinational and sequential logic.

6. Sequence control, relay ladder diagrams for sequence control in processes and machines. Programmable Logic Controllers and applications: PLC structures, PLC languages, programming of PLC using Mnemonics, Interfacing PLC with actuators, Sequencing of cylinders. Timers, internal relays and counters. Open loop and closed loop control using PLC.

7. Architecture of microprocessors and microcontrollers, Use of suitable software languages for micro controllers and their applications in mechatronic systems, Real time interfacing between computers and measurement or control systems. Introduction to modeling and computer control of process and mechanical systems.

8. Communication systems Protocols, Open systems interconnection models, Smart transducers and transmitters, Field buses.

TEXT BOOKS:

1. Mechatronics – Electronic control in mechanical & electrical engineering by W.Bolton, Longman Indian Edn. 1999.
2. Mechatronic system design, by D.Shetty and R.A. Kolk – Mechatronic system design, PWS Publ. Co., Boston, 1997.
3. Mechatronics and Measurement Systems by D.G.Alciatore and M.B. Histand, TMH Publ. 2nd Edn. 2003.

NOTE: In the semester examination, the examiner will set 8 questions in all, and students will be required to attempt only 5 questions.

B.TECH. WEEKEND SEMESTER- VII
CSE(W)-401: MULTIMEDIA TECHNOLOGIES
(Common for all branches other than CSE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

1. **Basics of Multimedia Technology:** Computers, communication and entertainment; multimedia an introduction; framework for multimedia systems; multimedia devices; CD-Audio, CD-ROM, CD-I, presentation devices and the user interface; multimedia presentation and authoring; professional development tools; LANs and multimedia; internet, World Wide Web & multimedia distribution network-ATM & ADSL; multimedia servers & databases; vector graphics; 3D graphics programs; animation techniques; shading; anti aliasing; morphing; video on demand.

2. **Image Compression & Standards:** Making still images; editing and capturing images; scanning images; computer color models; color palettes; vector drawing; 3D drawing and rendering; JPEG-objectives and architecture; JPEG-DCT encoding and quantization, JPEG statistical coding, JPEG predictive lossless coding; JPEG performance; overview of other image file formats as GIF, TIFF, BMP, PNG etc.

3. **Audio & Video:** Digital representation of sound; time domain sampled representation; method of encoding the analog signals; subband coding; fourier method; transmission of digital sound; digital audio signal processing; stereophonic & quadraphonic signal processing; editing sampled sound; MPEG Audio; audio compression & decompression; brief survey of speech recognition and generation; audio synthesis; musical instrument digital interface; digital video and image compression; MPEG motion video compression standard; DVI technology; time base media representation and delivery.

4. **Virtual Reality:** Applications of multimedia, intelligent multimedia system, desktop virtual reality, VR operating system, virtual environment displays and orientation making; visually coupled system requirements; intelligent VR software systems.

   Applications of environment in various fields.

Text Books:

1. An introduction, Villamil & Molina, Multimedia Mc Milan, 1997
2. multimedia: Sound & Video, Lozano, 1997, PHI, (Que)

Reference Books:

1. Multimedia: Production, planning and delivery, Villamil & Molina,Que, 1997
2. Multimedia on the PC, Sinclair,BPB
3. Multimedia: Making it work, Tay Vaughan, fifth edition, 1994, TMH.
4. Multimedia in Action by James E Shuman, 1997, Wadsworth Publ.,
5. Multimedia in Practice by Jeff coate Judith, 1995,PHI.
6. Multimedia Systems by Koegel, AWL
7. Multimedia Making it Work by Vaughar, etl.
8. Multimedia Systems by John .F. Koegel, 2001, Buford.
9. Multimedia Communications by Halsall & Fred, 2001, AW.

Note: Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- VII
CSE(W)-204: PRINCIPLES OF OPERATING SYSTEMS
(Common for all branches other than CSE)

L	T	P
3	-	-

Class Work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs.
Credits	: 4

1. **Introduction:** Introduction to Operating System Concepts (including Multitasking, multiprogramming, multi user, Multithreading etc)., Types of Operating Systems: Batch operating system, Time-sharing systems, Distributed OS, Network OS, Real Time OS; Various Operating system services, architecture, System programs and calls.

2. **Process Management:** Process concept, process scheduling, operation on processes; CPU scheduling, scheduling criteria, scheduling algorithms -First Come First Serve (FCFS), Shortest-Job-First (SJF), Priority Scheduling, Round Robin(RR), Multilevel Queue Scheduling.

3. **Memory Management:** Logical & Physical Address Space, swapping, contiguous memory allocation, non-contiguous memory allocation paging and segmentation techniques, segmentation with paging; virtual memory management - Demand Paging & Page-Replacement Algorithms; Demand Segmentation.

4. **File System:** Different types of files and their access methods, directory structures, various allocation methods, disk scheduling and management and its associated algorithms, Introduction to distributed file system.

5. **Process-Synchronization & Deadlocks:** Critical Section Problems, semaphores; methods for handling deadlocks-deadlock prevention, avoidance & detection; deadlock recovery.

6. **I/O Systems:** I/O Hardware, Application I/O Interface, Kernel, Transforming I/O requests, Performance Issues.

7. **Unix System And Windows NT Overview:** Unix system call for processes and file system management, Shell interpreter, Windows NT architecture overview, Windows NT file system.

