M.D UNIVERSITY
SCHEME OF STUDIES AND EXAMINATION
B.Tech II YEAR (ELECTRONICS & INSTRUMENTATION ENGINEERING)
SEMESTER III
'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
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 will not be permitted in the examination.

HUM-201-F **ENGINEERING ECONOMICS**

L T P		
3 1 0	Class Work marks	: 50
	Theory marks	: 100
	Total marks	: 150
	Duration of Exam	: 3 hr

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 0	Class Work marks	: 50
	Theory marks	: 100
	Total marks	: 150
	Duration of Exam	: 3 hr

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 0	Class Work marks	: 50
	Theory marks	: 100
	Total marks	: 150
	Duration of Exam	: 3 hr

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 **ELECTRONIC DEVICES & CIRCUITS**

L T P		
3 1 0	Class Work marks	: 50
	Theory marks	: 100
	Total marks	: 150
	Duration of Exam	: 3 hr

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:

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 0	Class Work marks	: 50
	Theory marks	: 100
	Total marks	: 150
	Duration of Exam	: 3 hr

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:

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

EE-205-F **ELECTROMECHANICAL ENERGY CONVERSION**

L T P		
3 1 0	Class Work marks	: 50
	Theory marks	: 100
	Total marks	: 150
	Duration of Exam	: 3 hr

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 STRUCTURE USING 'C'**

(ECE, EI, CSE, IT)

L T P		
3 1 0	Class Work marks	: 50
	Theory marks	: 100
	Total marks	: 150
	Duration of Exam	: 3 hr

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:

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

Reference Books:

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

EE-221-F **PCB & ELECTRONIC WORKSHOP LAB**

L T P		
0 0 2	Class Work marks	: 25
	Theory marks	: 25
	Total marks	: 50

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. 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	Class Work marks	: 25
0 0 2	Theory marks	: 25
	Total marks	: 50

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 **ELETRICAL WORKSHOP & MACHINE LAB**

L T P	Class Work marks	: 50
0 0 3	Theory marks	: 50
	Total marks	: 100

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
0	0	2

Class Work marks : 25
Theory marks : 25
Total marks : 50

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.
   (Insertion and Deletion in Binary search Tree)

8. Write a program to create a linked list & perform operations such as insert, delete, update, reverse in the link list

9. Write the program for implementation of a file and performing operations such as insert, delete, update a record in the file.

10. Create a linked list and perform the following operations on it
    a) add a node b) Delete a node

11. Write a program to simulate the various searching & sorting algorithms and compare their timings for a list of 1000 elements.

12. Write a program to simulate the various graph traversing algorithms.

13. 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.**

M.D UNIVERSITY
SCHEME OF STUDIES AND EXAMINATION
BE. II YEAR (ELECTRONICS & INSTRUMENTATION ENGINEERING)
SEMESTER – IV
Modified 'F' Scheme effective from 2009-10

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
EEE 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
EI-210-F	ELECTRONICS MEASUREMENT & MEASURING INSTRUMENTS (EI)	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
EI-202-F	ELECTRONICS MEASUREMENT & MEASURING INSTRUMENTS LAB (EI)	-	-	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 0r 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.

HUM-201-F **ENGINEERING ECONOMICS**

L T P	Class Work marks	: 50
3 1 0	Theory marks	: 100
	Total marks	: 150
	Duration of Exam	: 3 hr

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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 0	Class Work marks	: 50
	Theory marks	: 100
	Total marks	: 150
	Duration of Exam	: 3 hr

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 0	Class Work marks	: 50
	Theory marks	: 100
	Total marks	: 150
	Duration of Exam	: 3 hr

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 **SIGNALS & SYSTEMS**

L T P		
3 0 0	Class Work marks	: 50
	Theory marks	: 100
	Total marks	: 150
	Duration of Exam	: 3 hr

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

Reference Books:

1. V. Oppenheim, A.S. Willsky and S. Hamid Nawab, 'Signals & System',PEARSON Education, Second Edition, 2003.

2. Schaume Series on Signals & Systems, HSU & RANJAN, TMH,India

EE-224-F **DIGITAL ELECTRONICS**

L T P		
3 1 0	Class Work marks	: 50
	Theory marks	: 100
	Total marks	: 150
	Duration of Exam	: 3 hr

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

EI-210-F **ELECTRONICS MEASUREMENT & MEASURING INSTRUMENTS**

L T P		
3 1 0	Class Work marks	: 50
	Theory marks	: 100
	Total marks	: 150
	Duration of Exam	: 3 hr

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

Classification of Instruments- Absolute Instruments, Secondary Instruments, Characteristics of Instruments,Static-Accuracy, Precision, sensitivity, Resolution,
Static error, Reproducibility, Drift, Dead zone. Dynamic- speed of response, Lag, Fidelity, Dynamic error. Types of error- Gross, Systematic, Random. Units of measurement fundamental. Standards and their classification- International,Primary, Secondary, Working. Calibration of Instruments. Grounds- Importance of ground, Grounding, Equipment of grounding for safety.

SECTION –B:

Analog DC and AC Meters

Classification of Analog Instruments. Definition of Average & RMS value. PMMC- Working Principle, Construction, Sources of torque. Analog DC Ammeters & Voltmeters. Analog AC Ammeter, Voltmeter & Wattmeter. Analog Multimeter- Block Diagram of Analog Multimeter and operation only. How to use Basic meters.

SECTION –C

Digital Meters

Concepts of ADC & DAC only. Resolution, Sensitivity and Accuracy of digital display. Digital frequency meter- Block Diagram and operation only. Digital Voltmeter-Ramp type DVM, Integrating type , Successive approximation type DVM, Dual slope type DVM. (Block diagram, Operation and waveform if required). Digital Multimeter- Block Diagram and operation only. LCR, Q meter- Block diagram and operation only. Digital phase meter- Block diagram and operation only.

SECTION-D

Oscilloscope, Signal Generator and Analyser

Oscilloscope subsystems- Display subsystems- CRT, Deflection of electron beam in CRT, Electrostatic and Electromagnetic deflection sensitivity. CRO-Block diagram of single beam dual trace and dual beam oscilloscope. Block diagram of Digital storage oscilloscope. Uses of CRO- Frequency and phase measurement.

Concept of oscillator. Signal generator-AF and RF type- Block diagram
and operation only. Function generator and pulse generator- Block
diagram, Simple controls and operation only.Spectrum & Logic analyzer- Block diagram and operation only.

TEXT BOOKS:

1. Electronic Measurements & Instrumentations BY Morris, Elsevier.
2. A Course in Electrical and Electronic Measurement & Instrumentation : A. K. Sawhney; Dhanpat Rai
3. Kalsi Electronic Instruments Tata Mc Graw Hill

REFERENCE BOOKS:

1. Electrical Measurments : E.W. Golding
2. Electronic & Electrical Measurment & Instrumention : J.B. Gupta; Kataria & Sons.
3. Electronic Instrumentation & Measurment Technique : W.D.Cooper & A.D.Helfrick.

EE-208-F **ELECTROMAGNETIC FIELD THEORY**

L T P		
3 1 0	Class Work marks	: 50
	Theory marks	: 100
	Total marks	: 150
	Duration of Exam	: 3 hr

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 Books:

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	Class Work marks	: 25
0 0 2	Theory marks	: 25
	Total marks	: 50

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	Class Work marks	: 25
0 0 2	Theory marks	: 25
	Total marks	: 50

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-202-F **ELECTRONICS MEASUREMENT & MEASURING INSTRUMENTS**

L T P		
0 0 2	Class Work marks	: 25
	Theory marks	: 25
	Total marks	: 50

LIST OF EXPERIMENTS:

1. Compare the specifications of Analog and Digital multimeter.
2. Measure DC Voltage & DC Current using PMMC instruments.
3. Find the RMS &Average value from the measurement.
4. Measurement of R.L.C & quality factor using LCR, Q meter.
5. Measure phase using Digital phase meter.
6. Study front panel controls of specification of typical CRO.
7. Measure frequency, voltage, phase difference (by time measurement) using CRO.
8. Testing of component using CRO.
9. Using Lissagous pattern find frequency & phase difference of unknown signal.
10. Study & use of DSO.
11. Measurement of parameter of a Signal generator (Impedance, Distortion, Range).
12. Measure frequency & voltage of the different o/p waveforms of function generator.

