B.Tech Syllabus – II, III & IV Year

Electronics & Communication Engineering

(**Approved by AICTE, Ministry of HRD, Govt of India & DTE, Govt of Haryana and Affiliated to M. D. University, Rohtak**)

M.D UNIVERSITY
SCHEME OF STUDIES AND EXAMINATION
B.Tech II YEAR (ELECTRONICS & COMMUNICATION ENGINEERING)
SEMESTER III
'F' Scheme effective from 2010-11

Sr No	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
HUM-201-F OR MATH-201-F	ENGG. ECONOMICS OR MATHEMATICS - III	3 3	1 2	- -	4 5	50	100	-	150	3
HUM-203-F	FUNDAMENTALS OF MANAGEMENT (COMMON FOR ALL BRANCHES)	3	1	-	4	50	100	-	150	3
EE-201-F	ELECTRONICS DEVICES & CIRCUITS(ECE,EI,EE,EEE,IC)	3	1	-	4	50	100	-	150	3
EE-203-F	NETWORK THEORY (ECE,EI,EE,EEE,IC)	3	1	-	4	50	100	-	150	3
EE-205-F	ELECTROMECHANICAL ENERGY CONVERSION(ECE,EI,IC)	3	1	-	4	50	100	-	150	3
CSE-201-F	DATA STRUCTURE USING ' C' (ECE,EI,CSE,IT)	3	1	-	4	50	100	-	150	3
EE-221-F	ELECTRONIC WORKSHOP, PCB DESIGN & CIRCUIT LAB(ECE,EI)	-	-	2	2	25	-	25	50	3
EE-223-F	NETWORK THEORY LAB(ECE,EI,EE,EEE,IC)	-	-	2	2	25	-	25	50	3
EE-225-F	ELETRICAL WORKSHOP & MACHINE LAB (ECE,EI)	-	-	3	3	50	-	50	100	3
CSE-205-F	DATA STRUCTURE USING 'C' Lab (ECE,EI,CSE,IT)		-	2	2	25	-	25	50	3
	TOTAL	**18**	**7**	**9**	**33 Or 34**	**425**	**600**	**125**	**1150**	

NOTE:

1. **Students will be allowed to use non-programmable scientific calculator. However, Sharing of Calculator and other material will not be permitted in the examination.**

M.D UNIVERSITY
SCHEME OF STUDIES AND EXAMINATION
BE. II YEAR (ELECTRONICS & COMMUNICATION ENGINEERING)
SEMESTER – IV
'F' Scheme effective from 2010-11

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
HUM-201-F OR MATH-201-F	ENGG. ECONOMICS OR MATHEMATICS - III	3 3	1 2	- -	4 5	50	100	-	150	3
EE-228-F	SIGNALS & SYSTEMS(ECE,EI)	3	-	-	3	50	100	-	150	3
EE-202-F	ANALOG ELECTRONICS (ECE,EI,EE,EEE,IC)	3	1	-	4	50	100	-	150	3
EE-204-F	DIGITAL ELECTRONICS (ECE,EI,EE,EEE,IC)	3	1	-	4	50	100	-	150	3
EE-206-F	COMMUNICATION SYSTEMS(ECE)	3	1	-	4	50	100	-	150	3
EE-208-F	ELECTRO MAGNETIC THEORY (ECE,EI,EE,EEE,IC)	3	1	-	4	50	100	-	150	3
EE-222-F	ANALOG ELECTRONICS LAB(ECE,EI,EE,EEE,IC)	-	-	2	2	25	-	25	50	3
EE-224-F	DIGITAL ELECTRONICS LAB(ECE,EI,EE,EEE,IC)	-	-	2	2	25	-	25	50	3
EE-226-F	COMMUNICATION SYSTEMS LAB (ECE)	-	-	2	2	25	-	25	50	3
MATH-204 –F	NUMERICAL METHODS OF COMPUTATIONAL PROGRAMMING LAB(ECE,EI,EE,EEE,IC)	1	1	2	4	25	-	25	50	3
GP-202-F	GENERAL PROFICIENCY (COMMON FOR ALL BRANCHES)	-	-	2	2	50	-	-	50	3
	TOTAL	**19**	**6 Or 7**	**10**	**35 Or 36**	**450**	**600**	**100**	**1150**	

Note:
1. Students will be allowed to use non-programmable scientific calculator. However, sharing of Calculator and other materials will not be permitted in the examination.
2. Each student has to undergo practical training of 6 weeks during summer vacation and its evaluation shall be carried out in the V semester.

M.D.UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION
B.Tech-III Year(ELECTRONICS & COMMUNICATION ENGINEERING)
SEMESTER-V
MODIFIED 'F' SCHEME EFFECTIVE FROM 2011-12

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
EE-301-F	COMMUNICATION ENGINEERING	3	1	-	4	50	100	-	150	3
EE-303-F	ELECTRONIC MEASUREMENT AND INSTRUMENTATION (EL,EI, IC,EE, EEE, AEI)	3	1	-	4	50	100	-	150	3
EE-305-F	ANALOG ELECTRONIC CIRCUITS (EL,EI, IC,EE, EEE, AEI)	3	1	-	4	50	100	-	150	3
EE-307-F	ANTENNA AND WAVE PROPAGATION	3	1	-	4	50	100	-	150	3
CSE-210-F	COMPUTER ARCHITECTURE AND ORGANISATION (EL, EI, IC, Common with IV sem. CSE, IT)	3	1	-	4	50	100	-	150	3
EE-309-F	MICROPROCESSORS AND INTERFACING (EL,EI, IC,CSE,IT, EEE, AEI)	3	1	-	4	50	100	-	150	3
EE-323-F	ELECTRONIC MEASUREMENT AND INSTRUMENTATION LAB (EL,EI, IC,EE)	-	-	2	2	25	-	25	50	3
EE-325-F	ANALOG ELECTRONIC CIRCUITS LAB (EL,EI, IC)	-	-	2	2	25	-	25	50	3
EE-329-F	MICROPROCESSORS AND INTERFACING LAB (EL,EI, IC,CSE,IT, EEE, AEI)	-	-	2	2	25	-	25	50	3
EE-335-F	PRACTICAL TRAINING-I	-	-	2	2	-	-	-	-	-
----------	GENERAL PROFICIENCY	-	-	-	-	50	-	-	50	3
	TOTAL	**18**	**6**	**8**	**32**	**425**	**600**	**75**	**1100**	

Note:

1. **Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**
2. **Assessment of Practical Training-I, undergone at the end of IV semester, will be based on seminar, viva-voce, report and certificate of practical training obtained by the student from the industry. According to performance letter grades A, B, C, F are to be awarded. A student who is awarded 'F' grade is required to repeat Practical Training.**

M.D.UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION
BACHELOR OF ENGINEERING (ELECTRONICS & COMMUNICATION ENGINEERING)
SEMESTER-VI
MODIFIED 'F' SCHEME EFFECTIVE FROM 2011-12

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
EE-302-F	MICROWAVE AND RADAR ENGINEERING	3	1	-	4	50	100	-	150	3
EE-304-F	CONTROL SYTEMS ENGG. (EL,EE, EEE)	3	1	-	4	50	100	-	150	3
EE-306-F	VLSI Design	3	1	-	4	50	100	-	150	3
IT-305-F	COMPUTER NETWORKS (EL,CSE, COMMON WITH V-SEM. – IT, AEI)	3	1	-	4	50	100	-	150	3
EE-310-F	DIGITAL SYSTEM DESIGN (EL, EI, IC,EE,CSE,AEI)	3	1	-	4	50	100	-	150	3
EE-308-F	MICROCONTROLLER & EMBEDDED SYSTEM	3	1	-	4	50	100	-	150	3
EE-328-F	MICROCONTROLLER & EMBEDDED SYSTEM LAB	-	-	2	2	25	-	25	50	3
EE-326-F	DIGITAL SYSTEM DESIGN LAB (EL,EI,IC, EE,CSE,AEI)	-	-	2	2	25	-	25	50	3
EE-322-F	MICROWAVE & RADAR LAB	-	-	2	2	25	-	25	50	3
EE-324-F	CONTROL SYSTEMS ENGG. LAB (EL,EE,EEE,AEI)	-	-	2	2	25	-	25	50	3
	TOTAL	**18**	**6**	**8**	**32**	**400**	**600**	**100**	**1100**	

Note:

1. **Each student has to undergo practical training of 6 weeks during summer vacation and its evaluation shall be carried out in the VII semester.**
2. **Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**

M.D.UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION
BACHELOR OF ENGINEERING (ELECTRONICS & COMMUNICATION ENGINEERING)
SEMESTER-VII
MODIFIED 'E' SCHEME EFFECTIVE FROM 2006-07

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
EE-401-E	DATA COMMUNICATION (EL, EE)	3	1	-	4	50	100	-	150	3
IC-403 E	EMBEDDED SYSTEMS DESIGN (EI, IC, EL)	3	1	-	4	50	100	-	150	3
EE-405-E	OPTICAL COMMUNICATION SYSTEMS	3	1	-	4	50	100	-	150	3
EE-407-E	DIGITAL SIGNAL PROCESSING (EL, EI, IC, EE)	3	1	-	4	50	100	-	150	3
	*OPEN ELECTIVE	4	-	-	4	50	100	-	150	3
EE-421-E	DATA COMMUNICATION LAB (EL, EE)	-	-	2	2	25	-	25	50	3
IC-417-E	EMBEDDED SYSTEMS DESIGN LAB. (EI, IC, EL)	-	-	2	2	25	-	25	50	3
EE-427-E	DIGITAL SIGNAL PROCESSING LAB (EL, EI, IC, EE)	-	-	2	2	25	-	25	50	3
EE-431-E	PROJECT	-	-	4	4	50	-	-	50	3
EE-435-E	PRACTICAL TRAINING – II	-	-	2	2	-	-	-		-
	TOTAL	**16**	**4**	**12**	**32**	**375**	**500**	**75**	**950**	

List of Open Electives

1	HUM-451-E	Language Skills for Engineers	8	CSE-451-E	Artificial Intelligence & Expert Systems
2	HUM-453-E	Human Resource Management	9	CSE-303-E	Computer Graphics
3	HUM-457-E	Business Communication	10	IC-455-E	Intelligent Instrumentation for Engineers
4	HUM-455-E	Entrepreneurship	11	IC-403-E	Embedded Systems
5	PHY-451-E	Nano technology	12	CH-453-E	Pollution & Control
6	PHY-453-E	Laser Technology	13	IT-471-E	Management Information System
7	ME-451-E	Mechatronics Systems	14	IT-204-E	Multimedia Technologies

Note:

1. **Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**
2. ***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.**
3. **Assessment of Practical Training-II, carried out at the end of VI semester, will be based on seminar, viva-voce and project report of the student from the industry. According to performance, letter Grades A, B, C, F are to be awarded. A student who is awarded 'F' grade is required to repeat Practical Training.**
4. **Project load will be treated as 2 hours per week for Project Coordinator and 1 hour for each participating teacher. Project will commence in VII semester where the students 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.**

M.D.UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION
BACHELOR OF ENGINEERING (ELECTRONICS & COMMUNICATION ENGINEERING)
SEMESTER-VIII
MODIFIED 'E' SCHEME EFFECTIVE FROM 2006-07

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
EE-402-E	WIRELESS COMMUNICATION (COMMON WITH VI SEM – CSE,IT)	3	1	-	4	50	100	-	150	3
EE-404-E	SATELITE COMMUNICATION ENGINEERING	3	1	-	4	50	100	-	150	3
	DEPTT. ELECTIVE – I	4	-	-	4	50	100	-	150	3
	DEPTT. ELECTIVE- II	4	-	-	4	50	100	-	150	3
EE-424-E	SATELITE COMMUNICATION LAB	-	-	2	2	50	-	50	100	3
EE-431-E	PROJECT	-	-	8	8	50	-	100	150	3
EE-422-E	INDEPENDENT STUDY SEMINAR	-	-	4	4	50	-	-	50	
GFEE-402-E	GENERAL FITNESS FOR THE PROFESSION	-	-	-	-	50	-	100	150	3
	TOTAL	14	2	14	30	400	400	250	1050	

DEPT. ELECTIVE-I

EE-432E	Mobile Communication
EE-317E	Power Electronics
IC-404E	Fuzzy Control System (Common with EI, IC main paper in VIIIth sem)

DEPT. ELECTIVE-II

EE-462-E	Genetic Algorithms & Applications
EE-454-E	Radar and Sonar Engg.
EE-406-E	Advance Control System

Note:

1) **Project load will be treated as 2 hrs. per week for the project coordinator and 1 hour for each participating teacher. 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-422E (Independent Study Seminar), a student will select a topic from emerging areas of Electronics & Communication Engineering and study it thoroughly and independently. Later he will give a seminar talk on the topic.**
3) **A team consisting of Principal/Director, HOD of concerned department and 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**

HUM-201-F ENGINEERING ECONOMICS

L	T	P
3	1	-

Class Work	**:**	50 Marks
Exam	**:**	100 Marks
Total	**:**	150 Marks
Duration of Exam.	**:**	3Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

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

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

Section-B

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.