Text Books:

1. Operating System Concepts by Silberchatz et al, 5th edition, 1998, Addison-Wesley.
2. Modern Operating Systems by A. Tanenbaum, 1992, Prentice-Hall.
3. Operating Systems Internals and Design Principles by William Stallings,4th edition, 2001, Prentice-Hall

Reference Books:

1. Operating System by Peterson, 1985, AW.
2. Operating System by Milankovic, 1990, TMH.
3. Operating System Incorporating With Unix & Windows By Colin Ritche, 1974, TMH.
4. Operating Systems by Mandrik & Donovan, TMH
5. Operating Systems By Deitel, 1990, AWL.
6. Operating Systems – Advanced Concepts By Mukesh Singhal , N.G. Shivaratri, 2003, T.M.H

Note: Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- VII
CSE(W)-409: ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS
(Common for all branches)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

1. **Introduction to Artificial intelligence:** Scope, history & applications: AI as representation and search the predicate calculus inference rules. Logic based financial advisor, structures and strategies for state space search graph theory, strategies for space search, using state space to represent reasoning with the predicate calculus.

2. **Heuristic Search:** An algorithm for heuristic search, admissibility monotonicity and informed ness heuristics in games, complexity issues, control and implementation of state space search recursion based search, pattern directed search. Production systems, predicate calculus and planning the black board architecture for problems solving.

3. **LISP and PROLOG:** Knowledge representation languages issues in knowledge representation, network representation language, structured representations, introduction to LISP, Search in LISP: a functional approach to the farmer, Wolf, Goat and cabbage problem, higher order functions & procedural abstraction, search strategies in LISP.

4. **Expert systems:** Introduction, History basic concepts, structure of expert systems, the human element in ES how ES works, problem areas addressed by ES, ES success factors, types of expert systems, ES and the internet interacts web, knowledge engineering, scope of knowledge, difficulties, in knowledge acquisition methods of knowledge acquisition, machine learning, intelligent agents, selecting an appropriate knowledge acquisition method, knowledge acquisition form multiple experts validation and verification of the knowledge base, analyzing coding, documenting & diagramming.

5. **Expert systems- II**: societal impacts reasoning in artificial intelligence, inference with rules, with frames: model based reasoning, case based rezoning, explanation & meta knowledge inference with uncertainty representing uncertainty probabilities and related approaches, theory of certainty (certainty factors) Qualitative reasoning, the development life cycle, phases I, II, III, IV, V, VI the future of expert system development process societal impacts.

Note: Eight questions will be set and students will be required to attempt five questions in all.

TEXT BOOKS:

1. Efrain Turban and Jay E Aranson: Decision support systems & intelligent systems (5th Edn.) Prentice hall, 1998.
2. Donald A Waterman: A Guide to expert Systems, Addison -Wesley 1995
3. G.F. Luger & W.A Stubble Field -Artificial Intelligence structures and Strategies for complex problem solving, 3 rd Edn. Addision Wesley 1998.
4. E.Rich and Knight, Artificial Intelligence, Second Edn, Tata Mc. Graw Hill Publishing, 1981.

B.TECH. WEEKEND SEMESTER- VII
CSE-411: MANAGEMENT INFORMATION SYSTEM
(Common for all branches)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

1. **Foundation of Information System:** Introduction to Information System and MIS, Decision support and decision making systems, systems approach, the systems view of business, MIS organization within company, Management information and the systems approach.

2. **Information Technology:** A manager's overview, managerial overviews, computer hardware & software, DBMS, RDBMS and Telecommunication.

3. **Conceptual system design:** Define the problems, set systems objective, establish system constraints, determine information needs determine information sources, develop alternative conceptual design and select one document the system concept, prepare the conceptual design report.

4. **Detailed system design:** Inform and involve the organization, aim of detailed design, project management of MIS detailed design , identify dominant and trade of criteria, define the sub systems, sketch the detailed operating sub systems and information flow, determine the degree of automation of each operation, inform and involve the organization again, inputs outputs and processing, early system testing, software, hardware and tools propose an organization to operate the system, document the detailed design revisit the manager user.

5. **Implementation evaluation and maintenance of the MIS:** Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train the operating personnel, computer related acquisitions, develop forms for data collection and information dissemination, develop the files test the system, cut-over, document the system, evaluate the MIS control and maintain the system. Pitfalls in MIS development.

6. **Advanced Concepts in Information Systems:** Enterprise Resources Management (ERP), Supply Chain Management, C R M, Procurement Management System.

Text Books:

1. Management Information System by W. S. Jawadekar, 2002, Tata McGraw Hill.
2. Information System for Modern Management (3rd edition) - Robert G. Murdick, Loel E. Ross & James R. Claggett. PHI

Reference books:

1. Management Information System; O Brian; TMH
2. Management Information System by Davis Olson Mac Graw Hill
3. Management Information System by Stasllings,(Maxwell Mc Millman Publishers)
4. Information System; a Management Perspective; Alter Addison Wesley
5. Introduction to Information System; McGraw Hill

Note: Eight questions will be set in all by the examiners taking at least one question from each unit. Students will be required to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- VII
EE(W)-455: INTELLIGENT INSTRUMENTATION FOR ENGINEERS
(Common for all branches)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

1. INTRODUCTION: Intelligence, features characterizing intelligence, intelligent instrumentation system; features of intelligent instrumentation; components of intelligent instrumentation system; Block diagram of an intelligent instrumentation system.