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	Class Work marks	: 25
1 1 2	Theory marks	: 25
	Total marks	: 50

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 G. Wheatley-Pearson, Education Ltd.
3. Numerical Methods By Babu Ram, Pearson
4. 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. 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	Marks for Class Work ;50
- - 2	Total Marks: 50

- 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.

M.D UNIVERSITY
SCHEME OF STUDIES AND EXAMINATION
B.Tech. III YEAR (ELECTRONICS & INSTRUMENTATION ENGINEERING)
SEMESTER V
'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		
EI-301-F	ANALOG ELECTRONICS-II	3	1	-	4	50	100	-	150	3
EI-303-F	ADVANCED MEASUREMENT & MEASURING INSTRUMENTS	3	1	-	4	50	100	-	150	3
EI-305-F	CONTROL ENGINEERING	3	1	-	4	50	100	-	150	3
EE-307-F	ANTENNAS, WAVE PROPAGATION & TV ENGG. (EI,ECE)	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
EI-311-F	RANDOM VARIABLES & STOCHASTIC PROCESSES	3	1	-	4	50	100	-	150	3
EI-321-F	CONTROL ENGINEERING LAB	-	-	2	2	25	-	25	50	3
EI-325-F	ANALOG ELECTRONICS-II LAB	-	-	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
EI-323-F	PROGRAMMING WITH MATLAB			2	2	25	-	25	50	3
EE-335-F	PRACTICAL TRAINING-I		-	2	2		-			
	TOTAL	**18**	**6**	**10**	**34**	**400**	**600**	**100**	**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.

EI-301-F **ANALOG ELECTRONICS-II**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

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 .

TUNED AMPLIFIER: General behavior of tuned amplifiers, Single tuned amplifiers, voltage gain & frequency response of single tuned amplifiers, double tuned amplifiers, advantages and disadvantages of tuned amplifiers.

Section-B

OSCILLATORS: Barkhausen criteria, Classification of oscillators, frequency and frequency stability of oscillatory circuits,Tuned based Oscillators, Hartley Oscillator, Colpitt Oscillators , 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, transformer coupled power amplifier, class B amplifier : efficiency & distortion; class A and class B push-pull amplifiers; class C power amplifier.

REVIEW OF CONCEPTS OF OP-AMP : Ideal and practical op-amp, differential mode configuration, transfer characteristics and its electrical parameters.

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 BOOKS :

1. Foundations & Analog & digital electronics,Elsevier
2. Integrated Electronics: Milman Halkias, TMH.
3. Microelectronic Circuits : Sedra & Smith.
4. ELECTRONIC DEVICES & CIRCUITS: BOYLESTAD & NASHELSKY: PEARSON

REFERENCE BOOKS :

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

EI-303-F **ADVANCED MEASUREMENTS & MEASURING INSTRUMENTS**

L T P		
3 1 -	Theory	: 100 Marks
	Class work	: 50 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

OSCILLOSCOPES : Block diagram of CRO, study of various stages in brief, electrostatic deflection, dual trace &dual beam oscilloscope, Sampling and storage oscilloscope

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

Section-B

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

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

Section-C

TRANSDUCERS & SIGNAL CONDITIONING: Overview, primary & secondary transducers, Active & passive transducers, DC & AC signal conditioning systems, data acquisition and conversion systems.

RESISTIVE, INDUCTIVE & CAPACITIVE TRANSDUCERS : Potentiometers, loading effect, power rating, linearity & sensitivity, Helipots, Strain gauges, unbounded & bounded types, LVDT, RVDT & uses. Transducers using L, Mu(u), G, N & Reluctance change. Use of changes in A, d, ε (Epsilon), differential arrangement.

Section-D

TELEMETRY : Modes of data transmission, D.C. telemetry system, voltage telemetry system, current telemetry system, A.C telemetry system., AM , FM, phase modulation, pulse telemetry system, PAM,. Pulse frequency system, Pulse duration modulation (PDM), digital telemetry, Pulse Code Modulation, Transmission channels & media, wire line channels, radio channels, microwave channels, power line carrier channels, Multiplexing in telemetry systems, introduction to various forms of multiplexing.

TEXT BOOKS:

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

2. Principles of electronics measurements & instrumentation; Morris - Elsevier

REFERENCE BOOKS.

1. Measurement Systems : E.O. Doeblin;TMH.
2. Electronic Instrumentation & Measurement Techniques : W.D. Cooper & A.D. Helfrick ; PHI.

EI-305-F **CONTROL ENGINEERING**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

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 AND MODELLING :Open loop and closed loop control system, Some illustrative examples of open and closed loop control system, Transfer function, relationship between transfer function and impulse response, Transfer function models of mechanical and electrical systems, block diagram algebra, signal flow graph analysis, Effect of parameter variations in open loop and closed loop control systems, Effect of feedback on sensitivity, overall gain and stability, Basic modes of feedback control: Proportional, integral and derivative.

Section-B

TIME DOMAIN ANALYSIS , ERRORS AND STABILITY: Typical test signals, time response of first order systems to various standard inputs, time response of 2nd order system to step input, Location of roots of characteristic equation and time response, Transient response specifications of second order system, Steady state errors, Static error coefficients, Steady state error for different type of systems, Concept of stability, Effect of location of poles on stability, Necessary but not sufficient conditions for stability, Hurwitz stability criterion, Routh stability criterion and relative stability.Root locus concept, development of root loci for various systems.

Section-C

FREQUENCY RESPONSE ANALYSIS: Relationship between time and frequency response, Polar plots, Procedure to sketch the polar plot, Inverse polar plot, Bode plot, Procedure for drawing the Bode plots, Phase margin and gain margin, Types of compensation, Design of compensation using Bode's plot, Phase lead, Phase lag and Lead-Lag compensation., Mapping, Mapping of close contour and principle of argument, Nyquist path or Nyquist contour, Nyquist stability criterion.

Section-D

STATE SPACE ANALYSIS AND NONLINEAR CONTROL: Concepts of state, state variable, state model, state models for linear continuous time functions, diagonalization of transfer function, solution of state equations, concept of controllability & observability. Some common types of non-linearities, Study of non-linear systems, Stability analysis with Describing function, The phase plane technique, Introductory concepts of Lyapunov stability analysis.

TEXT BOOKS:

1. Ogata, K., "Modern Control Engineering", Prentice Hall, second edition, 1991.

2. Nagrath & Gopal, “Modern Control Engineering”, New Ages International.

REFERENCE BOOKS:

1. Kuo, B.C., “Automatic Control System”, Prentice Hall, sixth edition, 1993.
2. S. Hasan Saeed, “ Automatic Control Systems(with MATLAB Programs)”, Katson **Educational Series.**

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

L	T	P
3	1	-

Theory	: 100 Marks
Class work	: 50 Marks
Total	: 150 Marks
Duration of Exam	: 3 Hours

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.

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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.

EE-309-F **MICROPROCESSORS AND INTERFACING**

L T P	Theory : 100 Marks
3 1 -	Class work : 50 Marks
	Total : 150 Marks
	Duration of Exam : 3 Hours

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. 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

EI-311-F RANDOM VARIABLES AND STOCHASTIC PROCESSES

L T P		
3 1 -	Theory	: 100 Marks
	Class work	: 50 Marks
	Total	: 150 Marks
	Duration of Exam	: 3 Hours

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

RANDOM VARIABLES: Discrete and Continuous Random Variable, Distribution and Density functions, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density. Expected Value of a Random Variable, Addition and multiplication theorems on expectations, Binomial, Poisson and Exponential Distributions.

Section B

STOCHASTIC PROCESSES: Their specification, Stationarity: First order and second order stationary processes, Wide-sense stationarity,Ergodicity,Joint Ergodicity, Mean Ergodic Process, correlation-Ergodic Process, Definition and examples of Markov chains, Transition matrix, Order of a Markov chain, Markov chains as graphs, Higher transition probabilities with illustrations.