Meaning of production and factors of production; Law of variable proportions, Returns to scale, Internal and External economics and diseconomies of scale.

Section-C

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.
Meaning of Market, Types of Market - Perfect Competition, Monopoly, Oligoply, Monoplistic Competition (Main features of these markets)

Section-D

Supply and Law of Supply, Role of Demand & Supply in Price Determinition and effect of changes in demand and supply on prices.

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

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

MATH-201-F MATHEMATICS-III

L	T	P
3	1	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of Exam.	:	3Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-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 consine 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.

Section-B

Functions of Complex Variable : Definition, Exponential function, Trignometric and Hyperbolic functions, Logrithmic functions. Limit and Continuity of a function, Differnetiability 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 fourmula.

Section-C

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).

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.

Section-D

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. Engg Mathematics By Babu Ram, Pearson India
2. Advanced Engg. Mathematics : F Kreyszig.
3. 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.

HUM-203-F FUNDAMENTALS OF MANAGEMENT

L	T	P
3	1	-

Class Work	**:**	50 Marks
Exam	**:**	100 Marks
Total	**:**	150 Marks
Duration of Exam.	**:**	3Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Meaning of management, Definitions of Management, Characteristics of management, Management Vs. Administration. Management-Art, Science and Profession. Importance of Management. Development of Management thoughts.

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

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.

Section-B

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**.**

Section-C

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.

Section-D

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.

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.

EE-201-F ELECTONIC DEVICES & CIRCUITS

L	T	P
3	1	-

Class Work	**:**	50 Marks
Exam	**:**	100 Marks
Total	**:**	150 Marks
Duration of Exam.	**:**	3Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

SECTION-A

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.

SECTION-B

SEMICONDUCTORS, CONSTRUCTION AND CHARACTERISTICS OF DEVICES:

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

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. And characteristics.

SECTION-C

Transistors: Metal-semiconductor-field-effect-transistors (MESFET), Metal-insulator-semiconductor-field-effect-transistors (MISFET), Metal oxide semiconductor field effect transistor (MOSFET): Construction, Operation and characteristics of above devices.

Bipolar junction transistors: Fundamentals of BJT operation, amplification with BJTs,

SECTION –D

SOME SPECIAL DEVICES:

Photodiodes, photo detectors, solar cell, light emitting diodes, semiconductor lasers, light emitting materials. Tunnel Diode: degenerate semiconductors, IMPATT diode; The transferred electron mechanism: The GUNN diode.P-N-P-N diode, semiconductor controlled rectifier (SCR), bilateral devices: DIAC, TRIAC, IGBT

Text Books:

1. Agarwal - Foundations of analog & Digital electronic Circuits,Elsevier
2. B. G. Streetman and S. Banerjee “Solid state electronics devices”, 5th Edition, PHI.
3. Donald Neamaen, “Electronic Circuit Analysis and Design”, 3rd Edition, TMH.

Reference Books:

1. Alok Dutta, “Semiconductor Devices and circuits”, Oxford University Press.
2. Ashby - Engineering Materials : Science and design,Elsevier

EE-203-F NETWORK THEORY

L	T	P
3	1	-

Class Work	**:**	50 Marks
Exam	**:**	100 Marks
Total	**:**	150 Marks
Duration of Exam.	**:**	3Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

SECTION-A

Signal analysis, complex frequency, and network analysis. General characteristics and descriptions of signals, step function and associated wave forms, The unit impulse Introduction to network analysis, network elements, initial and final conditions, step and impulse response, solution of network equations,

SECTION-B

Review of Laplace transforms, poles and zeroes, initial and final value theorems, The transform circuit, Thevenin's and Norton's theorems, the system function, step and impulse responses, the convolution integral. Amplitude and phase responses. Network functions, relation between port parameters, transfer functions using two port parameters, interconnection of two ports.

SECTION-C

Hurwitz polynomials, positive real functions. Properties of real immittance functions, Synthesis of LC driving point immittances, Synthesis of RC driving point impedances, Synthesis of RC impedances or RL admittances, properties of RL impedances and RC admittances.

SECTION-D

Properties of transfer functions, zeroes of transmission, synthesis of Y_{21} and Z_{21} with 1Ω terminations Introduction to active network synthesis, Network Tropology and Graph Theory.

Text Books:

1. Bird - Electric Circuit theory & technology,Elsevier
2. Franklin F. Kuo, "Network Analysis and synthesis", 2nd Edition, Wiley India Pvt Ltd.
3. D Roy Choudary, "Network and Systems" New Age International,

Reference Books:

1. M. E. Van Valkenberg, "Network Analysis", 2nd Edition, Prentice Hall of India Ltd.

EE-205-F ELECTROMECHANICAL ENERGY CONVERSION

L	T	P
3	1	-

Class Work	**:**	50 Marks
Exam	**:**	100 Marks
Total	**:**	150 Marks
Duration of Exam.	**:**	3Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

SECTION-A

MAGNETIC CIRCUITS AND INDUCTION:

Magnetic Circuits, Magnetic Materials and their properties, static and dynamic emfs and force on current carrying conductor, AC operation of Magnetic Circuits, Hysteresis and Eddy current losses.

SECTION-B

DC MACHINES :

Basic theory of DC generator, brief idea of construction, emf equation, load characteristics, basic theory of DC motor, concept of back emf, torque and power equations, load characteristics, starting and speed control of DC motors, applications.

SECTION -C

Synchronous Machine

Constructional features, Armature winding, EMF Equation, Winding coefficients, equivalent circuit and phasor diagram, Armature reaction, O. C. & S. C. tests, Voltage Regulation

Synchronous Motor: Starting methods, Effect of varying field current at different loads, V- Curves.

SECTION-D

Three phase Transformer & Induction Machine

Three Phase Transformer: Review of Single phase transformer. Three Phase transformer: Basics & operation Induction Machine: Constructional features, Rotating magnetic field, Principle of operation Phasor diagram, equivalent circuit, torque and power equations, Torque- slip characteristics, no load & blocked rotor tests, efficiency, Induction generator & its applications. Introduction of S**ingle phase Induction Motor, R**epulsion motor. **AC Commutator Motors:**Universal motor, Single phase a.c. series compensated motor, stepper motors

Text Books:

1. D.P.Kothari & I.J.Nagrath, "Electric Machines", Tata Mc Graw Hill
2. Ashfaq Hussain"Electric Machines" Dhanpat Rai & Company

Reference Books:

1. P.S.Bimbhra, "Electrical Machines", Khanna Publisher
2. Fitzerald,A.E.,Kingsley and S.D.Umans "Electric Machinery", MC Graw Hill.

CSE-201-F **DATA STRUCHURE USING 'C'**
(ECE,EI,CSE,IT)

L	T	P
3	1	-

Class Work : 50 Marks
Exam : 100 Marks
Total : 150 Marks
Duration of Exam. : 3Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Overview of 'C' : Introduction , Flow of Control, Input output functions, Arrays and Structures, Functions
Data structures and Algorithms: an overview : concept of data structure, choice of right data structures, types of data structures, basic terminology Algorithms, how to design and develop an algorithm: stepwise refinement, use of accumulators and counters; algorithm analysis, complexity of algorithms Big-oh notation.
Arrays : Searching Sorting: Introduction, One Dimensional Arrays, operations defined : traversal, selection, searching, insertion, deletion, and sorting
Searching: linear search, binary search; Sorting: selection sort, bubble sort, insertion sort, merge sort, quick sort, shell sort. Multidimensional arrays, address calculation of a location in arrays.
Stacks and queues: Stacks, array representation of stack. Applications of stacks. Queues, Circular queues, array representation of Queues, Deques, priority queues, Applications of Queues.

Section-B

Pointers and Linked Lists;

Pointers: Pointer variables, Pointer and arrays, array of pointers, pointers and structures, Dynamic allocation.
Linked Lists: Concept of a linked list,. Circular linked list, doubly linked list, operations on linked lists. Concepts of header linked lists. Applications of linked lists, linked stacks, linked Queues.

Section-C

Trees and Graphs

Trees: Introduction to trees, binary trees, representation and traversal of trees, operations on binary trees, types of binary trees, threaded binary trees, B Trees, . Application of trees.
Graphs : Introduction, terminology, 'set, linked and matrix' representation, operations on graphs, Applications of graphs.

Section-D

File Handling and Advanced data Structure

Introduction to file handling, Data and Information, File concepts, File organization, files and streams, working with files. AVL trees, Sets, list representation of sets, applications of sets, skip lists

Text Books:

- Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem, PHI Pub.
- Data Structures using C by A. K. Sharma, Pearson

Reference Books:

- Data Structures and Algorithms by A.V. Aho, J.E. Hopcroft and T.D. Ullman, Original edition, Addison-Wesley, 1999, Low Priced Edition.
- Fundamentals of Data structures by Ellis Horowitz & Sartaj Sahni, Pub, 1983,AW
- Fundamentals of computer algorithms by Horowitz Sahni and Rajasekaran.
- Data Structures and Program Design in C By Robert Kruse, PHI,
- Theory & Problems of Data Structures by Jr. Symour Lipschetz, Schaum's outline by TMH
- Introduction to Computers Science -An algorithms approach , Jean Paul Tremblay, Richard B. Bunt, 2002, T.M.H.
- Data Structure and the Standard Template library – Willam J. Collins, 2003, T.M.H

EE-221-F PCB & ELECTRONICS WORKSHOP LAB

L	T	P
-	-	2

Class Work	:	25 Marks
Exam	:	25 Marks
Total	:	50 Marks
Duration of Exam.	:	3Hours

Objective: To create interest in Hardware Technology.

1. Winding shop: Step down transformer winding of less than 5VA.
2. Soldering shop: Fabrication of DC regulated power supply
3. PCB Lab: (a) Artwork & printing of a simple PCB.
   (b) Etching & drilling of PCB.
4. Wiring & fitting shop: Fitting of power supply along with a meter in cabinet.
5. Testing of regulated power supply fabricated.

Experiment to be performed

1. Introduction & Hands on experience to use circuit creation & simulation software like TINAPRO , P-SPICE or ORCAD etc.
2. Design a full wave centre tapped rectifier & study the effect of capacitive filter & its output on a virtual oscilloscope.
3. 3. Design a RLC resonance circuit & verify the transient & phase response for different values of R,L &C.
4. Design a circuit for a fixed power supply.
5. Design a half adder using discrete components & verify the timing diagrams.
6. Convert the power supply circuit into PCB & simulates its 2D & 3D view.
7. PCB printing using screen printing or any other technique.
8. Etching of the above PCB.
9. UV exposure & Drilling of PCB.
10. Coating of etched PCB to protect it from oxidation.
11. Fabrication & placing of components as per above power supply circuit.
12. Testing of above circuit.

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 & setup by the concerned institution as per the scope of the syllabus.

EE-223-F NETWORK THEORY LAB

L	T	P
-	-	2

Class Work : 25 Marks
Exam : 25 Marks
Total : 50 Marks
Duration of Exam. : 3Hours

LIST OF EXPERIMENTS:

A: Simulation based

1. Introduction of circuit creation & simulation software like TINAPRO, P-Spice, Dr.-Spice/other relevant Software
2. Transient response of RC, RL circuit on any of above software.
3. To find the resonance frequency, Band width of RLC series circuit using any of above software.
4. To plot the frequency response of low pass filter and determine half-power frequency.
5. To plot the frequency response of high pass filter and determine the half-power frequency.
6. To plot the frequency response of band-pass filter and determine the band-width.