2. SIGNAL PROCESSING, MANIPULATION AND TRANSMISSION: Signal amplification & attenuation (OP-AMP based); Instrumentation Amplifier (circuit diagram, high CMRR & other features); Signal Linearization (different types such as Diode-resistor combination, OP-AMP based, etc.); Bias Removal, Signal filtering (outputs from ideal filters, outputs from constant-k filters, matching of filter sections, active analog filters); OP-AMP based Voltage-to-current converter, Current-to-voltage conversion, Signal integration, Voltage follower (pre-amplifier), voltage comparator, Phase-locked loop, Signal addition, Signal multiplication, Signal Transmission (Signal amplification, Shielding, Current loop transmission, Voltage-to-frequency conversion, Fiber optic transmission); Description of Spike Filter (software-based).

3. SMART SENSORS: Primary sensors; Excitation; Compensation (Nonlinearty**:** look up table method**,** polygon interpolation, polynomial interpolation**,** cubic spline interpolation, Approximation & regression; Noise & interference**;** Response time**;** Drift; Cross-sensitivity)**;** Information Coding/ Processing**;** Data Communication**;** Standards for smart sensor interface**.**

4. INTERFACING INSTRUMENTS & COMPUTERS: Basic issues of interfacing; Address decoding; Data transfer control; A/D converter; D/A converter; Sample & hold circuit; Other interface considerations.

5. RECENT TRENDS IN SENSOR TECHNOLOGIES: Introduction**;** Film sensors (Thick film sensors, Thin film sensors)**;** Semiconductor IC technology – standard methods; Microelectro-mechanical systems (Micro-machining, some application examples)**;** Nano-sensors**.**

TEXT BOOK:

1. Barney, G.C., Intelligent Instruments. Hemel Hempstead: Prentice Hall, 1985.
2. Alan S. Morris, Principles of Measurement & Instrumentation. N. Delhi: PHI Pvt. Ltd., 1999.

REFERENCE BOOK:

1. D. Patranabis, Sensors & Transducers. N. Delhi: PHI, 2003.
2. Roman Kuc, Introduction to Digital Signal Processing. N. York: McGraw-Hill Pub. Co.

NOTES:

1. In the semester exam., the examiner will set 8 questions in all covering the entire syllabus. Students will be required to attempt any five questions.
2. Use of scientific calculator will be allowed in the Exam. However, pager, programmable calculator & cellular phone etc. And exchange of any materials will not be allowed.

B.TECH. WEEKEND SEMESTER- VII
ECE(W)-403: EMBEDDED SYSTEMS DESIGN
(Common for all branches other than ECE)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

1. INTRODUCTION: 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.

2. MICROCONTROLLER ARCHITECTURE: Introduction to PIC microcontrollers, Architecture and pipelining, program memory considerations, Addressing modes, CPU registers, Instruction set, simple operations.

3. INTERRUPTS AND I/O PORTS: Interrupt logic, Timer2 scalar initialization, IntService Interrupt service routine, loop time subroutine, External interrupts and timers, Synchronous serial port module, Serial pheriphal device, O/p port Expansion, I/p port expansion, UART.

4. SOFTWARE: Development tools/ environments, Assembly language programming style, Interpreters, High level languages, Intel hex format object files, Debugging.

5. PROGRAMMING WITH MICROCONTROLLERS: Arithmetic operations, Bit addressing, Loop control, Stack operation, Subroutines, RAM direct addressing, state machines, Oscillators, Timer Interrupts, Memory mapped I/O.

6. DESINING USING MICROCONTROLLERS: Music box, Mouse wheel turning, PWM motor control, Aircraft Demonstration, ultra sonic distance measuring, Temperature Sensor, Pressure Sensor, Magnetic field 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. ND.
3. Programming Embedded Systems in C and C++: Michael Barr; SHROFF PUB. & DISTR. ND.

Note: Eight questions will be set and students will be required to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- VII
CH(W)-453: POLLUTION AND CONTROL
(Common for all branches)

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 04

1. Waster Water & its treatment Processes-Waste-water characteristics, effiuent standards, primary treatment, secondary treatment – aerobic (activated sludge, aerated lagoons, trickling filter, roughing filter, rotating biological contactor) anaerobic (contact process, UASB).

2. Air Pollution- Classification of air pollutants Particulates: Physical characteristics, mode of formation, setting properties, Control measures. Hydrocarbons: Nature; sources, control Carbon Monoxide: Source, harmful effects on human health, control measures. Oxides of Sulphur and Nitrogen Sources, effects on human health and plants. Control measure.

3. Solid Waste Types, sources and properties of solid waste, aolid waste management Generation, Collection and techniques for ultimate disposal, Elementary discussion on resource and energy recovery.Elementary treatment of nuclear pollution, metal pollution, noise pollution their effects & control.

Books Suggested:

1. Environmental Engg.: by Howard s. Peavy & Others, MGH International.
2. Metacaf – EDDY – Waste-water engineering revised by George Teholonobus (TMH)
3. Environmental Chemistry by B.K. Sharma, Goel Publishing, Meerut.
4. Environmental Chemistry, A.K.DE, Wiley Eastern.
5. Air Pollution: H.C. Perking – McGraw Hill.

Note: Eight questions will be set and students will be required to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- VIII
EE(W)-402: ADVANCED CONTROL SYSTEMS

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **STATE VARIABLE TECHNIQUES:** State variable representation of systems by various methods. Solution of state equations-state transition matrix. Transfer function from state variable model. Controllability & Observability of state variable model.