Section C

POISSION PROCESS: Postulates, properties of Poisson process, Poisson process and related distributions, Pure birth process, Birth-immigration process, Time dependent Poisson processes, Birth and death process, immigration-emigration process, mean population size, extinction probability.

Section D

QUEUING THEORY: General concepts on queuing systems, transient and steady state solutions, M/M/1 and M/M/C queuing models with limited and unlimited system capacities with illustrations.

INFORMATION THEORY: Introduction, measure of Information, binary unit of information , entropy, properties of average measure of entropy, important relations for various entropies, set of axioms for an entropy function, uniqueness theorem, communication system, noiseless channel, cannel capacity, efficiency and redundancy, expected mutual information, encoding.

SUGGESTED BOOKS:

1. Probability,Random Variables and Stochastic Processes:Athanosis Papouils and Pillai;Tata Mc-Graw Hill.

2. Probability Theory and Stochastic process for Engineering ; Bhatt Shila and Ganguly; Pearson's Education.
3. Probability and Random Process 3rd Ed: Geoffrey R Grimmett, Oxford University Press .
4. Probability ,Random Variables and Random Signal Processing ;Peyton Peebles;TMH.
5. Operations Research :A.P.Verma; S.K Kataria & Sons..
6. Probability, Random Processes and Queuing Theory, A.M.Natarajan and A.Tamilarsi, New Age International.

.

EI-321-F **CONTROL ENGINEERING LAB**

L T P			
0 0 2	CLASS WORK	:	25
	EXAM	:	25
	TOTAL	:	50
	DURATION OF EXAM	:	3 HRS

LIST OF EXPERIMENTS:

1. To study AC servo motor and to plot its torque speed characteristics.

2. To study AC motor position control through continuous and step command.

3. Study of ON/OFF controller using PID trainer.

4. Study of open loop & close loop system using PID trainer.

5. Study of close loop system with disturbance using PID trainer.

6. Study of synchro transmitter in terms of position v/s phase angle & voltage magnitude w.r.t rotor voltage mag./phase.

7. Study of remote position indication system using synchro transmitter/receiver.

8. Study of DC servo motor.

9. To plot the Bode response of the continuous SISO function.

10. To plot root locus of a given transfer function and locate the closed loop poles for different values of k.

11. To study the MATLAB package for simulation of control system design.

12. Introduction to control system toolbox in MATLAB.

13. Study of relay control system.

14. Study of speed control of AC induction motor.

15. Study of speed control of DC motor by Thyristor control.

16. To study digital control of a simulated system using an 8-bit microcomputer.

17. Study of thyristor temperature controller response.

18. To study & plot the various kind of input signal using MATLAB programme.

19. Determine transpose, inverse values of a given matrix using MATLAB command.

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

At least 10 experiments are to be conducted from the above list.

EI-325-F **ANALOG ELECTRONICS- II LAB**

L T P			
0 0 2	CLASS WORK	:	25
	EXAM	:	25
	TOTAL	:	50
	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 **MICROPROCESSORS & INTERFACING LAB**

L T P			
0 0 2	CLASS WORK	:	25
	EXAM	:	25
	TOTAL	:	50
	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.

EI-323-F **PROGRAMMING WITH MATLAB**

L T P			
0 0 2	CLASS WORK	:	25
	EXAM	:	25
	TOTAL	:	50
	DURATION OF EXAM	:	3 HRS

LIST OF EXPERIMENTS:

1: Introduction to Matlab

1. Matlab Interactive Sessions
2. Menus and the toolbar
3. Computing with Matlab
4. Script files and the Editor Debugger
5. Matlab Help System
6. Programming in Matlab

2: Arrays

1. Arrays
2. Multidimensional Arrays
3. Element by Element Operations
4. Polynomial Operations Using Arrays
5. Cell Arrays
6. Structure Arrays

3: Functions & Files

a) Elementary Mathematical F
b) User Defined Functions
c) Advanced Function Programming
d) Working with Data Files

4: Programming Techniques

a) Program Design and Development
b) Relational Operators and Logical Variables
c) Logical Operators and Functions
d) Conditional Statements
e) Loops
f) The Switch Structure
g) Debugging Mat Lab Programs

5: Plotting

a) XY- plotting functions
b) Subplots and Overlay plots
c) Special Plot types
d) Interactive plotting
e) Function Discovery
f) Regression
g) 3-D plots

6: Linear Algebraic Equations

a) Elementary Solution Methods
b) Matrix Methods for (LE)
c) Cramer's Method
d) Undetermined Systems
e) Order Systems

7: Probability and Statistics

1. Interpolation

2. Statistics, Histogram and probability
3. The Normal Distribution
4. Random number Generation
5. Interpolation

8. Symbolic Processing With Matlab

1. Symbolic Expressions and Algebra
2. Algebraic and Transcendental Equations
3. Calculus
4. Symbolic Linear Algebra

9. Final Project: Design a Filter Using MATLAB

At least 10 experiments should be performed and at least one experiment is to be performed from each unit.

References:

1. Chapman Stephen J.: MATLAB Programming for Engineers, 3rd Edition, Thomson /Cengage.
2. Rudra Pratap: Getting Started with MATLAB 7, Oxford University Press (Indian Edition).
3. Palm; Matlab 7.4; TMH.
4. Proakis John G.: Contemporary Communication System Using MATLAB; Thomson Vikas Pub.
5. B.S. Manke: Linear Control Systems - with MATLAB Application, Khanna Publishers.
6. Simulation/Designing Software Manuals.
7. Hassan S; Automatic Control Systems (with MATLAB Programming); Kataria and Sons, Delhi.

M.D. UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION

B.Tech. III YEAR (ELECTRONICS & INSTRUMENTATION ENGINEERING)

SEMESTER – VI

'F' Scheme effective from 2012-13

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
EI-302-F	INDUSTRIAL ELECTRONICS	3	1	-	4	50	100	-	150	3
EI-304-F	COMMUNICATION CIRCUIT & SYSTEMS	3	1	-	4	50	100	-	150	3
EE-312-F	MICROCONTROLLERS & EMBEDDED SYSTEMS (COMMON WITH ECE)	3	1	-	4	50	100	-	150	3
IT-305-F	COMPUTER NETWORKS (EI,ECE, CSE, IT)	3	1	-	4	50	100	-	150	3
EE-310-F	DIGITAL SYSTEM DESIGN (IC,EE,EEE,ECE,CSE,)	3	1	-	4	50	100	-	150	3
CSE-210-F	COMPUTER ARCHITECTURE & ORGANIZATION (common with 4th sem CSE)	3	1	-	4	50	100	-	150	3
EI-326-F	COMMUNICAION CIRCUITS & SYSTEMS LAB	-	-	2	2	25	-	25	50	3
EE-330-F	DIGITAL SYSTEM DESIGN LAB (IC,EE,EEE,ECE,CSE,)	-	-	2	2	25	-	25	50	3
CSE-310-F	COMPUTER NETWORKS LAB	-	-	2	2	25	-	25	50	3
EI-324-F	CIRCUIT SIMULATION & PCB DESIGN LAB	-	-	2	2	25	-	25	50	
	TOTAL	**18**	**6**	**8**	**32**	**400**	**600**	**100**	**1100**	

1. **Note: Students will be allowed to use non-programmable scientific calculator. However, sharing of Calculator 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 VII semester.**

EI-302-F **INDUSTRIAL ELECTRONICS**

L	T	P
3	1	-

Theory	: 100 Marks
Class work	: 50 Marks
Total	: 150 Marks
Duration of Exam	: 3 Hours

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

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.

Section-B

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.

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.

Section-C

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.

Section-D

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.