B: Hardware Based

7. To calculate and verify "Z" & "Y" parameters of a two port network.
8. To determine equivalent parameter of parallel connections of two port network and study loading effect.
9. To calculate and verify "ABCD" parameters of a two port network.
10. To synthesize a network of a given network function and verify its response.

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 & setup by the concerned institution as per the scope of the syllabus.

EE-225-F ELECTRICAL WORKSHOP & MACHINE LAB

L	T	P
-	-	3

Class Work	**:**	50 Marks
Exam	**:**	50 Marks
Total	**:**	100 Marks
Duration of Exam.	**:**	3Hours

LIST OF EXPERIMENTS:

1. Introduction of tools, electrical materials, symbols and abbreviations.
2. To study stair case wiring.
3. To study house wiring i.e., batten, cleat, casing-caping and conduit wirings.
4. To study fuses, relays, contactors, MCBs and circuit breakers, fluorescent tube light.
5. Study of construction of a DC machine.
6. To plot O.C.C of a DC shunt generator and find its Critical Resistance.
7. To perform direct load test of a DC motor.
8. Speed control of a DC motor by armature control and field control methods.
9. To perform open circuit and block rotor tests of an induction motor.
10. Star-delta starting of a three phase induction motor.
11. Plot O.C.C of a synchronous generator.
12. To plot V-curve of a synchronous motor.

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 & setup by the concerned institution as per the scope of the syllabus.

CSE-231-F DATA STRUCTURE USING 'C' LAB

L	T	P
-	-	2

Class Work	:	25 Marks
Exam	:	25 Marks
Total	:	50 Marks
Duration of Exam.	:	3Hours

1. Write a program to search an element in a two-dimensional array using linear search.
2. Using iteration & recursion concepts write programs for finding the element in the array using Binary Search Method
3. Write a program to perform following operations on tables using functions only
   (a) Addition (b) Subtraction (c) Multiplication (d) Transpose
4. Using iteration & recursion concepts write the programs for Quick Sort Technique
5. Write a program to implement the various operations on string such as length of string concatenation, reverse of a string & copy of a string to another.
6. Write a program for swapping of two numbers using 'call by value' and 'call by reference strategies.
7. Write a program to implement binary search tree.
8. (Insertion and Deletion in Binary search Tree)
9. Write a program to create a linked list & perform operations such as insert, delete, update, reverse in the link list
10. Write the program for implementation of a file and performing operations such as insert, delete, update a record in the file.
11. Create a linked list and perform the following operations on it
    (a) add a node (b) Delete a node
12. Write a program to simulate the various searching & sorting algorithms and compare their timings for a list of 1000 elements.
13. Write a program to simulate the various graph traversing algorithms.
14. Write a program which simulates the various tree traversal algorithms.

Note: **At least 5 to 10 more exercises to be given by the teacher concerned.**

HUM-201-F ENGINEERING ECONOMICS

L	T	P
3	1	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of Exam.	:	3Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

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

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

Section-B

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.

Meaning of production and factors of production; Law of variable proportions, Returns to scale, Internal and External economics and diseconomies of scale.

Section-C

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.
Meaning of Market, Types of Market - Perfect Competition, Monopoly, Oligoply, Monoplistic Competition (Main features of these markets)

Section-D

Supply and Law of Supply, Role of Demand & Supply in Price Determinition and effect of changes in demand and supply on prices.

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

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

MATH-201-F MATHEMATICS-III

(Common to CSE, ME, ECE, BME, EE, EEE, E&I, I&C, IT, CE)

L	T	P
3	1	-

Class Work	**:**	50 Marks
Exam	**:**	100 Marks
Total	**:**	150 Marks
Duration of Exam.	**:**	3Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-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 consine 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.

Section-B

Functions of Complex Variable : Definition, Exponential function, Trignometric and Hyperbolic functions, Logrithmic functions. Limit and Continuity of a function, Differnetiability 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 fourmula.

Section-C

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).

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.

Section-D

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. Engg Mathematics By Babu Ram, Pearson India
2. Advanced Engg. Mathematics : F Kreyszig.
3. 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.

EE-202-F ANALOG ELECTRONICS

L	T	P
3	1	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of Exam.	:	3Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

SECTION-A

Semiconductor Diode: Review of P-N junction and Characteristics, P-N junction as a rectifier, Switching characteristics of Diode, 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.

SECTION-B

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

SECTION -C

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

SECTION-D

Operational Amplifier: Inverting and non-inverting configurations, difference amplifier, Effect of finite open loop gain and bandwidth on circuit performance, Large signal operation of op-amp.

Feedback: The general feed back structure, properties of negative feed back, the four basic feed back topologies, the series-shunt feedback amplifier, the series-series feedback amplifier, the shunt-shunt and shunt series feedback amplifier.

Differential Amplifier: MOS differential pair, small signal operation of the MOS differential pair, BJT differential pair, other non-ideal characteristic of the Differential amplifier (DA), DA with active load

Text Books:

1. Foundations of Analog & Digital electronic Circuits, Agarwal, Elsevier
2. **A. S. Sedra and K. C. Smith, "**Microelectronic Circuits", Oxford University Press, 5th Ed.
3. Integrated Electronics: Millman & Halkias ; McGrawHill
4 Electronic circuit analysis and design (Second edition): D.A.Neamen; TMH

Reference Books:

1. Spencer and Ghausi, Introduction to Electronic Circuit Design, Pearson Education, 2003
2. A. Dutta, Semiconductor Devices and Circuits, Oxford University Press, ND 2008

EE-228-F SINGALS & SYSTEMS

L	T	P
3	-	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of Exam.	:	3Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

SECTION-A

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

SECTION-B

Fourier Transforms (FT):

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

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

SECTION-C

Time and frequency domain analysis of systems

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

SECTION D

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

(i) One-sided LT of some common signals, important theorems and properties of LT, inverse LT, solutions of differential equations using LT, Bilateral LT, Regions of convergence (ROC) (ii) One sided and Bilateral Z-transforms, ZT of some common signals, ROC, Properties and theorems, solution of difference equations using one-sided ZT, s- to z-plane mapping .

Text Books:

1. `Signal and Systems' I J NAGRATH, R. RANJAN & Sharan, 2009 Edn., TMH, New Delhi

Reference Books:

2. V. Oppenheim, A.S. Willsky and S. Hamid Nawab, 'Signals & System',PEARSON Education, Second Edition, 2003.
3. Schaume Series on Signals & Systems, HSU & RANJAN, TMH,India

EE-204-F DIGITAL ELECTRONICS

L	T	P
3	1	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of Exam.	:	3Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

SECTION-A

Digital system and binary numbers: Signed binary numbers, binary codes, cyclic codes, error detecting and correcting codes, hamming codes.

Gate-level minimization: The K-map method up to five variable, don't care conditions, POS simplification, NAND and NOR implementation, Quine Mc-Clusky method (Tabular method)

SECTION-B

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

SECTION -C

Synchronous Sequential logic: Sequential circuits, storage elements: latches, flip flops, analysis of clocked sequential circuits, state reduction and assignments, design procedure.
Registers and counters: Shift registers, ripple counter, synchronous counter, other counters

SECTION- D

Memory and programmable logic: RAM, ROM, PLA, PAL. Design at the register transfer level: ASMs, design example, design with multiplexers. Asynchronous sequential logic: Analysis procedure, circuit with latches, design procedure, reduction of state and flow table, race Free State assignment, hazards

Text Book:

1. M. Morris Mano and M. D. Ciletti, "Digital Design", 4th Edition, Pearson Education
2. Pedroni - Digital Electronics & Design, Elsevier
3. R.P. Jain , "Modern digital electronics" , 3rd edition , 12th reprint TMH Publication, 2007.
4. Digital Design and computer organization: Nasib Singh Gill & J. B. Dixit, university press(Laxmi Publication)

REFERENCE BOOKS :

1. Grout - Digital Design using FPGA'S & CPLD's, Elsevier
2. F. Vahid: Digital Design: Wiley Student Edition, 2006
3. J. F. Wakerly, Digital Design Principles and Practices, Fourth Edition, Prentice-Hall, 2005.
4. R. L. Tokheim, Digital electronics, Principles and applications, 6th Edition, Tata McGraw Hill Edition, 2003

EE-206-F COMMUNICATION SYSTEMS

L	T	P
3	1	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of Exam.	:	3Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

SECTION-A

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. Analog Communication & Digital Communication. Basic concepts of Modulation, Demodulators, Channels,Multiplexing & Demultiplexing.

SECTION-B

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).
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.

SECTION C

PULSE ANALOG MODULATION: Sampling theory, sampling and hold circuits. Time division (TDM) and frequency division (FDM) multiplexing, pulse amplitude modulation (PAM), pulse time modulation.
PULSE DIGITAL MODULATION : Coding & Decoding techniques, 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)

SECTION D

DIGITAL MODULATION TECHNIQUES: ASK, FSK, BPSK, QPSK, M-ary PSK.
PC-PC data Communication
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.

Reference Books:

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

EE-208-F ELECTROMAGNETIC FIELD THEORY

L	T	P			
3	1	-	**Class Work**	:	50 Marks
			Exam	:	100 Marks
			Total	:	150 Marks
			Duration of Exam.	:	3Hours

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

SECTION-A

Coordinate systems and transformation: Cartesian coordinates, circular cylindrical coordinates, spherical coordinates Vector calculus: Differential length, area and volume, line surface and volume integrals, del operator, gradient of a scalar, divergence of a vector and divergence theorem, curl of a vector and Stoke's theorem, Laplacian of a scalar

SECTION-B

Electrostatics: Electrostatic fields, Coulombs law and field intensity, Electric field due to charge distribution, Electric flux density, Gausses's Law – Maxwell's equation, Electric dipole and flux lines, energy density in electrostatic fields. Electric field in material space: Properties of materials, convection and conduction currents, conductors, polarization in dielectrics, dielectric constants, continuity equation and relaxation time, boundary condition. Electrostatic boundary value problems: Poission's and Laplace's equations, general procedures for soling Poission's or Laplace's equations, resistance and capacitance, method of images.

SECTION-C

Magnetostatics: Magneto-static fields, Biot-Savart's Law, Ampere's circuit law, Maxwell's equation, application of ampere's law, magnetic flux density- Maxwell's equation, Maxwell's equation for static fields, magnetic scalar and vector potential.

Magnetic forces, materials and de vices: Forces due to magnetic field, magnetic torque and moment, a magnetic dipole, magnetization in materials, magnetic boundary conditions, inductors and inductances, magnetic energy

SECTION-D

Waves and applications: Maxwell's equation, Faraday's Law, transformer and motional electromotive forces, displacement current, Maxwell's equation in final form.

Electromagnetic wave propagation: Wave propagation in lossy dielectrics, plane waves in lossless dielectrics, plane wave in free space, plain waves in good conductors, power and the pointing vector, reflection of a plain wave in a normal incidence. Transmission lines: Transmission line parameters, Transmission line equations, input impedance, standing wave ratio and power,

Text Book:

1. M. N. O. Sadiku, "Elements of Electromagnetic", 4th Ed, Oxford University Press.

Reference Books:

1. W. H. Hayt and J. A. Buck, "Electromagnetic field theory",7th edition TMH
2. Electromagnetic Field theory by Balmein and Jordan

EE-222-F ANALOG ELECTRONICS LAB

L	T	P
-	-	2

Class Work	:	25 Marks
Exam	:	25 Marks
Total	:	50 Marks
Duration of Exam.	:	3Hours

Objective: To attain expertise in lab equipment handling and understanding the basic devices, their properties, characteristics in detail. Along with their practical usage in the circuit

1. **Study of lab equipments and components:** CRO, Multimeter, Function Generator, Power supply- Active, Passive Components & Bread Board.

2. **P-N Junction Diode**: Characteristics of PN Junction diode-Static and dynamic resistance measurement from graph.

3. **Applications of PN junction diode**: Half & Full wave rectifier- Measurement of Vrms, Vdc, and ripple factor-use of filter- ripple reduction (RC Filter)-Clipper & Clamper

4. **Properties of junctions** Zener diode characteristics. Heavy doping alters the reverse characteristics. Graphical measurement of forward and reverse resistance.