2. **SECOND ORDER SYSTEMS & STATE PLANE:** Phase portrait of linear second order systems. Method of isoclines, phase portrait of second order system with non-linearities, limit cycle, singular points.

3. **DESCRIBING FUNCTION ANALYSIS:** Definition, limitations, use of describing function for stability analysis , describing function of ideal relay, relay with hysteresis & dead zone, saturation/coulomb friction & backlash,

4. **LINEAR APPROXIMATION OF NONLINEAR SYSTEMS:** Taylor series, Liapunov's 2^{nd} method.

5. **SAMPLED DATA SYSTEMS:** Sampling process, impulse modulation, mathematical analysis of sampling process, application of Laplace transform, Shannon's theorem, reconstruction of sampled signal zero order & first order hold, Z-transform, definition, evaluation of Z-transform, Inverse Z-transform, pulse transfer function, limitations of Z-transform, state variable formulation of discrete time systems. Solution of discrete time state equations, stability, definition, the Schur-Cohn stability criterion, Jury's test of stability of extension of Routh-Hurwitz criterion to discrete time systems.

TEXT BOOKS:

1. Digital Control & State Variable Methods: M.Gopal ; TMH.

REFERENCE BOOKS :

1. Modern Control Theory: M.Gopal; Wiley International.
2. Discrete time control system : K.Ogata; PHI
3. Digital Control Systems: B.C.Kuo
4. Applied non-linear control: J.E.Slotine & W.P.Li; Prentice Hall, USA,
5. Nonlinear Control Systems: Isidori; Springer-Verlag.

NOTE: 8 questions are to be set –one from each unit. Students have to attempt five questions.

B.TECH. WEEKEND SEMESTER- VIII

EE(W)-408: COMPUTER APPLICATIONS TO POWER SYSTEM ANALYSIS

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

PART-A

LOAD FLOW STUDIES: Introduction, Bus Admittance Matrix, Formation of Y Bus, Tree graph, Co-tree, Primitive network, Bus Incidence matrix, Formulation of Y Bus using singular transformation, Load flow equations, Approximate Load flow study, Gauss-Seidel method for Load flow Study, Algorithm and flow- Chart for Computer application to Load flow studies using G-S method, Newton-Raphson method for Load flow studies, Algorithm and flow chart for Computer Application to Load flow studies using N.R. Method. Decoupled Load flow Studies, Fast Decoupled Load flow. Comparison between G-S & N.R. Methods. Load flow Study of Distribution System.

PART-B

DIGITAL TECHNIQUES IN FAULT CALCULATIONS: Review of symmetrical components, Sequence networks for synchronous machines, transformers and transmission Lines. Bus Impedance matrix, Algorithm for formulation of Bus Impedance Matrix; all types of modifications, Short circuit Studies: Single line to ground fault, Line to Line fault, Double line to Ground fault and symmetrical fault. Consideration of Pre-fault currents.

PART-C

COMPUTER CONTROL & AUTOMATION: Introduction to energy control centres, various states of a power system, SCADA Systems and RTU. Introduction to the MATLAB Power System Block Set.

TEXT BOOKS:

1. Power System Engg.: B.R.Gupta (S.Chand).
2. Computer methods in power system: G. W. Stagg and A. H. El-Abiad, M.G.H.
3. Power System Engineering(with Computer Applications): S.K.Gupta (Umesh Publications)

REFERENCE BOOKS:

1. Power System Analysis : Hadi Saadat, TMH, New Delhi.
2. Electrical Energy system theory: An introduction by O.I.Elgerd, TMH.
3. Elements of power system analysis: W. D. Stevenson, M.G.H.
4. Power System Engineering, : I.J.Nagrath & D.P.Kothari(TMH).
5. Advance power system analysis and dynamics: L.P. Singh, Wiley Eastern ltd.

NOTE: 8 questions are to be set –at least 3 questions from Part-A & Part-B each and 2 questions from Part-C. Students have to attempt any five questions.

B.TECH. WEEKEND SEMESTER- VIII

EE(W)-428: COMPUTER APPLICATIONS TO POWER SYSTEM ANALYSIS LAB

L	T	P
-	-	2

Class-work Marks	: 50
Practical	: 50
Total Marks	: 100
Duration of Exam	: 3 Hrs
Credits	: 2

List of Experiments:

1. Draw the flow chart and develop the computer program for the formation of the Y Bus of a generalized network.
2. Draw the flow chart and develop the computer program for the formation of the Z Bus of a generalized network.
3. To plot the swing curve and observe the stability.
4. To perform load flow study using Gauss-Siedel method.
5. Perform short circuit study for any type of fault.
6. To observe transmission losses and efficiency with variations in power for the given example.
7. Design of distribution system
8. To study the features of EMTP
9. To study the MATLAB Power System block set features.

NOTE: At least 10 experiments have to be performed with at least 7 from above list, remaining 3 may either be performed from above list or designed & set by the department as per the scope of syllabus.

B.TECH. WEEKEND SEMESTER- VIIl
EE(W)-412: SEMINAR

L	T	P		
-	-	2	Class-work Marks	: 50
			Total Marks	: 50
			Credits	: 3

The objectives of the course are:

- To learn how to carry out literature search
- To learn the art of technical report writing
- To learn the art of verbal communication with the help of modern presentation techniques

A student will select a topic in emerging areas of Engineering & Technology and will carry out the task under the observation of a teacher assigned by the department.