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

TEXT BOOKS:

1. Power Electronics: P.S Bhimra
2. Power Electronics: MH Rashid; PHI
3. Bose - Power electronics, Elsevier

REFERENCE BOOKS :

1. Rashid - Handbook of power electronics,Elsevier
2. Power Electronics : PC Sen; TMH
3. Power Electronics : HC Rai; Galgotia
4. Thyristorised Power Controllers : GK Dubey, PHI
5. Power Electronics and Introduction to Drives : A.K.Gupta and L.P.Singh;Dhanpat Rai

EI-304-F COMMUNICATION CIRCUITS & SYSTEMS

L T P		
3 1 0	CLASS WORK	: 50
	EXAM.	: 100
	TOTAL	: 150
	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 TO COMMUNICATION SYSTEMS: The essentials of Communication system, modes and media's of communication, classification of signals and systems, Fourier Analysis of signals.

AMPLITUDE MODULATION: Amplitude modulation, mathematical analysis of a modulated carrier wave, power relations in an AM wave, AM generation-plate , and grid modulated system, Demodulation of AM waves, DSBSC, Generation of DSBSC waves, Coherent detection of DSBSC waves, single side band modulation, generation of SSB waves, vestigial sideband modulation (VSB).

Section-B

ANGLE MODULATION : Basic definitions: Phase modulation (PM) & frequency modulation (FM), FM Sidebands, modulation index and number of side bands, mathematical expression for FM wave, narrow band frequency modulation, wideband frequency modulation, generation of FM waves, demodulation of FM waves, comparison between AM & FM.

PULSE ANALOG MODULATION: Sampling theory, time division multiplexing (TDM) and frequency division multiplexing (FDM), Pulse Amplitude Modulation (PAM), Pulse Width Modulation (PWM) and Pulse Position Modulation (PPM).

Section-C

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

Section-D

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

INTRODUCTION TO NOISE : Sources of External noise, internal noise, S/N ratio, noise figure.

TEXT BOOKS :

3. Communication systems (4th Edn.): Simon Haykins ; John wiley &sons.
4. Communication systems: Singh & Sapre; TMH.

REFERENCE BOOKS :

1. Electronic Communication Systems (4th Edn.): Kennedy & Davis: TMH.
2. Communication Electronics : Frenzel; TMH.
3. Communication system : Taub & Schilling; TMH.
4. Communication systems : Bruce Carlson

EE-312-F MICROCONTROLLERS & EMBEDDED SYSTEMS

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

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 Books:

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

IT-305-F **COMPUTER NETWORKS**

L	T	P
3	1	-

Theory	: 100 Marks
Class work	: 50 Marks
Total	: 150 Marks
Duration of Exam	: 3 Hours

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 Books :

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

Reference Books :

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

EE-310-F **DIGITAL SYSTEM DESIGN**

L	T	P
3	1	-

Theory	: 100 Marks
Class work	: 50 Marks
Total	: 150 Marks
Duration of Exam	: 3 Hours

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

CSE-210-F

COMPUTER ARCHITECTURE & ORGANIZATION

L	T	P
3	1	-

Class Work:	:50
Exam:	:100
Total	: 150
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 heir 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 inpractice: 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:

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

EI-326-F COMMUNICATION CIRCUITS & SYSTEMS LAB

L T P
0 0 2

CLASS WORK	:	25
EXAM	:	25
TOTAL	:	50
DURATION OF EXAM	:	3 HRS

LIST OF EXPERIMENTS:

1. Study of Amplitude Modulation and determination of Modulation index.
2. To study the working operation of DSB Balanced Modulator.
3. Study of Frequency Modulation using voltage controlled oscillator and determination of Modulation index.
4. Study of Phase Modulation technique.
5. To study the sampling and Pulse Amplitude Modulation.
6. Study of Pulse Width Modulation technique.
7. To Study the Pulse Frequency Modulation technique.
8. Study of Pulse Code Modulation digital technique.
9. Study of Carrier Modulation technique using Frequency Shift Keying.
10. Study of Amplitude Shift Keying and Quadrature Amplitude Shift Keying.
11. Study of Phase Shift Keying and Quadrature Phase Shift Keying.
12. Comparative study of Delta Modulation & Adaptive Delta Modulation Technique.
13. Project related to the scope of the course.

NOTE: Atleast ten experiments are to be performed , atleast 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.

EE-330-F **DIGITAL SYSTEM DESIGN LAB**

L T P			
0 0 2	CLASS WORK	:	25
	EXAM	:	25
	TOTAL	:	50
	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

CSE-310-F **COMPUTER NETWORKS LAB**

L	T	P			
-	-	2	Class Work	:	25
			Exam	:	25
			Total	:	50
			Duration of Exam	:	3 Hrs.

This course provides students with hands on training regarding the design, troubleshooting, modeling and evaluation of computer networks. In this course, students are going to experiment in a real test-bed networking environment, and learn about network design and troubleshooting topics and tools such as: network addressing, Address Resolution Protocol (ARP), basic troubleshooting tools (e.g. ping, ICMP), IP routing (e,g, RIP), route discovery (e.g. traceroute), TCP and UDP, IP fragmentation and many others. Student will also be introduced to the network modeling and simulation, and they will have the opportunity to build some simple networking models using the tool and perform simulations that will help them evaluate their design approaches and expected network performance.

EI-324-F CIRCUIT SIMULATION & PCB DESIGN LAB

L T P			
0 0 2	CLASS WORK	:	25
	EXAM	:	25
	TOTAL	:	50
	DURATION OF EXAM	:	3 Hrs

LIST OF EXPERIMENTS:

Study of Circuit Simulation Software (any one - TINA-PRO/ PSPICE/ Labview/ CIRCUIT MAKER/MULTI-SIM). PCB Layout Software (any one - PROTEL/ ORCAD/ ALTERA). Design and Simulation of basic Electronic Circuits (Example Rectifiers, Amplifiers, Oscillators, Digital Circuits, Transient and steady state analysis of RC/RL/RLC circuits etc). Design and fabrication of PCB pertaining to various circuits studied on PCB machine.

1) Simulate and study half wave, full wave and bridge rectifier.
2) Simulate and study diode clipper and clamper circuits.
3) Simulate and study emitter bias and fixed bias BJT and FET circuits.
4) Simulate a common emitter amplifier using self biasing and study the effect of variation in emitter resistor on voltage gain, input and output impedance.
5) Determine the frequency response of Vo/Vs for CE BJT amplifier.
6) Study the effect of cascading of two stages of amplifiers on bandwidth.
7) Simulate and study the Darlington pair amplifier and determine dc bias and output dc voltage.
8) Simulate and study active low pass, high pass, and band pass filters.
9) Simulate and study class A, B, C, and AB amplifier.
10) Study the operation of 555 timer oscillator.
11) Simulate any one logic expression provided by the instructor and determine its truth table.
12) Simulate logic expression of full adder circuit and determine its truth table.
13) Simulate a synchronous 4-bit counter and determine its count sequence.
14) Simulate a master slave flip flop using NAND gates and study its operation.
15) Simulate and study the operation of preset and clear in flip flops.

At least 10 experiments should be performed. At least seven experiments should be performed from the above list and remaining three experiments may be designed as per the relevant syllabus.

M.D. UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION
B.Tech. IV YEAR (ELECTRONICS & INSTRUMENTATION ENGINEERING)

SEMESTER – VII

F' Scheme

EFFECTIVE FROM THE SESSION 2012-13

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
EI-401-F	PLCs & SCADA SYSTEMS	3	1	-	4	50	100	-	150	3
EI-403-F	Fuzzy Logic & Control	3	1	-	4	50	100	-	150	3
ECE-405-F	Wireless Communication (Common with ECE)	3	1	-	4	50	100	-	150	3
ECE-409-F	DIGITAL SIGNAL PROCESSING (Common with ECE)	3	1	-	4	50	100	-	150	3
	* Open Elective	3	1	-	4	50	100	-	150	3
	* Dept. Elective	3	1	-	4	50	100	-	150	3
ECE-423-F	WIRELESS & SATELLITE COMM. LAB			3	3	50		50	100	3
EI-431-F	PLCs & SCADA SYSTEMS LAB	-	-	2	2	50	-	50	100	3
ECE-429-F	Digital Signal Processing Lab	-	-	2	2	25	-	25	50	3
GPEI-401-F	GENERAL FITNESS FOR THE PROFESSION	-	-	-	-	-	-	50	50	3
EI-435-F	PRACTICAL TRAINING-II	-	-	2	2	-	-	-	-	-
	TOTAL	**18**	**6**	**9**	**33**	**425**	**600**	**175**	**1200**	