5. **Application of Zener diode:** Zener diode as voltage regulator. Measurement of percentage regulation by varying load resistor.

6. **Characteristic of BJT**: BJT in CB and CE configuration- Graphical measurement of h parameters from input and output characteristics. Measurement of A_v, A_I, R_o and R_i of CE amplifier with potential divider biasing.

7. **Characteristic of FET**: FET in common source configuration. Graphical measurement of its parameters gm, rd & m from input and output characteristics.

8. **Characteristic** of silicon-controlled rectifier.

9. **To plot** V-I Characteristics of DIAC .

10. **To draw** V-I characteristics of TRIAC for different values of Gate Currents.

11. Study of frequency response of active filters LP, HP & BP.

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 & setup by the concerned institution as per the scope of the syllabus.

EE-224-F DIGITAL ELECTRONICS LAB

L	T	P
-	-	2

Class Work	:	25 Marks
Exam	:	25 Marks
Total	:	50 Marks
Duration of Exam.	:	3Hours

Objective: To understand the digital logic and create various systems by using these logics.

1. Introduction to digital electronics lab- nomenclature of digital ICs, specifications, study of the data sheet, concept of V_{cc} and ground, verification of the truth tables of logic gates using TTL ICs.
2. Implementation of the given Boolean function using logic gates in both SOP and POS forms.
3. Verification of state tables of RS, JK, T and D flip-flops using NAND & NOR gates.
4. Implementation and verification of Decoder/De-multiplexer and Encoder using logic gates.
5. Implementation of 4x1 multiplexer using logic gates.
6. Implementation of 4-bit parallel adder using 7483 IC.
7. Design, and verify the 4-bit synchronous counter.
8. Design, and verify the 4-bit asynchronous counter.
9. Static and Dynamic Characteristic of NAND and Schmitt-NAND gate(both TTL and MOS)
10. Study of Arithmetic Logic Unit.
11. Mini Project.

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 & setup by the concerned institution as per the scope of the syllabus.

EE-226-F COMMUNICATION SYSTEMS LAB

L	T	P
-	-	2

Class Work	**:**	25 Marks
Exam	**:**	25 Marks
Total	**:**	50 Marks
Duration of Exam.	**:**	3Hours

LIST OF EXPERIMENTS: (Any ten experiments)

1. Generation of DSB-SC AM signal using balanced modulator.
2. Generation of SSB AM signal
3. To study envelop detector for demodulation of AM signal and observe diagonal peak clipping effect.
4. Frequency modulation using voltage controlled oscillator.
5. To generate a FM Signal using Varactor & reactance modulation.
6. Detection of FM Signal using PLL & foster seelay method..
7. To Study Super heterodyne AM receiver and measurement of receiver parameters viz.sensitivity, selectivity & fidelity.
8. To study the circuit of PAM/PWM/PPM modulator & Demodulator
9. Study of Frequency Division Multiplexing/Demultiplexing with sinusoidal & audio inputs.
10. Generation & study of Analog TDM at least 4 channels.
11. Study of 4 channel Time Division Multiplexing system.
12. Study of pulse code modulation and demodulation with parity & Hamming code.
13. Study pulse data coding & Decoding techniques for various formats.
14. Study of ASK, FSK modulator and demodulator.
15. Study of PSK & QPSK modulator and demodulator.

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 & setup by the concerned institution as per the scope of the syllabus.

MATH-204-F NUMERICAL METHODS OF COMPUTATIONAL PROGRAMMING LAB

L	T	P			
1	1	2	**Class Work**	:	25 Marks
			Exam	:	25 Marks
			Total	:	50 Marks
			Duration of Exam.	:	3Hours

THIS LAB IS DESIGNED IN manner where every lab will have first hour as lecture on Numerical methods and followed by 2 hours of programming Lab.

THEORY TO BE TAUGHT

Interpolation and curve fitting : Interpolation problem, Lagrangian polynomials, Divided differences, Least square approximations.

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

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

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.

Numerical Solution of Partial Differential Equations : Finite difference approximations of partial derivatives, solution of Laplace equation

Text Books:

1. Phillips - Theory & Applications & Numerical analysis, Elsevier
2. Applied Numerical Analysis : Curtis F. Gerald and Patrick
3. G. Wheatley-Pearson, Education Ltd.
4. Numerical Methods By Babu Ram, Pearson.
5. Numerical Method : E. Balagurusamy T.M.H.

Reference Books:

1. Numerical Methods in Engg. & Science: B.S. Grewal.

LAB SESSION (ANY TEN PROGRAMM TO BE DEVELOPED)
WRITE DOWN AND EXECUTE THE FOLLOWING PROGRAMS USING C/C++

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. 10. To find numerical solution of ordinary differential equations by any one methods Euler's / Runge-Kutta method.
11. To find the numerical solution of Laplace equation.
12. Department specific problem given by lecturer.

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 & setup by the concerned institution as per the scope of the syllabus.

GP-202-F GENERAL PROFICIENCY

L	T	P			
-	-	2	**Class Work**	:	50 Marks
			Total	:	50 Marks

- Quiz & Aptitude
- Comprehension
- Communication for Specifics
- Lets Speak
- Composition Sills – Instead of the given content we should teach the students formal letter writing based on the trends in practice in corporate culture.
- Training on etiquettes & manners should be carried further and should be observed during the general classes, if required, even the faculty should imparted some training on the same.

EE-301-F COMMUNICATION ENGINEERING

L	T	P
3	1	-

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

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

SPECTRAL ANALYSIS : Fourier Series, Fourier transforms, Convolution Theorem, Correlation, Cross-Correlation and autocorrelation.

Section-B

INFORMATION THEORY : Introduction to information and entropy, channel capacity for discrete and continuous channels, Shannon‟ s Theorem, Shannon-Hartley Theorem, Noisy channels, coding theory : Shannon-Fano coding, minimum redundance coding, maximization of entropy of a continuous message transmission rate, effect of medium on the information, selection of channels ,effect of noise and its minimization.

Section-C

RANDOM SIGNAL THEORY : Representation of random signals, concept of probability, probability of joint occurrence, conditional probability, discrete probability theory, continuous random variables, probability distribution function, probability density function, joint probability density functions.

Section-D

RANDOM SIGNAL THEORY : Statistical average and moments, Ergodic processes, correlation Function, power spectral density, central limit theory, response of linear system to random signals. Error function Covariance relation among the spectral densities of the two input-output random processes. Cross spectral densities, optimum filters. Introduction to Linear Block Code abd cyclic Codes

TEXT BOOK :

1. Principles of Communication Systems : Taub Schiling; TMH

REFERENCE BOOKS.

1. Communication Systems : Singh and Sapre ; TMH
2. Communication Systems : A Bruce Carlson; TMH

EE-303-F ELECTRONIC MEASUREMENT AND INSTRUMENTATION

L	T	P
3	1	-

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

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

OSCILLOSCOPE: Block diagram, study of various stages in brief, high frequency CRO considerations measurement of phase &frequency,electrostatic deflection,dual trace &dual beam oscilloscope Sampling and storage oscilloscope

.

Section-B

ELECTRONIC INSTRUMENTS: Instruments for measurement of voltage, current & other circuit parameters, Q-meters, R.F. power measurements, introduction to digital meter,chopper amplifier type voltmeter,true RMS voltmeter, electronic multimeter

Section-C

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

FREQUENCY & TIME MEASUREMENT: Study of decade counting Assembly(DCA), frequency measurements, period measurements, universal counter,

Section-D

TRANSDUCERS & SIGNAL CONDITIONING: Classification, Transducers of types: RLC photocell, thermocouples etc. basic schemes of measurement of displacement, velocity, acceleration, strain, pressure, liquid level & temperature. DC signal conditioning system, AC signal conditioning system, data acquisition and conversion system

TEXT BOOK:

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

REFERENCE BOOKS.

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

EE-305-F ANALOG ELECTRONIC CIRCUITS

L	T	P
3	1	-

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

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

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 .

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.

Section-B

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

Section-C

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

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) .

Section-D

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.

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. Agarwal - Foundations & Analog & digital electronics,Elsevier
2. Integrated Electronics: Milman Halkias, TMH.
3. Microelectronic Circuits : Sedra & Smith.

REFERENCE BOOKS:

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

EE-307-F ANTENNAS, WAVE PROPOGATION & TV ENGINEERING

L	T	P
3	1	-

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

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

Retarded potential, field of short dipole, Antenna pattern & antenna parameters Antenna pattern, Gain, Directivity, Radiation resistance, Aperture, Beam-width etc, Reciprocity theorem for antenna.

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Section-B

Wave equation for radiated fields from current and voltage sources in terms of electric scalar potential and magnetic vector potential .Fields and pattern of an infinitesimal dipole. Definition of various potentials used in antenna theory .: Relation between current distribution and field pattern of an antenna, linear antenna, half wave dipole, Antenna impedance, Directivity, Radiation resistance, Directional properties, Effect of ground on antenna pattern, Input impedance Broad band matching.

Section-C

Two element array, broad side, End fired pattern, Beam width pattern multiplication, multi element array and their properties, Synthesis of an array.parabolic feed antena, conical, helix, log periodic, horn, Microwave antenna ground waves propagation, Space waves propagation, Effect of Earth, Duct formation, Ionosphere, and sky wave

Section-D

TELEVISION SYSTEM: Picture transmission, sound transmission, picture reception, sound reception synchronization, receiver controls, color television. Monochrome picture tube, Beam deflection, screen phosphor, face plate, picture tube characteristics, picture tube, circuit controls. Television Camera Tubes: Basic principal, Image orthicon, Vidicon.

.

TEXT BOOKS:

1. Antennas by J.D.Kraus, TMH.
2. Antenna & Wave Propagation by K.D Prasad.
3. Monochrome and Color Television : R.R.Gulati ; New Age.

CSE-210-F COMPUTER ARCHITECTURE & ORGANIZATION

L	T	P
3	1	-

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

NOTE: For setting up the question paper, question no 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section A

Boolean algebra and Logic gates, Combinational logic blocks(Adders, Multiplexers, Encoders, de-coder), Sequential logic blocks(Latches, Flip-Flops, Registers, Counters) Store program control concept, Flynn‟ s classification of computers (SISD, MISD, MIMD); Multilevel viewpoint of a machine: digital logic, micro architecture, ISA, operating systems, high level language; structured organization; CPU, caches, main memory, secondary memory units & I/O; Performance metrics; MIPS, MFLOPS.

Section B

Instruction Set Architecture: Instruction set based classification of processors (RISC, CISC, and their comparison); addressing modes: register, immediate, direct, indirect, indexed; Operations in the instruction set; Arithmetic and Logical, Data Transfer, Control Flow; Instruction set formats (fixed, variable, hybrid); Language of the machine: 8086 ; simulation using MSAM.

Section C

Basic non pipelined CPU Architecture and Memory Hierarchy & I/O Techniques : CPU Architecture types (accumulator, register, stack, memory/ register) detailed data path of a typical register based CPU, Fetch-Decode-Execute cycle (typically 3 to 5 stage); microinstruction sequencing, implementation of control unit, Enhancing performance with pipelining.

The need for a memory hierarchy (Locality of reference principle, Memory hierarchy in practice: Cache, main memory and secondary memory, Memory parameters: access/ cycle time, cost per bit); Main memory (Semiconductor RAM & ROM organization, memory expansion, Static & dynamic memory types); Cache memory (Associative & direct mapped cache organizations.

Section D

Introduction to Parallelism and Computer Organization [80x86]: Goals of parallelism (Exploitation of concurrency, throughput enhancement); Amdahl‟ s law; Instruction level parallelism (pipelining, super scaling – basic features); Processor level parallelism (Multiprocessor systems overview). Instruction codes, computer register, computer instructions, timing and control, instruction cycle, type of instructions, memory reference, register reference. I/O reference, Basics of Logic Design, accumulator logic, Control memory, address sequencing, micro-instruction formats, micro-program sequencer, Stack Organization, Instruction Formats, Types of interrupts; Memory Hierarchy.

Text Books:

1. Patterson - Computer Organization & design, Elsevier
2. Computer Organization and Design, 2nd Ed., by David A. Patterson and John L. Hennessy, Morgan 1997, Kauffmann.
3. Computer Architecture and Organization, 3rd Edi, by John P. Hayes, 1998, TMH.