He/ She will give a seminar talk on the same before a committee constituted by the Chairperson of the department. The committee shall comprise of two three faculty members from different specializations. The teacher associated in the committee will be assigned 1 hours teaching load per week.

However, guiding students' seminar will not be considered towards teaching load.

The format of the cover page and the organization of the body of the seminar report for all the undergraduate programs will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

B.TECH. WEEKEND SEMESTER- VIIl
EE(W)-423: PROJECT

L	T	P
-	-	1

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 8

The project started in VII Semester will be completed in VIII Semester and will be evaluated through a panel of examiners consisting of the following:

Chairperson of Department	: Chairperson
Project coordinator	: Member
External expert	: To be appointed by the University

The student will be required to submit two copies of his/her project report to the department for record (one copy each for the department and participating teacher).

Project coordinator will be assigned the project load of, maximum of 1 hrs. per week including his own guiding load of one hr. However, the guiding teacher will be assigned maximum of one period of teaching load irrespective of number of students/groups under him/her.

The format of the cover page and the organization of the body of the report for all the B.Tech. will be finalized and circulated by the Dean, Faculty of Engineering and Technology.

B.TECH. WEEKEND SEMESTER- VIIl
GFEE(W)-402: GENERAL FITNESS FOR THE PROFESSION

L	T	P		
-	-	-	Exam Marks	: 100
			Credits	: 4

The purpose of this course is to inculcate a sense of professionalism in a student along with personality development in terms of quality such as receiving, responding, temperament, attitude and outlook. The student efforts will be evaluated on the basis of his/ her performance / achievements in different walks of life.
The evaluation will be made by the committee of examiners constituted as under:

1.	Dean, Faculty of Engineering & Technology	Chairperson
2.	Chairperson of the department	Member
3.	External expert	Appointed by the university

A. The student will present a written report before the committee with the following in view:

The student will present before the committee his/her achievements during the current academic session in the form of a written report highlighting the followings:

I.	Academic Performance	--------
II.	Extra Curricular Activities	**(8 Marks)**
III.	Technical Activities	**(8 Marks)**
IV.	Industrial, Educational tour	**(8 Marks)**
V.	Sports/games	**(8 Marks)**
VI.	Community Service, Hostel Activities	**(8 Marks)**

NOTE: Report submitted by the students should be typed on both sides of the paper.

B. A student will support his/her achievement and verbal & communicative skill through presentation before the examiners. **(40 Marks)**

C. Faculty Counselor Assignment **(20 Marks)**

It will be the duty of the student to get evaluated by respective faculty counselor and to submit the counselor assessment marks in a sealed envelope to the committee.

A counselor will assess the student which reflecting on his/her learning graph including the followings:

1. Discipline throughout the year.
2. Sincerity towards study.
3. How quickly the student assimilates professional value system, etc.

DEPT. ELECTIVE I
B.TECH. WEEKEND SEMESTER- VIII
EE(W)-424: FUZZZY CONTROL SYSTEM

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **INTRODUCTION:** Fuzzy control from an industrial perspective, knowledge-based controllers, knowledge representation in KBC's.

2. **THE MATHEMATICS OF FUZZY CONTROL**: Vagueness, fuzzy logic versus probability theory, fuzzy sets, their properties & operations on fuzzy sets, fuzzy relations & operations on fuzzy relations, the Extension Principle, Fuzzy propositions, The Compositional Rule of Inference, Different implications, Representing a set of rules.

3. **FKBC DESIGN PARAMETERS:** The FKBC architecture, choice of variables & content of rules, Derivation of rules, choice of membership functions, choice of scaling factors, choice of fuzzification procedure, choice of defuzzification procedure, comparison and evaluation of defuzzification methods.

4. **NONLINEAR FUZZY CONTROL:** The Control Problem, The FKBC as a Non-Linear Transfer Element, Types of FKBC such as PID-like FKBC, Sliding Mode FKBC, Sugeno FKBC.

5. **ADAPTIVE FUZZY CONTROL:** Design & Performance Evaluation, Approaches to Design such as membership function tuning using gradient descent, membership function tuning using performance criteria, the self-organizing controller, model based controller.

6. **STABILITY OF FUZZY CONTROL SYSTEMS:** The State space approach, Stability and robustness indices, input-output stability, circle criterion, the conicity criterion.

TEXT BOOK:

1. An Introduction to Fuzzy Control: D.,Driankov, H.Hellendoorn and M.Reinfrank.; Narosa Publications.

REFERENCE BOOKS:

1. Fuzzy Control Systems by Abraham Kandel and Gideon Imngholz; Narosa Publications.

NOTE: Eight questions are to be set at least one from each unit. Students have to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- VIIl
EE(W)-432: EXTRA HIGH VOLTAGE AC / DC

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **Break Down Mechanism of Gaseous Materials:** Mechanism of Breakdown of gases, Townsend's first Ionization Co-efficient, Townsend's second Ionization Co-efficient, Townsend's Breakdown Mechanism, Streamer Theory of Breakdown in gases, Paschen's law.