List of Open Electives

1.	HUM-451-F	Language Skills for Engineers
2.	HUM-453-F	Human Resource Management
3.	HUM-459-F	Renewable Energy Resources and Tecchnology
4.	ME-451-F	Mechatronics Systems
5.	IC-455-F	Intelligent Instrumentation for Engineers
6.	OR-401-F	Operations Research

Dept. Elective:

1	Wireless Sensor Networks	ECE-411-F	5	Advance Control Systems	EE-405-F
2	Mos ICs & Technology	EI-421-F	6	Radar & Sonar Engineering	EI-423-F
3	Optical Communication Systems	ECE-415-F			
4	Reliability of Electronic Systems	EI-437-F			

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. **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. **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.**

EI-401-F **PLCs & SCADA SYSTEMS**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

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- PLCs, Adv. of PLCs Over Relay System, **I/ O** Section – Fixed, **I/ O**, Modular **I/ O,** Discrete **I/ O** Modules, Analog **I/ O** Modules
PROCESSOR UNIT- Processor, Memory types, Guarding Against Electro Static Discharge, Peripherals, Memory Organizatio

SECTION-B

PROGRAMMING DEVICES- Programming Devices, Dedicated Desktop Programmes, Hand Held Programmers, Computer Programmers
LADDER DIAGRAM & PLC PROGRAMMING- Ladder Diagram Rules, Writing Diagram, Ladder Diagrams, Basic Stop / START Ckt, Digital Logic gates, Sequenced Motor Starting, Relay Type Instruction, Programming a PLC, PLC Peripherals, Network Limitation, Program Scanning

SECTION-C

Program Control Instruction- Marta Control Relay Instruction, Latching Relay instruction, Immediate **I/ O** Instruction, Jump and Label Instruction
PROGRAMMING TIMER & COUNTERS- Pneumatic Timers, Cascading Timers, Alan Bradly PLCs Counters, Combining Timer & Counters

SECTION-D

SCADA- Introduction, Concept of Automatic SCADA, Architecture of SCADA, Hierarchical of SCADA, Microprocessor & PLC based SCADA systems and comparison, Data Acquisition Unit Remote Terminal Unit

TEXT BOOKS :
Technicians guide to Programmable Controller Richard A. Cox
Computer Process Control, by P.B. Despande, ISA Publications

REFERENCE BOOKS:
Programmable Controllers, by Petrezeulla , McGraw Hill, 1999
Programmable Logic Controllers, by T. Hughes, ISA Press, 1989

EI-403-F **FUZZY LOGIC & CONTROL**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

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 ON FUZZY OPERATIONS: Background of fuzzy logic, Uncertainty and imprecision, statistics and random processes, Uncertainty of information, Fuzzy sets and membership, Classical sets, Operations on classical sets, Properties of classical sets, Mapping of classical sets to functions, Fuzzy sets, Fuzzy set operations, Properties of fuzzy sets, Cartesian product, Crisp relations, Cardinality of crisp relations, Operations on crisp relations, Properties of crisp relations, Composition, Fuzzy Relations, Cardinality of fuzzy relations, Operations on fuzzy relations, Properties of fuzzy relations, Fuzzy Cartesian Product and Composition, Tolerance and equivalence relations, Crisp equivalence relation, Crisp Tolerance relation, Fuzzy tolerance and equivalence relations. Related numericals.

SECTION-B

FUZZIFICATION AND DEFUZZIFICATION METHODS: Membership functions, Features of the membership function, Standard forms and boundaries, Fuzzification, Membership value assignments, Intuition, Inference, Rank ordering, Angular fuzzy sets,Genetic Algorithms, Computing Membership functions using genetic algorithms, Inductive reasoning, Fuzzy-To-Crisp conversions, lambda-cuts for fuzzy sets, Lambda- cuts for fuzzy relations, Defuzzification methods.

SECTION-C

FUZZY ARITHMETIC & LOGIC: Extension Principle, Crisp functions, mapping and relations, Functions of fuzzy sets-Extension principle, Fuzzy Transform(Mapping), Practical considerations, Fuzzy numbers, Fuzzy vectors, Classical logic and fuzzy logic, Classical predicate logic, Tautologies, Contradictions, Equivalence, Exclusive OR and Exclusive NOR, Logical proofs, Deductive Inferences, Fuzzy logic, Approximate reasoning, Fuzzy Tautologies, Contradictions, Equivalence, and Logical Proofs, Other forms of the Implication Operation and Composition operation.

SECTION-D

FUZZY RULE-BASE, NONLINEAR SIMULATION AND CONTROL SYSTEM: Natural Language, Linguistic Hedges, Rule-based Systems, Graphical Techniques of Inference, Fuzzy nonlinear simulation, Fuzzy relational equations, Partitioning, Non-linear simulation using fuzzy rule-based systems, Fuzzy Associative Memories(FAMs), Fuzzy control systems, Review of control system theory, Simple fuzzy logic controllers, General Fuzzy logic controllers, Special forms of fuzzy logic control system models, Examples of fuzzy control system Design, Classical fuzzy control problems.

TEXT BOOKS :

1. " Fuzzy logic with engineering applications": Timothy J. Ross: University of New Maxico. USA publisher: second edition.

2. " C++ Neural networks and fuzzy logic": Valluru B. Rao: M & T Books, IDG books worldwide, Inc, Edition 1**.**

REFERENCE BOOKS:

1. "An Introduction to Fuzzy Control" : D.,Driankov, H.Hellendoom & M.Reinfrank: Narosa.

2. "Fuzzy Control Systems" : Abraham Kandel & Gideon Imngholz ; Narosa New Delhi.

ECE-405-F **WIRELESS COMMUNICATION**

L T P **Class Work : 50**

3 1 - **Exam : 100**

Total : 150

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 TO WIRELESS COMMUNICATION SYSTEMS: Evolution of mobile radio communications, examples of wireless comm. systems, paging systems, Cordless telephone systems, comparison of various wireless systems.

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.

Section-B

INTRODUCTION TO CELLULAR MOBILE SYSTEMS: Spectrum Allocation, basic Cellular Systems, performance Criteria, Operation of cellular systems, analog cellular systems, digital Cellular Systems.

CELLULAR SYSTEM DESIGN FUNDAMENTALS: Frequency Reuse, channel assignment strategies, handoff Strategies, Interference and system capacity, tracking and grade off service, improving coverage and capacity.

Section-C

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.

Section-D

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.

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:

Mobile Communications: Jochen Schiller; Pearson

EI-421-F **MOS ICs & TECHNOLOGY**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

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

REVIEW OF MOS TECHNOLOGY: Introduction to IC technology, MOS transistor enhancement mode and depletion mode operations, fabrication of NMOS , CMOS and Bi CMOS devices. Equivalent circuit for MOSFET and CMOS.

MOS TRANSISTOR THEORY : MOS device design equation , MOS transistor , evaluation aspect of MOS transistor, threshold voltage , MOS transistor transconductance and output conductance , figure of merit, determination of pull up to pull down ratio for an NMOS inverter driven by another NMOS inverter and by one or more pass transistor , alternative forms of pull up , CMOS and Bi CMOS inverters, latch up in CMOS circuitry and Bi CMOS latch up susceptibility.

SECTION-B

MOS CIRCUITS AND LOGIC DESIGN : Basic physical design of simple logic gates using NMOS , PMOS and CMOS , CMOS logic gate design considerations, CMOS logic structure , CMOS logic structure , clocking strategies.

SECTION-C

CIRCUIT CHARACTERIZATION AND PERFORMANCE ESTIMATION: Resistance estimation , capacitance estimation , inductance , switching characteristics, CMOS gate transistor sizing , power dissipation.

VLSI FABRICATION : Crystal growth, wafer preparation, epitaxy , oxidation , lithography, etching , diffusion, dielectric and poly silicon film deposition, ion implantation, yield and reliability , metallization.