Reference Books:

1. Operating Systems Internals and Design Principles by William Stallings,4th edition,

EE-309-F MICROPROCESSORS AND INTERFACING

L	T	P
3	1	-

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

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

PART A

THE 8085 PROCESSOR : Introduction to microprocessor, 8085 microprocessor : Architecture, instruction set, interrupt structure, and Assembly language programming.

PART B

THE 8086 MICROPROCESSOR ARCHITECTURE : Architecture, block diagram of 8086, details of sub-blocks such as EU, BIU; memory segmentation and physical address computations, program relocation, addressing modes, instruction formats, pin diagram and description of various signals

PART C

INSTRUCTION SET OF 8086 : Instruction execution timing, assembler instruction format, data transfer instructions, arithmetic instructions, branch instructions, looping instructions, NOP and HLT instructions, flag manipulation instructions, logical instructions, shift and rotate instructions, directives and operators, programming examples.

PART D

INTERFACING DEVICE : 8255 Programmable peripheral interface, interfacing keyboard and seven segment display, 8254 (8253) programmable interval timer, 8259A programmable interrupt controller, Direct Memory Access and 8237 DMA controller.

TEXT BOOKS :

1. Microprocessor Architecture, Programming & Applications with 8085 : Ramesh S Gaonkar; Wiley Eastern Ltd.
2. The Intel Microprocessors 8086- Pentium processor : Brey; PHI

REFERENCE BOOKS:

1. Microprocessors and interfacing : Hall; TMH
2. The 8088 & 8086 Microprocessors-Programming, interfacing,Hardware & Applications :Triebel & Singh; PHI
3. Microcomputer systems: the 8086/8088 Family: architecture, Programming & Design : Yu-Chang Liu & Glenn A Gibson; PHI.
4. Advanced Microprocessors and Interfacing : Badri Ram; TMH

EE-323-F ELECTRONIC MEASUREMENT AND INSTRUMENT LAB

L	T	P
-	-	2

Class Work	:	25 Marks
Exam	:	25 Marks
Total	:	50 Marks
Duration of Exam	:	3 Hrs.

LIST OF EXPERIMENTS:

1. Study blocks wise construction of a analog oscilloscope & Function generator.
2. Study blocks wise construction of a Multimeter & frequency counter.
3. Study Measurement of different components & parameters like Q of a coil etc using LCRQ meter.
4. Study of distortion factor meter and determination of the % distortion of the given oscillator
5. Determine output characteristics of a LVDT and Measure displacement using LVDT
6. Study characteristics of temperature transducer like Thermocouple, Thermistor & RTD with implementation of a small project using signal conditioning circuits like instrumentation amplifier.
7. Measurement of Strain using Strain Guage.
8. To study differential pressure transducer & signal conditioning of output signal.
9. Measurement of level using capacitive transducer..
10. Study of Distance measurement using ultrasonic transducer.

Note:

Any Eight Experiments should performed from above list and two experiments can be suitably chosen on the contemporary topics

EE-325-F ANALOG ELECTRONIC CIRCUITS LAB

L	T	P
-	-	2

Class Work	:	25 Marks
Exam	:	25 Marks
Total	:	50 Marks
Duration of Exam	:	3 Hrs.

LIST OF EXPERIMENTS: (Select Any ten Experiments)

1. Design & measure the frequency response of an RC coupled amplifier using discrete components.
2. Design a two stage RC coupled amplifier and determine the effect of cascading on gain and bandwidth
3. Study the effect of voltage series, current series, voltage shunt, and current shunt feed-back on amplifier using discrete components.
4. Design & realize inverting amplifier, non-inverting and buffer amplifier using 741 Op Amp.
5. Verify the operation of a differentiator circuit using 741 op amp and show that it acts as a high pass filter.
6. Verify the operation of a integrator circuit using 741 op amp and show that it acts as a low pass filter.
7. Design and verify the operations of op amp adder and subtractor circuits.
8. Plot frequency response of AC coupled amplifier using op amp 741 and study the effect of negative feedback on the bandwidth and gain of the amplifier.
9. Study of IC 555 as astable & monostable multivibrator
10. Design & realize using op amp 741, Wein -bridge oscillator.
11. To design & realize using op amp 741, square wave generator.
12. To design & realize using op amp 741, logarithmic amplifier & VCCS.
13. Study of 8 bit monolithic Analog to digital converter
14. Study of R-2R ladder network & 8 bit monolithic Digital to Analog Converter.

EE-329-F MICROPROCESSOR & INTERFACING LAB

L	T	P
-	-	2

Class Work	:	25 Marks
Exam	:	25 Marks
Total	:	50 Marks
Duration of Exam	:	3 Hrs.

List of Experiment
ANY TEN EXPERIMENTS SHOULD BE PERFORMED:

1. Write a program using 8085 for Hexadecimal addition & subtraction of two numbers.
2. Write a program using 8085 Microprocessor for addition and subtraction of two BCD numbers
3. Write a program to perform multiplication and division of two 8 bit numbers using 8085
4. Write a program using 8086 for division of a defined double word (stored in a data segment) by another double Word division and verify.
5. Write a program using 8086 for finding the square root of a given number and verify.
6. Write a program using 8086 to copy 12 bytes of data from source to destination & verify.
7. Write a program to find maximum and minimum from series using 8086.
8. Write a program to initiate 8251 and to check the transmission and reception of character.
9. Write a program to interface ADC & DAC with 8085 & demonstrate generation of square wave.
10. Write a program to control the operation of stepper motor using 8085/8086 and 8255 PPI.
11. Write a program to interface 8X8 LED Matrix Display using 8085/8086 microprocessors and 8255 PPI.
12. Write a program to control the traffic light system using 8085/8086 and 8255 PPI.
13. Write a program to control simulated elevator 8085/8086 microprocessors and 8255 PPI.

EE-302-F MICROWAVE AND RADAR ENGINEERING

L	T	P
3	1	-

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

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

WAVEGUIDES: Introduction, comparison with transmission lines, propagation in TE & TM mode, rectangular wave guide, TEM mode in rectangular wave guide, characteristic impedance, introduction to circular waveguides and planar transmission lines.

Section-B

MICROWAVE COMPONENTS &TUBES: Directional couplers, tees, hybrid ring, Sparameters, attenuators, cavity resonators ,mixers & detectors, matched Load, phase shifter ,wave meter, Ferrite devices: Isolators, circulators. Limitation of conventional tubes; Construction, operation and properties of Klystron amplifier, reflex Klystron, magnetron, TWT , BWO , crossed field amplifiers.

Section-C

MICROWAVE SOLID STATE DEVICES & MEASUREMENTS: Varactor diode, Tunnel diode, Schottky diode, GUNN diode, IMPATT, TRAPATT and PIN diodes. MASER, parametric amplifiers .Power measurement using calorimeter & bolometers measurement of SWR, frequency , wavelength and impedance. Microwave bridges.

Section-D

RADAR: Block Diagram and operation, Radar Frequencies, Simple form of Radar Equation, Prediction of Range Performance, Pulse Repetition frequency and Range Ambiguities, Applications of Radar

TEXT BOOKS:

1. Microwave devices and circuits :Samuel Liao;PHI
2. Microwave devices & Radar Engg :M .Kulkarni;Umesh

REFERENCE BOOK :

1. Microwaves and Radar : A.K. Maini; Khanna

EE-304-F CONTROL SYSTEM ENGINEERING

L	T	P
3	1	-

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

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

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.

Section-B

MATHEMATICAL MODELLING : Concept of transfer function, relationship between transfer function and impulse response, order of a system, blockdiagram 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.

Section-C

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, w and wn, 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. Root locus concept, development of root loci for various systems, stability considerations..

Section-D

FREQUENCY DOMAIN ANALYSIS , COMPENSATION & CONTROL COMPONENT :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. Necessity of compensation, compensation networks, application of lag and lead compensation, basic modes of feedback control, proportional, integral and derivative controllers, illustrative examples. Synchros, AC and DC techo-generators, servomotors, stepper motors, & their applications, magnetic amplifier.

TEXT BOOK:

1. Control Systems :Anuj Jain & Naveen mehra vayu education
2. Control Systems - Principles & Design : Madan Gopal; Tata Mc Graw Hill.
3. Control System Engineering : I.J.Nagrath & M.Gopal; New Age

REFERENCE BOOKS :

1. Automatic Control Systems : B.C.Kuo, PHI.
2. Modern Control Engg : K.Ogata; PHI.

EE-310-F DIGITAL SYSTEM DESIGN

L	T	P
3	1	-

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

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

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 behavioral dataflow and structural models.

Section-B

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.

Section-C

COMBINATIONAL & SEQUENTIAL CIRCUIT DESIGN:VHDL Models and Simulation of combinational circuits such as Multiplexers, Demultiplexers, encoders, decoders , code converters, comparators, implementation of Boolean functions etc. VHDL Models and Simulation of Sequential Circuits Shift Registers, Counters etc.

Section-D

DESIGN OF MICROCOMPUTER & PROGRAMMABLE DEVICE : Basic components of a computer, specifications, architecture of a simple microcomputer system, implementation of a simple microcomputer system using VHDL Programmable logic devices : ROM, PLAs, PALs, GAL, PEEL, CPLDs and FPGA. Design implementation using CPLDs and FPGAs

REFERENCE BOOKS:

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

IT-305-F COMPUTER NETWORKS

L	T	P
3	1	-

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

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions

Section-A

OSI Reference Model and Network Architecture: Introduction to Computer Networks, Example networks ARPANET, Internet, Private Networks, Network Topologies: Bus-, Star-, Ring-, Hybrid -, Tree -, Complete -, Irregular –Topology; Types of Networks : Local Area Networks, Metropolitan Area Networks, Wide Area Networks; Layering architecture of networks, OSI model, Functions of each layer, Services and Protocols of each layer

Section-B

TCP/IP: Introduction, History of TCP/IP, Layers of TCP/IP, Protocols, Internet Protocol, Transmission Control Protocol , User Datagram Protocol, IP Addressing, IP address classes, Subnet Addressing, Internet Control Protocols, ARP, RARP, ICMP, Application Layer, Domain Name System, Email – SMTP, POP,IMAP; FTP, NNTP, HTTP, Overview of IP version 6.

Section-C

Local Area Networks: Introduction to LANs, Features of LANs, Components of LANs, Usage of LANs, LAN Standards, IEEE 802 standards, Channel Access Methods, Aloha, CSMA, CSMA/CD, Token Passing, Ethernet, Layer 2 & 3 switching, Fast Ethernet and Gigabit Ethernet, Token Ring, LAN interconnecting devices: Hubs, Switches, Bridges, Routers, Gateways.

Wide Area Networks: Introduction of WANs, Routing, Congestion Control, WAN Technologies, Distributed Queue Dual Bus (DQDB),

Section-D

Synchronous Digital Hierarchy (SDH)/ Synchronous Optical Network (SONET), Asynchronous Transfer Mode (ATM), Frame Relay.,Wireless Links.

Introduction to Network Management: Remote Monitoring Techniques: Polling, Traps, Performance Management, Class of Service, Quality of Service, Security management, Firewalls, VLANs, Proxy Servers, Introduction to Network Operating Systems: Client-Server infrastructure, Windows NT/2000.

Text Book:

1. Computer Networks (3rd edition), Tanenbaum Andrew S., International edition, 1996.

Reference Books:

1. Data Communications, Computer Networks and Open Systems (4th edition), Halsall Fred, 2000, Addison Wesley, Low Price Edition.
2. Business Data Communications, Fitzgerald Jerry,.
3. Computer Networks – A System Approach, Larry L. Peterson & Bruce S. Davie, 2nd Edition
4. Computer Networking – ED Tittel , 2002, T.M.H.

EE-306-F VLSI DESIGN

L	T	P
3	1	-

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

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

BASIC MOS TRANSISTOR : Enhancement mode & Depletion mode – Fabrication (NMOS, PMOS, CMOS, BiCMOS) Technology – NMOS transistor current equation – Second order effects – MOS Transistor Model.

Section-B

NMOS & CMOS INVERTER AND GATES : NMOS & CMOS inverter – Determination of pull up / pull down ratios – Stick diagram – Lamda based rules – Super buffers – BiCMOS & steering logic.

