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.

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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.