SECTION-D

DESIGN EXAMPLE USING CMOS : Incrementer/decrementer , left/right shift serial/ parallel register, comparator for two n bit number , a two phase non overlapping clock generator with buffer output on both phases, design of an event driven element for EDL system.

TEXT BOOKS :

1. Introduction to digital integrated circuit by Rabaey, Chandrakasan and Nikolic
2. Principles of CMOS VLSI Design by Neil H.E. Weste and Kamran Eshraghian , Pearson publication.

REFERENCE BOOKS:

1. Introduction to digital circuit by Rabaey and ……..LPE (PH)
2. …… ...by S K Gandhi
3. VLSI Technology : S M Sze , Mc Graw-Hill
4. Integrating circuits by K R Botkar, Khanna Publisher

EI-423-F **RADAR & SONAR ENGINEERING**

L	T	P
3	1	-

Theory : 100 Marks
Class work : 50 Marks
Total : 150 Marks
Duration of Exam : 3 Hours

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 RADAR: Radar Block Diagram & operation, Radar Frequencies, Radar development, Application of Radar. 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.

SECTION-B

CW & FREQUENCY MODULATED RADAR: The Doppler effect, CW Radar, Frequency-modulated CW Radar, Multiple Frequency CW Radar.

TRACKING RADAR: Tracking with Radar, Sequential Lobbing, Conical Scan, Monopulse Tracking Radar, Tracking in range, Acquisition.

SECTION-C

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.

SECTION-D

RECEIVERS, DISPLAYS & DUPLEXERS:
Radar Receivers, Noise Figure, Mixer, Low-noise Front ends, Displays, Duplexer, Receiver protectors.

INTRODUCTION TO SONAR:
Introduction, history, underwater propagation, acoustic waves, propagation speed, sound velocity profiles, sound pressure level, propagation modes, multipath, active SONAR, passive SONAR.

TEXT BOOKS :

Introduction to Radar Systems: Merrill I. Skolnik, ; McGraw Hill Publications

REFERENCE BOOKS:

Electronic Communication Systems : Kennedy; Tata McGraw Hill Publications

EE-405-F **ADVANCED CONTROL SYSTEMS**

L T P
3 1 -

Theory : 100
Class Work : 50
Total : 150
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

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.

Section-B

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.

Section-C

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,

LINEAR APPROXIMATION OF NONLINEAR SYSTEMS: Taylor series, Liapunov's 2nd method.

Section-D

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. Modern Control Systems, 11/e: Richard C. Dorf; Pearson

REFERENCE BOOKS :

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

EI-419-F **OPTICAL COMMUNICATION SYSTEMS**

L T P	CLASS WORK	: 50
3 1 0	EXAM.	: 100
	TOTAL	: 150
	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 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.

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

SECTION-B

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.

SECTION-C

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.

SECTION-D

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 BOOKS
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.

ECE-411-F **WIRELESS SENSOR NETWORKS**

L T P
3 1 -

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

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

Section-A

OVERVIEW OF WIRELESS SENSOR NETWORKS :

Challenges for Wireless Sensor Networks, Enabling Technologies For Wireless Sensor Networks.

Section-B

ARCHITECTURES:

Single-Node Architecture - Hardware Components, Energy Consumption of Sensor Nodes , Operating Systems and Execution Environments, Network Architecture - Sensor Network Scenarios, Optimization Goals and Figures of Merit, Gateway Concepts.

Section-C

NETWORKING SENSORS :

Physical Layer and Transceiver Design Considerations, MAC Protocols for Wireless Sensor Networks, Low Duty Cycle Protocols And Wakeup Concepts - S-MAC , The Mediation Device Protocol, Wakeup Radio Concepts, Address and Name Management, Assignment of MAC Addresses, Routing Protocols- Energy-Efficient Routing, Geographic Routing.

Section-D

INFRASTRUCTURE ESTABLISHMENT :

Topology Control , Clustering, Time Synchronization, Localization and Positioning, Sensor Tasking and Control.

TEXT BOOKS:

1. Holger Karl & Andreas Willig, " Protocols And Architectures for Wireless Sensor Networks" , John Wiley, 2005.
2. Feng Zhao & Leonidas J. Guibas, “Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.

REFERENCES:

1. Kazem Sohraby, Daniel Minoli, & Taieb Znati, “Wireless Sensor Networks- Technology, Protocols, And Applications”, John Wiley, 2007.
2. Anna Hac, “Wireless Sensor Network Designs”, John Wiley, 2003.

EI-437-F **RELIABILITY OF ELECTRONIC SYSTEMS**

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

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

Section A

Concept of Reliability: Failures of systems and its modes, Measure of Reliability, Reliability function, Hazard rate MTBF and their inter-relations.

Reliability Data and Analysis: Data Sources, Data collection, use of Reliability Data, Reliability Analysis, :Performance Parameters, Calculation of failure rate, Application of Weibill distribution.

Section B

System Reliability and Modeling: Series systems, Parallel system, series –parallel systems. Time dependence, Reliability Determination, Stand by Systems, r out of n, configurations, Methods of tie set and cut sets of Or reliability evaluation, simulation and Reliability prediction. Monte Carlo method, concepts of network topology. Overall reliability evolution.

Section C

Maintainability and Availability: Maintainability and its equation. Factors affecting maintainability, Measures of Maintainability, Mean down Time, Available Intrinsic availability equipment availability & Mission availability. Replacement processes and Policies.

Section D

Life Testing of Equipments: Non-destructive tests, destruction tests and their Mathematic modeling. Quality and Reliability, Measurement & prediction of Human Reliability, Reliability and safety, safety margins in critical Devices, case studies.

Value Engineering: Techniques in value Engg. Reliability Management.

Reference Books:

1)Reliability Engineering: A.K.Govil
2) Reliability Engineering: Dr AK Aggarwal
3) Reliability Engineering: E Balagurusamiy; TMH
4) Reliability Engineering: L S Shrinath; EWP
5) Related IEEE Research Papers

ECE-415-F **OPTICAL COMMUNICATION SYSTEMS**

L T P **Class Work : 50**

3- 1 -0 **Exam : 100**

Total : 150

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 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.

Section-B

OPTICAL FIBERS: Optical fibers structures and their types, fiber characteristics : attenuation, scattering, absorption, fiber bend loss, dispersion; fiber couplers and connectors.

Section-C

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.
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.

Section-D

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; Pearson.

REFERENCE BOOKS :

1. Optical Communication Systems : John Gowar; PHI.
2. Optical Fiber Communications : Gerd Keiser; TMH
3. Optical Communication System, (2nd Edition): Satinder Bal Gupta and Ashish Goel; University Science Press
4. Optical fiber Communication : Selvarajan, Kar, Srinivas; TMH.
5. Optical Fiber Communication System by MK Raina, Satya Parkashan, New Delhi.

ECE-409-F **DIGITAL SIGNAL PROCESSING**

L T P
3 1 -

Class Work : 50
Exam : 100
Total : 150
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

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.

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

Section-B

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.

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

Section-C

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.

Section-D

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; Pearson
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

EI-431-F **PLCs & SCADA SYSTEMS LAB**

L T P
0 0 2

CLASS	WORK	:	50
EXAM		:	50
TOTAL		:	100
DURATION OF EXAM		:	3 HRS

LIST OF EXPERIMENTS:

1. Familiarization with architecture & operation of 8 &16 bit microcontroller
2. Study of functioning of different components of PLC in hardware.
3. Two inputs are given to a PLC & a output is taken. Verify the scan time of PLC with heoretical value.
4. To Interface the PLC with computer by using RS -232.
5. To study the PLC software.
6. Write a ladder program in PLC software by using 5 digital inputs & one digital output & verify it by applying it on hardware.
7. Write a ladder program by using -4 digital input & one times in series for a delay of 10 min. in o/p.
8. Write a ladder program by using counter Component.
9. Make a project by using PLC software and implement it on hardware.
10. Write a program in statement logic and control logical flowchart & verify it using ladder diagram.
11. Design of data acquisition system using PCI/NI card.
12. Online control of PC based liquid level control/indicator system.
13. Study of SCADA systems and applications.