Section-C

SUB SYSTEM DESIGN & LAYOUT: Structured design of combinational circuits – Dynamic CMOS & clocking – Tally circuits – (NAND-NAND, NOR-NOR and AOI logic) – EXOR structure – Multiplexer structures – Barrel shifter.

Section-D

DESIGN OF COMBINATIONAL ELEMENTS & REGULAR ARRAY LOGIC : NMOS PLA – Programmable Logic Devices - Finite State Machine PLA – Introduction to FPGA**.**

VHDL PROGRAMMING: RTL Design – Combinational logic – Types – Operators – Packages – Sequential circuit – Sub-programs – Test benches. (Examples: address, counters, flipflops, FSM, Multiplexers / De-multiplexers).

TEXT BOOKS

1. D.A.Pucknell, K.Eshraghian, „Basic VLSI Design" , 3rd Edition, Prentice Hall of India, New Delhi, 2003.
2. Introduction to Digital Integrated Circuits : Rabaey,Chandrakasan & Nikolic.
3. Principles of CMOS VLSI Design : Neil H.E. Weste and Kamran Eshraghian; Pearson.

REFERENCE BOOKS

1. N.H.Weste, „Principles of CMOS VLSI Design" , Pearson Education, India, 2002
2. VLSI Technology: S.M. Sze; McGraw-Hill.

EE-308-F MICROCONTROLLER AND EMBEDDED SYSTEMS

L	T	P
3	1	-

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

NOTE: For setting up the question paper, Question No. 1 will be set up from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question, which is compulsory, and one question from each of the four sections. Thus students will have to attempt 5 questions out of 9 questions.

Section-A

INTRODUCTION OF MICROCONTROLLER: 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.

Section-B

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

Section-C

Microcontrollers - Microcontroller 8051- Architecture, Pin Diagram, I/O Ports, Internal RAM and Registers, Interrupts, Addressing Modes, Memory Organization and External Addressing, Instruction Set, Assembly Language Programming, Real Time Applications of Microcontroller- Interfacing with LCD, ADC, DAC, Stepper Motor, Key Board and Sensors.

Section-D

Embedded Systems-Introduction, Classification, Processors, Hardware Units, Software Embedded into System, Applications and Products of Embedded Systems, Structural Units in Processor, Memory Devices, I/O Devices, Buses, Interfacing of Processor Memory and I/O Devices, Case Study of an Embedded System for a Smart Card.

Text Book

1. B. B. Brey: The Intel Microprocessors, Architecture, Programming and Interfacing, Pearson Education.
2. Design with PIC Microcontrollers by John B. Peatman , Pearson.
3. Raj Kamal: Embedded Systems- Architecture, Programming and Design, TMH, New Delhi.
4. V. Udayashankara and M. S. Mallikarjunaswamy: 8051 Microcontroller, TMH, New Delhi.

References:

1. Mazidi and Mazidi: The 8051 Microcontroller and Embedded Systems, Pearson Education.
2. A. V. Deshmukh: Microcontroller (Theory and Application), TMH.
3. D. V. Hall: Microprocessors and Interfacing, TMH
4. Programming and Customizing the 8051 Microcontroller : Predko ; TMH.
5. Programming Embedded Systems in C and C++ : Michael Barr; SHROFF PUB. & DISTR

EE-328-F MICROCONTROLL & EMBEDDED SYSTEM DESIGN LAB

L	T	P
-	-	2

Class Work	:	25 Marks
Exam	:	25 Marks
Total	:	50 Marks
Duration of Exam	:	2 Hrs.

List of Experiment:

8051/AT 89C51 microcontroller

1. Write an Assembly language Programme (ALP) to generate 10 kHz square wave.
2. To study implementation & interfacing of Display devices Like LCD, LED Bar graph & seven segment display with Microcontroller 8051/AT89C51
3. To study implementation & interfacing of Different motors like stepper motor, DC motor & servo Motors.
4. Write an ALP for temperature & pressure measurement.
5. Write a program to interface a graphical LCD with 89C51.
6. To study Programming and Transmission & reception of data through Serial port & study of Parallel printer port.

PIC Microcontroller

7. To interface PWM based voltage regulator using PIC Microcontroller .
8. Study and analysis of interfacing of Graphical LCD using PIC controller
9. Study and interfacing of IR (RC5 protocol) and RF Communication using PIC controller
10. Study of SD/MMC card Interface using 18F4550

EE-324-F CONTROL SYSTEM LAB

L	T	P
-	-	2

Class Work	:	25 Marks
Exam	:	25 Marks
Total	:	50 Marks
Duration of Exam	:	3 Hrs.

LIST OF EXPERIMENTS:

ANY SIX EXPERIEMENTS (from Sl. No1-11).

1. To study speed Torque characteristics of
    a. A.C. servo motor
    b. DC servo motor .
2.
    a. To demonstrate simple motor driven closed loop DC position control system.
    b. To study and demonstrate simple closed loop speed control system.
3. To study the lead, lag, lead-lag compensators and to draw their magnitude and phase plots .
4. To study a stepper motor & to execute microprocessor or computer-based control of the same by changing number of steps, direction of rotation & speed.
5. To implement a PID controller for temperature control of a pilot plant.
6. To study behavior of 1 order,2 order type 0,type 1 system.
7. To study control action of light control device.
8. To study water level control using a industrial PLC.
9. To study motion control of a conveyor belt using a industrial PLC

MATLAB BASED (ANY FOUR EXPT.)

10. Introduction **to MATLAB (Control System Toolbox), Implement at least any**

    Different Toolboxes in MATLAB, Introduction to Control Systems Toolbox.

    Determine transpose, inverse values of given matrix.

    Plot the pole-zero configuration in s-plane for the given transfer function.

    Plot unit step response of given transfer function and find peak overshoot, peak time.

    Plot unit step response and to find rise time and delay time.

    Plot locus of given transfer function, locate closed loop poles for different values of k.

    Plot root locus of given transfer function and to find out S, Wd, Wn at given root & to discuss stability.

    Plot bode plot of given transfer function and find gain and phase margins

    Plot the Nyquist plot for given transfer function and to discuss closed loop stability, gain and phase margin.

EE-330-F DIGITAL SYSTEM DESIGN LAB

L	T	P
-	-	2

Class Work	:	25 Marks
Exam	:	25 Marks
Total	:	50 Marks
Duration of Exam	:	3 Hrs.

LIST OF EXPERIMENTS:
ANY FIVE EXPERIMENTS: VHDL

1. Design all gates using VHDL.
2. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
   a. half adder
   b. full adder
3. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
   a. multiplexer
   b. demultiplexer
4. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
   a. decoder
   b. encoder
5. Write a VHDL program for a comparator and check the wave forms and the hardware generated
6. Write a VHDL program for a code converter and check the wave forms and the hardware generated
7. Write a VHDL program for a FLIP-FLOP and check the wave forms and the hardware generated
8. Write a VHDL program for a counter and check the wave forms and the hardware generated
9. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
   a. register
   b. shift register

ANY FIVE EXPERIMENTS USING: using FPGA (Spartan 3) & CPLD

1. Design of Half-Adder, Full Adder, Half Subtractor, Full Subtractor
2. Design a parity generator
3. Design a 4 Bit comparator
4. Design a RS & JK Flip flop
5. Design a 4: 1 Multiplexer
6. Design a 4 Bit Up / Down Counter with Loadable Count
7. Design a 3: 8 decoder
8. Design a 8 bit shift register
9. Design a arithmetic unit
10. Implement ADC & DAC interface with FPGA
11. Implement a serial communication interface with FPGA
12. Implement a Telephone keypad interface with FPGA
13. Implement a VGA interface with FPGA
14. Implement a PS2 keypad interface with FPGA
15. Implement a 4 digit seven segment display

EE-322-F MICROWAVE AND RADAR ENGINEERING LAB

L	T	P
-	-	2

Class Work	:	25 Marks
Exam	:	25 Marks
Total	:	50 Marks
Duration of Exam	:	2 Hrs.

LIST OF EXPERIMENTS: ANY TEN EXPERIEMNTS CAN BE SELECTED

1. Study of wave guide components.
2. To measure frequency of microwave source and demonstrate relationship among guide dimensions, free space wave length and guide wavelength.
3. To measure VSWR of unknown load and determine its impedance using a smith chart.
4. Study of characteristics of Gunn oscillator & Gunn diode as modulated source (PIN modulation) and determination of modulation depth.
5. Study of insulation & coupling coefficient of a magic T & coupling coefficient and directivity of a directional coupler
6. Measurement of attenuation of a attenuator and isolation, insertion loss, cross coupling of an circulator.
7. Study of waveguide horn and its radiation pattern and determination of the beam width.
8. To study working of MIC Components like Power Divider , Ring resonator, Filters & Microwave Amplifier
9. To study Measurement of Guide wavelength (λg).,Free Space wavelength (λ). & Concept of reduction of wavelength due to substrate material
10. Measurement of SWR in a Microwave transmission line.
11. To study working of Doppler radar & measure RPM, object Counter & velocity, .
12. Study of audio & data communication over Microwave bench.
13. Measurement of microwave power using power meter.

EE-401-E Data Communication

L	T	P
3	1	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of exam.	:	3 Hours

Unit 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.

Unit 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.

Unit 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.

Unit 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.

Unit 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
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

IC-403-E Embedded System Design

L	T	P
3	1	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of exam.	:	3 Hours

Unit 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.

Unit 2 : Microcontroller Architecture

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

Unit 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 peripheral device, O/p port Expansion, I/p port expansion, UART.

Unit 4 : Software

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

Unit 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.

Unit 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.

EE-405-E Optical Communication Systems

L	T	P
3	1	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of exam.	:	3 Hours

Unit1 Introduction To Optical Communication Systems :
Electromagnetic spectrum used for optical communication, block diagram of optical communication system. Basics of transmission of light rays. Advantages of optical fiber communication.

Unit2 Optical Fibers:
Optical fibers structures and their types, fiber characteristics : attenuation, scattering, absorption, fiber bend loss, dispersion; fiber couplers and connectors

Unit3. Led Light Source :
Light emitting diode : recombination processes, the spectrum of recombination radiation, LED characteristics, internal quantum efficiency, external quantum efficiency, LED structure, lens coupling to fiber, behavior at high frequencies.

Unit4. Laser Light Source :
Basic principles of laser action in semi -conductors, optical gain, lasing threshold, laser structures and characteristics, laser to fiber coupling, comparison with LED source.

Unit5 . Avalanche And Pin Photodetectors:
Principles of optical detection, quantum efficiency, responsivity, general principles of PIN photodetector, intrinsic absorption, materials and designs for PIN photodiodes, impulse and frequency response of PIN photodiodes, noise in PIN Photodiodes, multiplication process, APD Design, APD bandwidth, APD noise.

Text Book:
Optical Fiber Communications: John M Senior; PHI.

Reference Books :
1. Optical Communication Systems : John Gowar; PHI.
2. Optical Fiber Communications : Gerd Keiser; TMH
3. Optical fiber Communication : Selvarajan, Kar, Srinivas; TMH.

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

EE-407-E Digital Signal Processing

L	T	P
3	1	-

Class Work	**:**	50 Marks
Exam	**:**	100 Marks
Total	**:**	150 Marks
Duration of exam.	**:**	3 Hours

Unit1. 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.

Unit2. Discrete-Time Systems :
Classification, properties, time invariant system, finite impulse Response (FIR) system, infinite impulse response (IIR) system.

Unit3. 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.

Unit4. Z-Transform :
Introduction, properties of the region of convergence, properties of the Z-transform, inversion of the Z-transform, applications of Z-transform.

Unit5. 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.

Unit6. 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
2. Digital Signal Processing: Salivahanan, Vallavaraj and Gnanapriya;TMH

Reference Books:
1. Digital Signal Processing: Alon V. Oppenhelm;PHI
2. Digital Signal processing(II-Edition): Mitra, TMH

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

EE-421-E Data Communication Lab

L	T	P
-	-	2

Class Work	:	25 Marks
Exam	:	25 Marks
Total	:	50 Marks
Duration of exam.	:	3 Hours

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 !6 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 cofigure a HUB/Switch.

Note :

At least ten experiments have to be performed in the semester; 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 concerned institution as per the scope of the syllabus .