2. **Breakdown in Liquid and Solid Dielectrics:** Suspended Particle Theory, Cavity Breakdown, Electro-convection Breakdown, Breakdown in solid Dielectrics, Intrinsic Breakdown, Electromechanical Breakdown, Breakdown due to Treeing and Tracking, Thermal Breakdown, Electrochemical Breakdown

3. **Generation of High Voltage AC. and D.C:** Half wave and Full wave Rectifier, Cockroft Walton Voltage Multiplier Circuit, Ripple in Multiplier Circuit, Electrostatic Vandegraff Generator, Generation of High Alternative Voltage, Cascade Transformer, Resonant Transformer, Generation of High Frequency A.C. High Voltage

4. **Generation of Impulse Voltages and Currents:** Standard Impulse Wave Shapes, Impulse Generator Circuit, Multistage Impulse Generator, Marx's Circuit, Generation of Switching Surges, Impulse Current Generation, Tripping and Control of Impulse Generator

5. **Measurement of High Voltage and Current:** Sphere-Gap, Uniform field Spark gap, Rod Gap, Electrostatic Voltmeter, Generating Voltmeter, Impulse Voltage Measurement using Voltage divider, Measurement of high DC, AC and Impulse Current.

6. **High Voltage Testing of Electrical Equipments:** Testing of line Insulator, Testing of Cable, Testing of Bushings, Testing of Power Capacitor, Testing of Power Transformers, Testing of Circuit Breaker.

7. **Transients & Insulation Co-ordination in Power System:** Over Voltage due to disturbances in D.C & A.C. System, Lightening surges, Switching Surges, Insulation Co-ordination in Power System, Surge Arrestor, Application of surge Arrestor.

Text Book:

1. High Voltage Engineering By M.S. Naidu & V. Kamaraju -TMH Publication

Reference Books:

1. J. Arrillaga, High Voltage Direct Current Transmission. Pub: Peter Peregrinus Ltd. on behalf of E.E Power Engg. Series.
2. Rakos Das Begamudre, Extra EHV A.C Transmission. PHI Publication.
3. C.L Wadhwa , High Voltage Engineering. Pub.: New Age International Ltd.

B.TECH. WEEKEND SEMESTER- VIII
EE(W)-434: ADVANCED INSTRUMENTATION

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **INTRODUCTION:** Functional block diagram of generalized Instrumentation system. Input-output configuration, specifications under steady and transient state & their performance characteristics.

2. **REVIEW OF SENSORS AND TRANSDUCERS:** Temperature, pressure, displacement, velocity, acceleration, strain and torque type.

3. **SIGNAL CONDITIONING:** Current & voltage sensitive bridges, Blumlein Bridges, Shielding & grounding, Instrumentation Amplifier & its Characteristics, Linearizing circuits, Wave form and frequency conversion, Acitve filters, A/D & D/A converters; Balanced modulators & demodulators.

4. **NOISE:** Characteristics & Measurement of signals in the presence of noise.

5. **MICROCONTROLLER BASED INSTRUMENTATION SYSTEM:** Interfacing of 8051 Microcontroller with (a) ADC and DAC, (b) Alphanumeric Devices (Sixteen-segment Display, Dot Matrix Displays, LCD Display).

REFERENCES:

1. E.O. Doeblin, Measurement System – Application & Design. TMH
2. A.K. Sawhney, A Course in Electrical & Electronics Measurement & Instrumentation. Pub.: Dhanpat Rai & Sons.
3. C.S. Rangan, G.R. Sarma, V.S.V. Mani, Instrumentation Devices & Systems. New Delhi: Tata McGraw-Hill Pub. Co. Ltd.
4. Oliver & Cage, Electronic Measurement & Instrumentation.
5. Raj Kamal, Microcontrollers: Architecture, Programming, Interfacing and System Design. Delhi: Pearson Education (Singpaore) Pte. Ltd., Indian Branch.
6. Kenneth. J. Ayala, The 8051 Microcontrollers – Architecture, Programming & Applications. Mumbai: Penram International Publishing (India) Pvt. Ltd..
7. Scott Mackenzie, The 8051 Microcontrollers. Englewood Cliffs: Prentice Hall Pub. Co.

NOTE: 8 questions are to be set,at least one from each unit. Students have to attempt any five questions.

B.TECH. WEEKEND SEMESTER- VIII

EE(W)-438: RECENT TRENDS IN DEREGULATED POWER SYSTEMS

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **Deregulation of the Electricity Supply Industry:** Background of deregulation and the current situation, Benefits from a competitive Electricity Market, After effects of Deregulation.

2. **Power System Operation in Competitive Environment:** Role of Independent System operator, Operational Planning activities of ISO, operational planning activities of Genco.

3. **Transmission open Access and Pricing Issues:** Power Wheeling, Transmission Open Access, Cost component in Transmission, Pricing of Power Transmissions, Security Management in Deregulated environment, Congestion management in Deregulation.

4. **Reliability and Deregulation:** Reliability Analysis, Optimal Power Flow as a Basic Tool, Unit Commitment, Formation of Power Pools.

REFERENCES:

1. Lei Lee Lal, Power System Restructuring and Deregulation. UK: John Wiley and Sons, 2001.
2. Kankar Bhattacharya, Math H.J.Bollen and Jaap E. Daalder, Operation of Restructured Power Systems. USA: Kluwer Academic Publishers, 2001.
3. Md Shahidehpour and Muwaffaq Alomoush, Restructured Electrical Power Systems. Marcel Dekker, Inc.
4. S.S. Rao, Switch Gear Protection and Power System Analysis. Khanna Publications.

Note: Two questions are to be set from each unit. Students have to attempt five questions with at-least one from each part.