NOTE: Atleast ten experiments are to be performed , atleast 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.

ECE-429-F DIGITAL SIGNAL PROCESSING LAB

L T P	Class Work : 25
- - 2	Exam : 25
	Total : 50
	Duration of Exam : 3 Hrs.

LIST OF EXPERIMENTS:

Perform the experiments using DSP Hardware Processor using Programmes in C Language:

1. To understand sampling theorem & generation of waveforms like sine, square & Triangle.
2. To study Quantization technique .
3. To study PCM encoding & Hamming code generation.
4. To Study Digital modulation techniques ASK/FSK& PSK .
5. To study FIR Filter Implementation.
6. To study Auto correlation & Linear convolution.

Experiments To be performed on MATLAB

1. 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 design analog filter(low-pass, high pass, band-pass, band-stop).
5. To design digital IIR filters(low-pass, high pass, band-pass, band-stop).
6. To design FIR filters using windows technique.

NOTE:
At least ten experiments have to be performed in the semester.

ECE-423-F WIRELESS & SATELLITE COMMUNICATION LAB

L T P	Class Work : 50
- - 3	Exam : 50
	Total : 100
	Duration of Exam : 3 Hrs.

LIST OF EXPERIMENTS:

1. To set up a satellite communication link & study of change in uplink & downlink frequency.
2. To Study Transmission of Audio & Video Signals & Data communication over satellite link .
3. To Study Transmission of telemetry data like temperature & light intensity over satellite link
4. To measure the propagation delay of signal in a Satellite communication Link.
5. To study different GPS data like longitude, latitude & different types of dilute of precision using GPS receiver..
6. To study selection of various PN codes like Gold, Barker & MLS in CDMA technology .
7. To study generation (spreading) & demodulation (Despreading) of of DSSS modulated signal
8. To study Voice communication over DSSS.
9. To study Minimum shift keying modulation & de modulation .
10. To study radiation pattern & calculate beam width for Yagi uda & Folded dipole antenna.
11. To study radiation pattern & calculate beam width for Circular & Triangular Patch Antenna.
12. To study FHSS Modulation & demodulation & transfer of numeric data.

NOTE:
At least ten experiments are to be performed.

GPEI-401-F **GENERAL FITNESS FOR THE PROFESSION**

L T P
- - -

Class Work : -- Marks
Practical : 50 Marks
Total Marks : 50 Marks

At the end of each year students will be evaluated on the basis of their performance in various fields. The evaluation will be made by the panel of experts/examiners/teachers to be appointed by the rincipal/Director of the College. A specimen perform indicating the weight age to each component/ activity is given below :-

Name : _____ College Roll No. _____
Univ.Roll No._____ _____
Branch _____ Year of Admission _____._____

I. Academic Performance (15 Marks) :

(a) Performance in University Examination :-

Sem.	**Result**	**%age of Marks obtained**	**Number of Attempt in which the Sem. exam. has been cleared**
I			
II			
III			
IV			
V			
VI			
VII			

II. Extra Curricular Activities (10 Marks) :

Item	**Level of Participation**	**Remarks (Position Obtained)**
Indoor Games (Specify the Games	_____ _____ _____	_____ _____
Outdoor Games (Specify the Games)	_____ _____ _____	
Essay Competition	_____ _____ _____	
Scientific Technical Exhibitions	_____ _____ _____	
Debate	_____ _____ _____	
Drama	_____ _____ _____	
Dance	_____ _____ _____	
Music	_____ _____ _____	

Fine Arts _____
_____
_____

Painting _____
_____
_____

Hobby Club _____
_____
_____

N.S.S. _____
_____
_____

H ostel Mgt _____
Activities _____
_____

Any other _____
activity (Please _____
Specify) _____

III. Educational tours/visits/Membership of Professional Societies (5 Marks)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

IV. Contribution in NSS Social Welfare Floor Relief/draught relief/Adult Literacy mission/Literacy Mission/Blood Donation/Any other Social Service
(5 Marks)

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

V. Briefly evaluate your academic & other performance & achievements in the Institution (5 Marks)

_____
_____
_____
_____

VI. Performance in Viva voce before the committee (10 Marks)

_____
_____
_____

*Marks obtained 1.( )+II( )+III( )+IV( )+V( )+VI( ) =
**Total Marks :

Member Member Member Member Member

(OPEN ELECTIVES)

HUM-451-F **LANGUAGE SKILLS FOR ENGINEERS**

L T P
3 1 0

Class Work Marks: 50
Exam Marks: 100
Total Marks: 150
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.

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.

Section A

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.

Section B

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

Section C

Punctuation and Mechanics: End Punctuation; internal Punctuation; Word Punctuation. Comprehension: Abstracting; Summarizing; Observation, Findings and Conclusions; Illustration and Inductive Logic; Deduction and Analogy.

Section D

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

TEXT BOOKS:

1.Working with words by R. Gairns and S. Redman, Cambridge University Press, London.
2. Meanings into Words-Upper Intermediate Students Book, Deff/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 Idom by W.J. Ball. Longman.
6. A guide to correct English by L.A. ill, 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.

HUM-453-F **HUMAN RESOURCE MANAGEMENT**

L T P
3 1 0

Class Work Marks: 50
Exam Marks: 100
Total Marks: 150
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

Understanding Organizational Behavior: Definition, Goals of Organizational behavior. Key forces affecting Organizational Behavior. Fundamental Concepts of Organizational Behavior. Motivation : Meaning, Objectives and importance of motivation. Theories of Motivation, Maslow's theory, Mc Greger's Theory Herzberg's theory. Morale : Meaning; Factors affecting morale, types of morale and productivity, Evaluation of morale, improving morale.

Section B

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

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

Section C

Importance of human resources in industry, Definition of human resource management, mechanical approach towards personnel, Paternalism, Social system approach. Need for human resource planning, process of human resource planning, Methods of recruitment, Psychological tests and interviewing meaning and importance of placement Meaning and techniques of induction. Training and development : Concepts of training and development, importance of training and development, Management development its nature, purpose and method.

Section D

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

Text Books:

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

Reference Books:

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

HUM-459-F RENEWABLE ENERGY RESOURCES & TECHNOLOGY

L T P	Theory : 100
3 1 -	Class Work : 50
	Total : 150
	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: Energy Sources and their availability, renewable energy sources, Prospects of renewable energy sources, application of non conventional and renewal energy sources.

Environmental Aspects of Electric Energy Generation: Introduction Thermal pollution, Atmospheric pollution, Effects of Hydroelectric projects, Nuclear power generation and environment, Green House Gas Effects, Global Environmental awareness, Energy options for Indian Economy.

Section -B

Solar Energy : Solar radiation estimation, Basic Principle of Solar Energy physical Principal of the conversion of solar radiation into heat, Collectors, Solar Energy storage system, solar thermal electric conversion, solar electric Power Plant & applications.

Wind Energy: Basic Principle of wind energy conversion, nature & Power of wind, site selection, wind energy conversion SYSTEM. Scheme for Electric Generation, Generator Control load control, Inter connected SYSTEM & applications.

Section -C

Bio Mass Energy: Biomass conversion technologies bio mass generation, classification of Bio Gas Plants material used in Bio Gas Plants., Selection of site & applications.

Geothermal Energy: Sources of Geothermal energy Estimation of Geothermal Power, Geothermal Power Plants, Geothermal energy in India and Prospects.

Ocean Energy: Ocean thermal electric conversion, site selection, Power Plant, Prospects of ocean energy in India, tidal Power tidal Power Plant, Prospects in India.

Section -D

MHD & Hydrogen Energy: Basic Principle MHD SYSTEM, advantages, Power OUTPUT of MHD Generation, future Prospects. Principle and classification of fuel cell energy, hydrogen as alternative fuel for Generation of Electrical Energy & applications.

Fuel Cell: Fuel Cell, Management of Fuel, Thermionic power generation, water Resource Electricity deviend scenario storage and handling, Pricing, Contract etc, Introduction to risk,

rules and regulation Aspects of Risk & Hazard Health & risk assessment visit to site, Mini hydro generators.