IC-417-E Embedded System Design Lab

L	T	P
-	-	2

Class Work	:	25 Marks
Exam	:	25 Marks
Total	:	50 Marks
Duration of exam.	:	3 Hours

8051 Micro Controller

1. Write an Assembly language Programme (ALP) to generate 10kHz square wave.
2. Write an ALP to generate 10 kHz frequency using interrupts.
3. Write an ALP to interface one Microcontroller with other wring serial/parallel communication.
4. Write an ALP for temperature & pressure measurement & to display on intelligent LCD display

PIC Microcontroller

5. Write an ALP for PWM based speed control of motor .
6. Write an ALP for PWM based regulator of voltage.
7. Write an ALP to send/receive the data from an computer to MC through serial communication

General

8. Study of Development tools/environment for Microcontroller Programme.
9. Develop an embedded system for traffic light controller using Micro controller
10. Develop an embedded system for the automatic motion of a car (Model of car) & Subsequent display on LCD using Microcontroller..

EE-427-E Digital Signal Processing Lab

L	T	P
-	-	2

Class Work	**:**	25 Marks
Exam	**:**	25 Marks
Total	**:**	50 Marks
Duration of exam.	**:**	3 Hours

List of Experiments:

Perform the 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 ten experiments have to be performed in the semester; 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 by the concerned institution.

Open Electives
HUM-451 E Language Skills for Engineers

L	T	P
4	-	-

Class Work	:	50 Marks
Exam	:	80 Marks
Pract./Presen	:	20 Marks
Total	:	150 Marks
Duration of exam.	:	3 Hours

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.

Course Content:

Unit I

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.

Unit II

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.

Unit III

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

Unit IV

Comprehension: Abstracting; Summarising; Observations, Findings and Conclusions; Illustration and Inductive Logic; Deduction and Analogy.

Unit V

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

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.

Scheme of Examination:

(A) Theoretical:

The pattern of the exam would be more or less like the pattern of the competitive exams. (i.e., OBJECTIVE TYPE) like CAT G-MAT etc., as far as the units I, II, III and IV are concerned.

Unit-I, II, III: (30, 20, 10 Marks respectively)

The first section of the question paper will have 110 objective type questions with no choice at all. These 110(60+40+10) questions will cover all the first three units (I, II, III) of the syllabus and would carry 30,20 and 10 marks respectively. The questions may be in the form of multiple choices, fill-in-the-blank, supply the right word/choice, choose the right alternative, do as directed etc.

Unit-IV: 20 Marks

The question from this unit will test comprehension competence (in the form of various elements mentioned in the unit) of the text given.

(B) Practical (Presentation):

There will be an oral test carrying **20 marks**. The presentation part of the section i.e. Unit-V will be covered in this test. Hence, there is no need to include this unit in theory exam.

Three hours for a group of 15 students are required for this test. Test can be in the form of any of the activities mentioned in the Unit-V.

A panel of examiners appointed by the University will evaluate the presentation.

CSE-303-E Computer Graphics

L	T	P
3	1	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of exam.	:	3 Hours

Unit-1: Introduction to Computer Graphics: What is Computer Graphics, Computer Graphics Applications, Computer Graphics Hardware and software, Two dimensional Graphics Primitives: Points and Lines, Line drawing algorithms: DDA, Bresenham's; Circle drawing algorithms: Using polar coordinates, Bresenham's circle drawing, mid point circle drawing algorithm; Filled area algorithms: Scanline: Polygon filling algorithm, boundary filled algorithm.

Unit-2: Two/Three Dimensional Viewing: The 2-D viewing pipeline, windows, viewports, window to view port mapping; Clipping: point, clipping line (algorithms):- 4 bit code algorithm, Sutherland-cohen algorithm, parametric line clipping algorithm (Cyrus Beck).

Polygon clipping algorithm: Sutherland-Hodgeman polygon clipping algorithm. Two dimensional transformations: transformations, translation, scaling, rotation, reflection, composite transformation.

Three dimensional transformations: Three dimensional graphics concept, Matrix representation of 3-D Transformations, Composition of 3-D transformation.

Unit-3: Viewing in 3D: Projections, types of projections, the mathematics of planner geometric projections, coordinate systems.

Unit-4: Hidden surface removal: Introduction to hidden surface removal. The Z- buffer algorithm, scanline algorithm, area sub-division algorithm.

Unit-5: Representing Curves and Surfaces: Parametric representation of curves: Bezier curves, B-Spline curves. Parametric representation of surfaces; Interpolation method.

Unit-6: Illumination, shading, image manipulation: Illumination models, shading models for polygons, shadows, transparency. What is an image? Filtering, image processing, geometric transformation of images.

Text Books:

- Computer Graphics Principles and Practices second edition by James D. Foley, Andeies van Dam, Stevan K. Feiner and Johb F. Hughes, 2000, Addision Wesley.
- Computer Graphics by Donald Hearn and M.Pauline Baker, 2nd Edition, 1999, PHI

Reference Books:

- Procedural Elements for Computer Graphics – David F. Rogers, 2001, T.M.H Second Edition
- Fundamentals of 3Dimensional Computer Graphics by Alan Watt, 1999, Addision Wesley.
- Computer Graphics: Secrets and Solutions by Corrign John, BPB
- Graphics, GUI, Games & Multimedia Projects in C by Pilania & Mahendra, Standard Publ.
- Computer Graphics Secrets and solutions by Corrign John, 1994, BPV
- Introduction to Computer Graphics By N. Krishanmurthy T.M.H 2002

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.

HUM-455-E Entrepreneurship

L	T	P
3	1	-

Class Work	**:**	50 Marks
Exam	**:**	100 Marks
Total	**:**	150 Marks
Duration of exam.	**:**	3 Hours

Unit-I : 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.

Unit -II : Ownership and Location of Industrial Units

Different forms of Industrial Organisation.
Theories of Industrial location. Process of preparing project reports.

Unit -III : Size of Firm and Pricing

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

Unit -IV : 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.

Unit -V : 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.

Unit -VI : 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 atleast one question from each unit and the students will have to attempt five questions in all.

HUM-452-E Business Communication

L	T	P
4	-	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of exam.	:	3 Hours

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.

Course Content:

Unit-I

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.

Unit-II

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.

Unit-III

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

Unit-IV

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 Macgraw 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 Macgraw 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.

Scheme Of Examination:

There will be six questions in all, covering all the units. All questions will be compulsory and will have enough internal choice.

Unit-I: 30 Marks

There will be two questions from this unit. One question will cover the theoretical aspect of business letter writing and will carry 10 marks. The other question will be on writing the letter in a proper format on a subject given and will be of 20 marks. There will be enough choice taking care of the justice to be given to both the aspects of the letter writing.

Unit-II: 35 Marks

There will be two questions from this unit. One question will cover the theoretical aspect of report/proposal writing and will carry 15 marks. The other question will be on preparing the report/proposal on a topic/subject given and will be of 20 marks. There will be enough choice taking care of the justice to be given to both the aspects of the report writing.

Unit-III: 15 Marks

There will be a question on theoretical aspects of the various items of this unit or students can be asked to draft a specimen of any of these from the material given in the exam. The question can be split into parts.

Unit-IV: 20 Marks

There will be one question having two parts. One part will be on theory and will be of 5marks and the other will require the drafting an advertisement copy of a product or service or a public announcement and will carry 15 marks.

PHY-453-E Laser Technology

L	T	P
4	-	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of exam.	:	3 Hours

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.

IC-403-E Embedded System Design

L	T	P
3	1	-

Class Work	**:**	50 Marks
Exam	**:**	100 Marks
Total	**:**	150 Marks
Duration of exam.	**:**	3 Hours

Unit 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.

Unit 2 : Microcontroller Architecture:

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

Unit 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.

Unit 4 : Software:

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

Unit 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.

Unit 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 :

4. Programming and Customizing the 8051 Microcontroller : Predko ; TMH.
5. Designing Embedded Hardware : John Catsoulis ;SHROFF PUB. & DISTR. ND.
6. Programming Embedded Systems in C and C++ : Michael Barr; SHROFF PUB. & DISTR. ND.

HUM-452-E Business Communication

L	T	P
4	-	-

Class Work	**:**	50 Marks
Exam	**:**	100 Marks
Total	**:**	150 Marks
Duration of Exam.	**:**	3 Hours

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.

Course Content:

Unit-I

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.

Unit-II

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.

Unit-III

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

Unit-IV

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 Macgraw 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 Macgraw 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.

Scheme Of Examination:

There will be six questions in all, covering all the units. All questions will be compulsory and will have enough internal choice.

Unit-I: 30 Marks

There will be two questions from this unit. One question will cover the theoretical aspect of business letter writing and will carry 10 marks. The other question will be on writing the letter in a proper format on a subject given and will be of 20 marks. There will be enough choice taking care of the justice to be given to both the aspects of the letter writing.

Unit-II: 35 Marks

There will be two questions from this unit. One question will cover the theoretical aspect of report/proposal writing and will carry 15 marks. The other question will be on preparing the report/proposal on a topic/subject given and will be of 20 marks. There will be enough choice taking care of the justice to be given to both the aspects of the report writing.

Unit-III: 15 Marks

There will be a question on theoretical aspects of the various items of this unit or students can be asked to draft a specimen of any of these from the material given in the exam. The question can be split into parts.

Unit-IV: 20 Marks

There will be one question having two parts. One part will be on theory and will be of 5marks and the other will require the drafting an advertisement copy of a product or service or a public announcement and will carry 15 marks.

CSE-451-E AI and Expert System

L	T	P
3	1	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of exam.	:	3 Hours

Contents

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 LIPS.
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.

Text

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.

IC-455-E INTELLIGNET INSTRUMENTATION FOR ENGINEERS

L	T	P			
3	1	-	**Class Work**	:	50 Marks
			Exam	:	100 Marks
			Total	:	150 Marks
			Duration of exam.	:	3 Hours

Introduction:

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

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 form constant-k filters, matching of filter sections, active analog filters);OP-AMP based Voltage-to-current converter, Current-to-voltage conversions, 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)

Smart Sensors

Primary sensors; Excitation; Compensation (Nonlinearity: 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…

Interfacing Instruments & Computers

Address decoding; Data transfer control; A/D converter; D/A converter; Sample & hold circuit; others interface considerations.

Recent Trends In Sensor Technologies

Introduction; Film sensors (Thick film sensors, this film sensor) Semiconductor IC Technology- Standard methods; Micro electro- mechanical systems (Micro-machining, some application examples); Nono-Sensors.

Text Book

1. Barney, G.C., Intelligent instruments. Hemel Hempsteao: Prentice Hall, 1985.
2. ALAN S. Morris, Principles of Measurement s Instrumentation. New. Delhi: PHI Pvt. Ltd. 1999.

Reference Book:

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

Notes

1. In the sessional 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 s cellular phone etc. will nit be allowed.

PHY-453-E LASER TECHNOLOGY

L	T	P
4	-	-

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

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.

PHY-451-E NANO TECHNOLOGY

L	T	P
4	-	-

Class Work	**:**	50 Marks
Exam	**:**	100 Marks
Total	**:**	150 Marks
Duration of Exam:		3 Hours

Unit-I Introduction To Nanotech

Crystalline noncrystalline materials, fundamental of Nano Technology & Nano-materials in metals, other materials & Biosystem molecular recognition, quantum mechanics and quantum idea in nanotechnology,semiconductor nano particles.

Unit-II Preparation And Characterization Of Nanoparticles

Nanoscale lithography,dip pen lithography,e-beam lithography,nanosphere life off,lithography,molecular synthesis,nanocrystal growth,polymerization nanobricks & building block: tool for measuring nanostructures-scanning probe instrument,spectroscopy,electrochemistry, electronmicroscopy tools to make nanostructure.

Unit-III Properties & Application Of Nano Crystalline Materials

Application in sensors, nanoscale biostructure electronics, magnets, optics, fabrication medical application, smart materials self healling structures, heterogeneous nano structure & composites encapsulation carbon nanotubes.

Unit-IV

Synthesis of semiconductor nanocluster,processing of nanomaterials,nanobusiness-boom,bust & nanotechnology,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, Deniel Ratner – Nano Technology – A gentle Introduction to the Next Big Idea.