B.TECH. WEEKEND SEMESTER- VIII

EE(W)- 466: UTILIZATION OF ELECTRIC POWER AND TRACTION

L	T	P
4	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **ILLUMINATION:** Basic laws of illumination, light sources and their characteristics, sources of light, design of lighting schemes, incandescent lamp, sodium lamp, mercury lamp and fluorescent lamp, comparison of various lamps.

2. **ELECTRIC HEATING:** Principle and application of resistance, induction and dielectric heating.

3. **ELECTRIC WELDING:** Resistance welding, arc welding, welding generator and welding transformer, properties of arcing electrode.

4. **ELECTROLYTIC PROCESS:** Principles and applications of electrolysis. Faraday's law of electrolysis, electroplating, charging and discharging. Capacity and efficiency of battery, defects in battery, maintenance of battery.

5. **ELECTRIC TRACTION:** Advantages of electric traction, requirements of an ideal traction system, train movement, mechanism of train movement, traction motors, traction motor control, multi unit control, braking of electric motors, thyristor control of electric traction.

REFERENCE BOOKS:

1. Utilization of Electrical Energy : Open Shaw Taylor ; ELBS
2. Art and Science of Utilization of Electrical Energy : H. Pratab ; Dhanpat Rai & Sons, Delhi.
3. Generation, Distribution and Utilization of Electrical Power : C.L. Wadhwa ; Khanna Pub.
4. H.Pratab,"Electric Traction", Dhanpat Rai & Sons.

NOTE: Eight questions are to be set – at least one from each unit. Students have to attempt any five questions.

DEPT. ELECTIVE II
B.TECH. WEEKEND SEMESTER- VIIIl
EE(W)-426: COMPUTER BASED INSTRUMENTATION AND CONTROL

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **INTRODUCTION:** Necessity and functions of computers. Level of automation and economy of computer control. Centralized computer control Vs distributed computer control.

2. **COMPUTER ARCHITECTURE:** Micro and mini computer, functional models of I.O. system.

3. **INTERFACING:** Sampling; Multiplexing; A/D and D/A converters, interfacing with different types of transducers - Analog / Digital, Electrical and non-electrical selection of sensors; Micro computer interfacing of standard buses, Serial buses; Serial data communication protocols.

4. **STRUCTURAL STUDY OF AUTOMATIC PROCESS CONTROL:** Fundamental of automatic process control, building blocks of automatic system, direct and distributed digital control system. Programmable controllers.

5. **PERSONAL COMPUTER IN REAL LIFE ENVIRONMENT:** Introduction, personal computer: system and facility, PC bus and signals, interrupts, interfacing PC with outer world, PC in RTE, Real time application of IBM PC, PC-based distributed control system

6. **PROGRAMMING AND APPLICATION:** Modeling and simulation for plant automation, PLC Architecture and programming of PLC, industrial control application: cement plant, thermal power plant , water treatment plant, steel plant,

TEXT BOOK :

1. Computer based industrial control: Krishan Kant,; PHI

NOTE: Eight questions are to be set - at least one from each unit. Students have to attempt five questions.

B.TECH. WEEKEND SEMESTER- VIIl
EE(W)- 442: High Voltage Engineering

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **Introduction:** Recent trends in high voltage transmission.

2. **Conduction and breakdown:** Conduction & breakdown in gases, liquids and solid dielectrics, insulator breakdown, insulation characteristics of long air gaps.

3. **Voltage gradients on conductors:** Electrostatic fields of sphere gaps, fields of line charges and their properties, charge-potential relations for multi-conductor lines, surface voltage gradients on conductors, distribution of voltage gradient on sub conductors of bundle.;

4. **Corona:** Corona and corona loss, corona loss formula, attenuation of travelling waves due to corona, audible noise-generation and characteristics, corona pulses--their generation and properties, properties of pulse, radio interference.

5. **Lightening:** Lightening phenomenon, lightning stroke mechanism, principle of lightning protection, tower foot resistance, insulator flash over and withstand voltage, lightning arresters nd their characteristics.

6. **H.V. testing and Lab equipments:** Standard wave-shapes for testing, wave-shaping circuits: principles and theory; impulse generator, generation of ac high voltage for testing, generation of direct voltage, measurement of high voltage, general layout of H.V. Laboratory.

Text Books:

1. E.H.V. AC Transmission: R.D. Begamudre, Wiley Eastern Ltd.
2. H.V. Engg.: V. Kamaraju and M.S. Naidu, T.M.H., N.Delhi.

Note: 8 questions are to be set – at least one from each unit. Students have to attempt any five questions.

B.TECH. WEEKEND SEMESTER- VIII
EE(W)-444: ELECTRICAL POWER QUALITY

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **INTRODUCTION TO ELECTRICAL POWER QUALITY:** Definition of Power Quality, Power Quality Issues, Power Quality v/s Equipment Immunity, Electric Power Quality Standards.

2. **POWER FREQUENCY DISTURBANCES:** Common Power Frequency Disturbances, Voltage Sag, Isolation Transformers, Voltage Regulators, Static Uninterruptible Power Source Systems.

3. **ELECTRICAL TRANSIENTS:** Types and Causes of Transients, Atmospheric Causes, Switching Loads On or Off, Interruption of Fault Circuits, Capacitor Bank Switching, Motor Start Transient, Power Factor Correction, Capacitor Switching Transient.

4. **HARMONICS:** Definition of Harmonics, Causes of Voltage and Current Harmonics. Individual and Total Harmonic Distortion, Effect of Harmonics on Power System Devices, Guidelines for Harmonic Voltage and Current Limitation, Harmonic Current Mitigation.