TEXT BOOKS:

1. Renewable Energy Sources and Emerging Technologies : D.P Kothari, K.C.Singla, Rakesh Ranjan - PHI Publications.
2. NON-Conventional energy Sources : G.D. Rai – Khanna Publications.
3. Renewal energy sources and their environmental aspects by Abbari: PHI
4. Electric Power : Dr. S.L. Uppal - Khanna Publications

REFERENCE BOOKS:

1. Power Plant Engineering : Jain & Bala Subramanyam

ME-451-F **MECHATRONICS SYSTEMS**

L T P Theory : 100 Marks

3 1 - Class work : 50 Marks

Total : 150 Marks

Duration of Exam : 3 Hours

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 : Definition – Trends - Control Methods: Standalone , PC Based (Real Time Operating Systems, Graphical User Interface , Simulation) - Applications: SPM, Robot, CNC, FMS, CIM.

SIGNAL CONDITIONING : Introduction – Hardware - Digital I/O , Analog input – ADC , resolution , sped channels

Filtering Noise using passive components – Resistors, capacitors - Amplifying signals using OP amps –

Software - Digital Signal Processing – Low pass , high pass , notch filtering

Section B

PRECISION MECHANICAL SYSTEMS : Pneumatic Actuation Systems - Electro-pneumatic Actuation

Systems - Hydraulic Actuation Systems - Electro-hydraulic Actuation Systems - Timing Belts - Ball

Screw and Nut - Linear Motion Guides - Linear Bearings - Harmonic Transmission - Bearings- Motor / Drive Selection.

ELECTRONIC INTERFACE SUBSYSTEMS : TTL, CMOS interfacing - Sensor interfacing - Actuator

interfacing – solenoids , motors Isoation schemes- opto coupling, buffer IC’s - Protection schemes – circuit breakers , over current sensing , resetable fuses , thermal dissipation - Power Supply - Bipolar transistors/ mosfets

Section C

ELECTROMECHANICAL DRIVES : Relays and Solenoids - Stepper Motors - DC brushed motors - DC

brushless motors - DC servo motors - 4-quadrant servo drives , PWM’s - Pulse Width Modulation – Variable Frequency Drives, Vector Drives - Drive System load calculation.

MICROCONTROLLERS OVERVIEW : 8051 Microcontroller , micro processor structure - Digital

Interfacing - Analog Interfacing - Digital to Analog Convertors - Analog to Digital Convertors - Applications.

Programming –Assembly , C (LED Blinking , Voltage measurement using ADC).

Section D

PROGRAMMABLE LOGIC CONTROLLERS : Basic Structure - Programming : Ladder diagram -

Timers, Internal Relays and Counters - Shift Registers - Master and Jump Controls - Data Handling -

Analog input / output - PLC Selection - Application.

PROGRAMMABLE MOTION CONTROLLERS : Introduction - System Transfer Function - Laplace

transform and its application in analysing differential equation of a control system - Feedback

Devices :
Position , Velocity Sensors - Optical Incremental encoders - Proximity Sensors : Inductive , Capacitive ,
Infrared - Continuous and discrete processes - Control System Performance & tuning - Digital Controllers
- P , PI , PID Control - Control modes – Position , Velocity and Torque - Velocity Profiles – Trapezoidal
- S. Curve - Electronic Gearing - Controlled Velocity Profile - Multi axis Interpolation , PTP , Linear ,
Circular - Core functionalities – Home , Record position , Go to Position - Applications : SPM, Robotics.

TEXT BOOKS :

1. Mechatronics Electronics Control Systems in Mechanical and Electrical Engineering by W Bolton,
Pearson Education Press, 3rd edition, 2005.
2. Mechatronics/M.D.Singh/J.G.Joshi/PHI.

REFERENCES :

1. Mechatronics Source Book by Newton C Braga, Thomson Publications, Chennai.
2. Mechatronics – N. Shanmugam / Anuradha Agencies Publisers.
3. Mechatronics System Design / Devdas shetty/Richard/Thomson.

IC-455-F INTELLIGENT INSTRUMENTATION FOR ENGINEERS

L T P	Theory : 100 marks
3 1 -	Class Work : 50 marks
	Total : 150 marks
	Duration of exam. : 3 hours

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:
Definition of an intelligent instrumentation system; feature of intelligent instrumentation; components of intelligent instrumentation; Block diagram of an intelligent instrumentation.

Section -B

INTERFACING INSTRUMENTS & COMPUTERS:
Basic issue of interfacing; Address decoding; Data transfer control; A/D converter; D/A converter; Other interface consideration.

Section -C

INSTRUMENTATION/ COMPUTER NETWORKS:
Serial & parallel interfaces; Serial communication lines; Parallel data bus; EEE 488bus; Local area networks(LANs) : Star networks, Ring &bus networks, Fiber optic distributed networks, Field bus;
Communication Protocols for very large systems: communication network rationalization.

Section -D

SOFTWARE FILTERS :
Description of Spike Filter, Low pass filter, High pass filter etc.

TEXT BOOK:
1. Principles of measurement & Instrumentation: Alan S. Moris; PHI

OR-401-F **OPERATIONS RESEARCH**

L T P **Class Work :** 50 Marks
3 1 0 **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

Development – Definition– Characteristics and Phases – Types of models – operation Research models – applications.

ALLOCATION : Linear OPERATIONS-RESEARCH

Problem Formulation – Graphical solution – Simplex method – Artificial variables techniques -Two–phase method, Big-M method – Duality Principle.

Section – B

TRANSPORTATION PROBLEM – Formulation – Optimal solution, unbalanced transportation problem – Degeneracy. Assignment problem – Formulation – Optimal solution - Variants of Assignment Problem-Traveling Salesman problem.

REPLACEMENT : Introduction – Replacement of items that deteriorate with time – when money value is not counted and counted – Replacement of items that fail completely, group replacement. staffing problem, equipment renewal problem.

Section – C

System Reliability: Introduction-Definition-Failure Rates-Bath-tub shaped failure rate(Hazard Rate)-Reliability of systems-series arrangement and parallel arrangement-methods of assuring reliability.

Section – D

Information Theory-Introduction, measure of Information, binary unit of information , entropy, properties of average measure of entropy, important relations for various entropies, set of axioms for an entropy function, uniqueness theorem, communication system, noiseless channel, channel capacity, efficiency and redundancy, mutual information, encoding.

TEXT BOOK :

1. OPERATIONS-RESEARCH / S.D.Sharma-Kedarnath
2. Introduction to O.R/ Taha/ Pearsons

REFERENCES: 1)Operation Research/A.P.VERMA/SK KATARIA AND SONS
2) Operations Research/P.K.GUPTA & D.S.HIRA

M.D. UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION

B.Tech. IV YEAR (ELECTRONICS & INSTRUMENTATION ENGINEERING)

SEMESTER – VIII

'F' Scheme

EFFECTIVE FROM THE SESSION 2012-13

Sl. No.	Course No.	Subject	Internal Marks	External Marks	Total Marks
1.	**EI- 402-F**	Industrial Training/Institutional Project Work	150	150	300

Note:

The students are required to undergo Industrial Training or Institutional Project Work of duration not less than 4 months in a reputed organization or concerned institute. The students who wish to undergo industrial training, the industry chosen for undergoing the training should be at least a private limited company. The students shall submit and present the mid-term progress report at the Institute. The presentation will be attended by a committee. Alternately, the teacher may visit the Industry to get the feedback of the students.

The final viva-voce of the Industrial Training or Institutional Project Work will be conducted by an external examiner and one internal examiner appointed by the Institute. External examiner will be from the panel of examiners submitted by the concerned institute approved by the Board of Studies in Engg. & Technology. Assessment of Industrial Training or Institutional Project Work will be based on seminar, viva-voce, report and certificate of Industrial Training or Institutional Project Work obtained by the student from the industry or Institute.

The internal marks distributions for the students who have undergone Industrial Training consist of 50 marks from the industry concern and 100 marks by the committee members consisting of faculty members of concerned department of the parent institute.

The teachers engaged for Institutional Project work shall have a workload of 2 hours per group (at least 4 students) per week.