Note

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

EE-402-E Wireless Communication

L	T	P
3	1	-

Class Work	**:**	50 Marks
Exam	**:**	100 Marks
Total	**:**	150 Marks
Duration of exam.	**:**	3 Hours

Unit 1. Introduction To Wireless Communication Systems:

Evolution of mobile radio communications, examples of wireless comm. systems, paging systems, Cordless telephone systems, comparison of various wireless systems.

Unit 2. Modern Wireless Communication Systems:

Second generation cellular networks, third generation wireless networks, wireless in local loop, wireless local area networks, Blue tooth and Personal Area networks.

Unit 3. Introduction To Cellular Mobile Systems:

Spectrum Allocation, basic Cellular Systems, performance Criteria, Operation of cellular systems, analog cellular systems, digital Cellular Systems.

Unit 4. Ellular System Design Fundamentals:

Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity, tracking and grade off service, improving coverage and capacity.

Unit 5. Multiple Access Techniques For Wireless Communication:

Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access, packet ratio, capacity of a cellular systems.

Unit 6. Wireless Networking:

Difference between wireless and fixed telephone networks, development of wireless networks, fixed network transmission hierarchy, traffic routing in wireless networks, wireless data services, common channel signaling, ISDN (Integrated Services digital Networks), advanced intelligent networks.

unit 7. Intelligent cell concept and application:

Intelligent cell concept, applications of intelligent micro-cell Systems, in-Building Communication, CDMA cellular Radio Networks.

Text Books:

1. Wireless Communications: Theodore S. Rappaport; Pearsons.
2. Mobile Cellular Telecommunication: W.C.Y.Lee; McGraw Hill

Reference Book:

1. Mobile Communications: Jochen Schiller; Pearson

Note:

Eight questions are to be set -one question from each unit. Students have to attempt any five question.

EE-404-E Satellite Communication

L	T	P
3	1	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of exam.	:	3 Hours

Unit1. Principles of Satellite Communication :
Evolution & growth of communication satellite, Synchronous satellite, Satellite frequency allocation & Band spectrum, Advantages of satellite communication, Active & Passive satellite, Modem & Codec. Applications of satellite communication.

Unit2. Communication Satellite Link Design:
Introduction, General link design equations, System noise temperature, C/N & G/T ratio, Atmospheric & Ionospheric effects on link design, Complete link design, Earth station parameters.

Unit3. Analog Satellite Communication:
Introduction, Baseband analog(Voice) signal, FDM techniques, S/N & C/N ratio in frequency modulation in satellite link, S/N ratio in FM with multiplexed telephone signal in satellite link, Single channel per carrier(SCPC) systems, Companded single sideband (CSSB) systems, Analog FM/FDM TV satellite link, Intermodulation products & their effects in FM/FDM systems, Energy disposal in FM/FDM systems.

Unit4. Digital Satellite Communication :
Advantages of digital communication, Elements of digital satellite communication systems, Digital baseband signals, Digital modulation techniques, Satellite digital link design, Time Division Multiplexing.

Unit5. Multiple Access Techniques:
Introduction, TDMA, TDMA-Frame structure, TDMA-Burst structure, TDMA-Frame efficiency, TDMA-superframe, TDMA-Frame acquisition & Synchronization, TDMA compared to FDMA, TDMA Burst Time Plan, Multiple Beam (Satellite switched) TDMA satellite system, Beam Hopping(Transponder Hopping) TDMA, CDMA & hybrid access techniques.

Unit6. Satellite Orbits:
Introduction, Synchronous orbit, Orbital parameters, Satellite location with respect to earth, Look angles, Earth coverage & slant range, Eclipse effect, Satellite placement in geostationary orbit, station keeping, Satellite stabilization.

Unit7. Special Purpose Communication Satellites :
BDS, INMARSAT, INTELSAT, VSAT(data broadband satellite), MSAT(Mobile Satellite Communication technique), Sarsat(Search & Rescue satellite) & LEOs (Lower earth orbit satellite), Satellite communication with respect to Fiber Optic Communication, LANDSAT, Defense satellite.

Unit8. Laser Satellite Communication:
Introduction, Link analysis, Optical satellite link transmitter, Optical satellite link receiver, Satellite Beam Acquisition, Tracking & Positioning, Deep Space Optical Communication Link.

Text Book:
1. Satellite Communication : D.C. Aggarwal ; Khanna.

Reference Book :
1. Satellite Communication :Gagliardi ; CBS

Note:
Eight questions are to be set - one question from each unit. Students have to attempt any five question.

EE-424-E Satellite Communication Lab

L	T	P
-	-	2

Class Work	:	50 Marks
Exam	:	50 Marks
Total	:	100 Marks
Duration of Exam.	:	3 Hours

List of Experiments:

1. To set up a active and passive satellite communication link and study their difference.
2. To measure the base-band analog (voice) signal parameters in the satellite link.
3. To measure C/N ratio.
4. To transmit and receive the function generator waveforms through a Sat.Com. link.
5. To measure the digital baseband signal parameters in Sat.Com. link.
6. To send telecommand and receive the telemetry data.
7. To set a PC to PC Sat. Com. Link using RS-232 ports.
8. To measure the propagation delay of signal in a Sat. Com. Link.
9. To measure fading of a received signal.
10. To measure the parameters in an analog FM/FDM TV Sat.Com. link.
11. To measure the S/N ratio.
12. To calculate the figure of merit and FM deviation.

Note:

At least ten experiments are to be performed , atleast seven experiments are to be taken from the above list and the remaining three based on the syllabus of EE-404-C (Satellite Communication Engineering) be developed at the institution level. The students will be required to perform at least eight experiments in the semester.

DEPT. ELECTIVE-I

EE-432E	Mobile Communication
EE-317E	Power Electronics
IC-404E	Fuzzy Control System

(Common with EI, IC main paper in VIII Semester)

DEPT. ELECTIVE-II

EE-462-E	Genetic Algorithms & Applications
EE-454-E	Radar and Sonar Engg.
EE-406-E	Advance Control System

EE-432-E Mobile Communication

L	T	P
3	1	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of Exam.	:	3 Hours

Unit 1 Mobile Radio System:
A reference model, Frequencies for radio transnussion, Signals, Antennas, Signal Propagation, Multiplexing. Modulation

Unit 2 Characteristics Of Radio Waves:
Multipath Characteristics of radio waves signal fading, time dispersion, Doppler spread, coherence time, LCR. fading statistics. Diversty techniques

Unit 3 Mobile Radio Propagation:
Mechanism, free space path loss, long distance path loss model, Okumara model, Hata model, PCS model, wideband PCS, Microcell model, Indoor propagation model, Jake's channel model.

Unit 4 Wireless Systems:
Standards – GSM, signaling & call control, mobility management, location racking wireless data services IS-95, GPRS.

Unit 5 Wireless Data Networking:
IEEE Standards, Models Different layers, wireless LAN, Hypes LAN, Blue tooth. Performance analysis of link & transport layer protocols over wireless channels.

Unit 6 Mobile Network Layer:
Mobile IP: Goals, assumptions & requirements, IP packet delivery, Agent discovery, Registration, tunneling and en capsulation, optimization, Reverse tunneling, IP-V6, Mobile ad-hoc networks.

Unit 7 Mobile Transport Lays:
Tradition TCP, Classical TCP improvement, TCP over 2.5G/3G wireless networks. Performance enhancing proxies.

Text Books:
Mobile Communication: II nd edition Jochen Schiller Pearson Education

References:
Mobile Cellular Telecommunications: 2nd Edition: William, C Y Lee Mc Graw Hill
Wireless and Digital Communication: Dr. Kamilo Feher (PHI)
T.S. Rappaport, "Wireless Communication, Principles & Practice", PHI 2001.

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

EE-317-E Power Electronics

L	T	P
3	1	-

Class Work	**:**	50 Marks
Exam	**:**	100 Marks
Total	**:**	150 Marks
Duration of Exam.	**:**	3 Hours

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.

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.

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.

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.

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.

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.

Unit7. Cycloconverters :
Basic principle of frequency conversion, types of cycloconverter, non-circulating and circulating types of cycloconverters.

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 : PC Sen; TMH
2. Power Electronics : HC Rai; Galgotia
3. Thyristorised Power Controllers : GK Dubey, PHI
4. Power Electronics and Introduction to Drives : A.K.Gupta and L.P.Singh;Dhanpat Rai
5. Power Electronics: P.S Bhimra.

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

IC-404-E Fuzzy Control System

L	T	P
3	1	-

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of Exam.	:	3 Hours

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

Unit 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.

Unit 3 FKBC Design Parameters:
The PKBC 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.

Unit 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.

Unit 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.

Unit 6 Stability Of Fuzzy Control Systems:
The State space approach, Stability and robustness indices, input-output stability, circle criterion, the conicity criterion.

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

Reference Books:
Fuzzy Control Systems : Abraham Kandel and Gideon Imngholz; Narosa

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

EE-462-E Genetic Algorithms & Applications

L	T	P
4	-	-

Class Work	**:**	50 Marks
Exam	**:**	100 Marks
Total	**:**	150 Marks
Duration of Exam.	**:**	3 Hours

1. **Introduction:** Overview, History of evolutionary computation: Search spaces & fitness landscapes, elements of genetic algorithms, comparison of Gas and tradition search methods.

2. **Fundamental Concepts of Gas:** Typical examples to illustrate how Gas work. Simple computer exercises.

3. **Problem Solving Using Gas:** Evolving computer programs, data analysis & prediction, evolving neural networks, simple computer exercises.

4. **Implementation of Gas:** Suitability of GA for typical problems, encoding a problem for a GA, adapting the encoding, selection methods, Genetic operators, Parameters for Gas.

Text Books:

1. Davis L,"Handbook of Genetic Algorithms
2. Goldberg D.E.,"Genetic Algorithms in Search optimization & Machine Learning."
3. Michalewiez, Z.,"Genetic Algorithms & Data Structures = Evolution Programs

Note:

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

EE-454-E Radar and Sonar Engineering

L	T	P
3	1	0

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of Exam.	:	3 Hours

Unit 1. Introduction To Radar:
Radar Block Diagram & operation, Radar Frequencies, Radar development, Application of Radar.

Unit 2. Radar Equation:
Simple form of Radar Equation, Prediction of Range performance, Minimum detectable signal, Receiver noise, Signal to Noise ratio, Transmitter Power, Pulse repetition frequency & range ambiguities, System losses, Propagation effects.

Unit 3. CW & Frequency Modulated Radar:
The Doppler effect, CW Radar, Frequency-modulated CW Radar, Multiple Frequency CW Radar.

Unit 4. MTI & Pulse Doppler Radar:
Introduction, Delay Line Cancellors, Multiple or staggered, Pulse repetition frequencies, range-Gated Doppler Filters, Digital Signal Processing, Other MTI delay line, Limitation of MTI performance, Noncoherent MTI, Pulse Doppler Radar, MTI from a moving platform.

Unit 5. Tracking Radar:
Tracking with Radar, Sequential Lobbing, Conical Scan, Monopulse Tracking Radar, Tracking in range, Acquisition.

Unit 6. Receivers, Displays & Duplexers:
Radar Receivers, Noise Figure, Mixer, Low-noise Front ends, Displays, Duplexer, Receiver protectors.

Unit 7. Introduction To Sonar

Text Book:
1. Introduction to Radar Systems: Merrill I. Skolnik, ; MGH

Reference Book:
1. Electronic Communication Systems : Kennedy; TMH

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

EE-406-E Advanced Control System

L	T	P
3	1	0

Class Work	:	50 Marks
Exam	:	100 Marks
Total	:	150 Marks
Duration of Exam.	:	3 Hours

Unit 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.

Unit 2. Second Order Systems & State Plane:
Phase portrait of linear second systems. Method of isoclines, phase portrait of second order system with non-linearities, limit cycle, singular points.

Unit 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,

Unit 4. Linear Approximation Of Nonlinear Systems:
Taylor series, Liapunov's 2nd method.

Unit 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.
2. Digital Control Systems : B.C.Kuo
3. Applied non-linear control : J.E.

Reference Books :

1. Modern Control Theory : M.Gopal ; Wiley International.
2. Discrete Slotine & W.P.Li; Prentice Hall, USA,
5. Nonlinear Control Systems: Isidari ; Springer-Verlag.

Note :
8 questions are to be set –one from each unit. Students have to attempt five questions.time control system : K.Ogate ; PHI