5. **MEASURING POWER QUALITY PROBLEMS:** Power Quality Measurement Devices, Harmonic Analyzers, Transient-Disturbance Analyzers, Oscilloscopes, Data Loggers and Chart Recorders, True RMS Meters, Power Quality Measurements.

REFERENCE BOOKS:

1. G.T. Heydt, Electric Power Quality. 2nd ed. West Lafayette, IN: Stars in a Circle, 1994.
2. A Ghosh, G. Ledwich, Power Quality Enhancement Using Custom Power Devices. Kluwer Academic, 2002
3. R.C. Dugan, M.F. McGranaghan and H.W. Beaty, Electric Power Systems Quality. New York: McGraw-Hill.1996.
4. Sankaran, Power Quality. CRC, 2002.
5. J. Arrillaga, D.A Bradely and P.S. Bodger, Power System Harmonics. New York: Wiley, 1985.

B.TECH. WEEKEND SEMESTER- VIII
EE(W)-446: ARTIFICIAL INTELLIGENCE

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **FOUNDATIONAL ISSUES IN ARTIFICIAL INTELLIGENCE:** Foundation and history of AI, AI problems and techniques, AI programming languages, introduction to LISP and PROLOG, problem spaces and searches, blind search strategies, Breadth first- Depth first - heuristic search techniques, Hill climbing, best first - A* algorithm, AO* algorithm- game tree, Min max algorithms, game playing- alpha beta pruning.

2. **KNOWLEDGE REPRESENTATION:** Issues, predicate logic, logic programming, semantic nets, frames and inheritance, constraint propagation, representing knowledge using rules, rules based deduction systems.

3. **APPROXIMATE REASONING:** Reasoning under uncertainty, review of probability, Baye's probabilistic inferences and Dempster Shafer theory, Heuristic methods, symbolic reasoning under uncertainty, Statistical reasoning, Fuzzy reasoning, Temporal reasoning, Non-monotonic reasoning.

4. **PLANNING & LEARNING:** Planning in situational calculus, Representation for planning, Partial order planning algorithm, Learning from examples, Discovery as learning, Learning by analogy, Explanation based learning, Introductory remarks on learning by Neural Networks and Genetic Algorithms.

5. **APPLICATIONS:** Rule based systems architecture, Expert systems, Knowledge acquisition concepts, AI application to robotics, and current trends in intelligent systems.

Text Book:

1. Artificial Intelligence: A Modern Approach,. Russell & Norvig. Prentice Hall, 1995.

Reference Books:

1. Elain Rich and Kevin Knight, "Artificial Intelligence", TMH, 1991.
2. Staurt Russel and Peter Norvig, "Artificial Intelligence - A modern approach", PHI, 1998.
3. Patrick Henry Winston, "Artificial intelligence", 3rd Ed., Addition Wesley, 1992.
4. Dan W. Patterson, "Artificial Intelligence", PHI, 1990

Note: Eight questions will be set in all by the examiner taking at least one question from each unit. Students will be required to attempt five questions in all.

B.TECH. WEEKEND SEMESTER- VIII
EE(W)-450: POWER MANAGEMENT

L	T	P
3	-	-

Class-work Marks	: 50
Exam Marks	: 100
Total Marks	: 150
Duration of Exam	: 3 Hrs
Credits	: 4

1. **INTRODUCTION:** Power Scenario, Power Development, Planning, Power resources, Environment- Power matters Plan, Pre-feasibility and feasibility studies, State relations for Power etc.

2. **RESOURCES:** Resources, Geophysical study, Seismic Considerations, Environmental Restraints, Resettlement and Rehabilitation.

3. **PROCUREMENT:** Contracting and Procurement, Consulting Services, Types of Contracts, Project Management, Organization and Economy Management, Organizational Planning and Time Scheduling, Project Cost Control.

4. **ENGINEERING:** Engineering & General Layout of Equipments, Generator, Transformer and Switch Gear and Control Equipment, Construction Methods, Operation and Maintenance Principle, Maintenance organization and planning, Availability, life cycle cost & future development. Visits to sites.

5. **POWER SECTOR:** Power sector structure in different states, Regulatory Regime in those states, Power utilities in Haryana, Grid management, Power financing, Visit to sites.

6. **POWER STATION:** Management of Fuel, water Resource Electricity deviend scenario storage and handling, Pricing, Contract etc, Human resource management, Visit to sites.

7. **RISK & HAZARD:** Introduction to risk, rules and regulation Aspects of Risk & Hazard Health & risk assessment visit to site.

8. **ELECTRICITY INDUSTRY STRUCTURE & SAFETY REGULATIONS BILL & ETC.:** State and Central Power boards / Power corporations.

REFERENCE BOOKS:

1. Electricity Bill, Safety & Conservation Act
2. Arora & Dom Kundwar, A Course in Power Plant Engineering, Pub.: Dhanpat Rai Pub, 2000.
3. Jain & Bala Subranmanyam, “Power Plant Engineering”, Dhanpat Rai Pub.,
4. Butter Worth, A.B. Gill, “Power Plant Performance Management”, Pub: 1984.
5. P.C. Sharma, “Power Plant Engineering”, Dhanpat Rai Pub.,
6. David A. Decenzo, Stephen P. Robbins, Human Resource Management. New Delhi: PHI Pvt. Ltd., 2004.
7. P.K. Nag, Power Plant Engg. N.Delhi: TMH, 2003.