M.D. UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION
B.E II YEAR (INSTRUMENTATION AND CONTROL ENGINEERING)
SEMESTER – III
Modified 'E' Scheme effective from 2006-07

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
HUM-201-E	ECONOMICS (COMMON FOR ALL BRANCHES)	3	1	-	4	50	100	-	150	3
MATH-201-E	MATHEMATICS - III (COMMON FOR ALL BRANCHES)	3	2	-	5	50	100	-	150	3
EE-201-E	ELECTRICAL ENGINEERING MATERIALS & SEMICONDUCTOR DEVICES (EL,EI, IC,EE, EEE, AEI)	3	1	-	4	50	100	-	150	3
EE-203-E	NETWORK THEORY (EL,EI, IC,EE, EEE, AEI)	3	1	-	4	50	100	-	150	3
EE-205-E	ELECTROMECHANICAL ENERGY CONVERSION (EL,EI, IC, AEI)	3	1	-	4	50	100	-	150	3
ME-217-E	APPLIED MECHANICS	3	1	-	4	50	100	-	150	3
EE-221-E	ELECTRICAL ENGINEERING MATERIALS & SEMICONDUCTOR DEVICES LAB (EL,EI, IC, AEI)	-	-	2	2	25	-	25	50	3
EE-223-E	NETWORK THEORY LAB (EL,EI, IC,EE, EEE, AEI)	-	-	2	2	25	-	25	50	3
EE-225-E	ELECTROMECHANICAL ENERGY CONVERSION LAB (EL,EI, IC, AEI)	-	-	3	3	50	-	50	100	3
EE-231-E	ELECTRICAL WORKSHOP (EL,EE, EI, IC,CHE, EEE, AEI)	-	-	2	2	25	-	25	50	3
	TOTAL	**18**	**7**	**9**	**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.**

M.D. UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION
B.E II YEAR (INSTRUMENTATION AND CONTROL ENGINEERING)
SEMESTER – IV
Modified 'E' Scheme effective from 2006-07

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
HUM-202-E	FUNDMENTALS OF MANAGEMENT (EE,EL,EI,IC,CHE,ME, EEE, AEI)	3	1	-	4	50	100	-	150	3
MATH-202-E	NUMERICAL METHODS (EE,EL,EI,IC,CHE, EEE, AEI)	3	1	-	4	50	100	-	150	3
EE-202-E	ANALOG ELECTRONICS (EL,EI, IC,EE, EEE, AEI)	3	1	-	4	50	100	-	150	3
EE-204-E	DIGITAL ELECTRONICS (EL,EI, IC,EE, EEE, AEI common with CSE, IT 3rd sem)	3	1	-	4	50	100	-	150	3
EE-208-E	ELECTROMAGNETIC THEORY (EL,EI, IC,EE, EEE, AEI)	3	1	-	4	50	100	-	150	3
EE-210-E	ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS (EI, IC, AEI)	3	1	-	4	50	100	-	150	3
EE-222-E	ANALOG ELECTRONICS LAB (EL,EI, IC,EE, EEE, AEI)	-	-	2	2	25	-	25	50	3
EE-224-E	DIGITAL ELECTRONICS LAB (EL,EI, IC,EE, EEE, AEI common with CSE, IT 3rd sem)	-	-	2	2	25	-	25	50	3
EE-230-E	ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS LAB (EI, IC, AEI)	-	-	2	2	25	-	25	50	3
MATH-204-E	NUMERICAL METHODS LAB (EE,EL,EI,IC,CHE, EEE, AEI)	-	-	2	2	25	-	25	50	3
GPIC-202-E	GENERAL PROFICIENCY	-	-	-	-	50	-	-	50	3
	TOTAL	18	6	8	32	450	600	100	1150	

Note:

1. **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 V semester.**

M.D. UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION
B.E III YEAR (INSTRUMENTATION AND CONTROL ENGINEERING)
SEMESTER –V
Modified 'E' Scheme effective from 2007-08

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
IC-301-E	TRANSDUCERS AND SIGNAL CONDITIONING (EI,IC)	3	1	-	4	50	100	-	150	3
IC-303-E	LINEAR CONTROL SYSTEMS (EI,IC)	3	1	-	4	50	100	-	150	3
CSE-210-E	COMPUTER ARCHITECTURE AND ORGANISATION (EL,EI,IC & Common with 4th Sem. – CSE)	3	1	-	4	50	100	-	150	3
EE-303-E	ELECTRONIC MEASUREMENT AND INSTRUMENTATION (EL,EI, IC,EE, EEE)	3	1	-	4	50	100	-	150	3
EE-305-E	ANALOG ELECTRONIC CIRCUITS(EL,EI, IC,EE, EEE, AEI)	3	1	-	4	50	100	-	150	3
EE-309-E	MICROPROCESSORS AND INTERFACING (EL,EI, IC,CSE,IT, EEE, AEI)	3	1	-	4	50	100	-	150	3
EE-323-E	ELECTRONIC MEASUREMENT AND INSTRUMENTATION LAB (EL,EI, IC,EE)	-	-	2	2	25	-	25	50	3
EE-325-E	ANALOG ELECTRONIC CIRCUITS LAB (EL,EI, IC)	-	-	2	2	25	-	25	50	3
EE-329-E	MICROPROCESSORS AND INTERFACING LAB (EL,EI, IC,CSE,IT, EEE, AEI)	-	-	2	2	25	-	25	50	3
1C-321-E	LINEAR CONTROL SYSTEM LAB (EI, IC)	-	-	2	2	25		25	50	3
IC-333-E	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.**

M.D. UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION
B.E III YEAR (INSTRUMENTATION AND CONTROL ENGINEERING)
SEMESTER – VI
Modified 'E' Scheme effective from 2007-08

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
IC-405-E	COMPUTER BASED INSTRUMENTATION AND CONTROL (EI, IC)	3	1	-	4	50	100	-	150	3
IC-302-E	NON LINEAR CONTROL SYSTEM	3	1	-	4	50	100	-	150	3
IC-304-E	TELEMETRY, DATA PROCESSING & RECORDING (EI, IC)	3	1	-	4	50	100	-	150	3
IC-306-E	BIOMEDICAL INSTRUMENTATION (EI, IC)	3	1	-	4	50	100	-	150	3
EE-310-E	DIGITAL SYSTEM DESIGN (EL,EI, IC,EE,CSE, AEI)	3	1	-	4	50	100	-	150	3
EE-317-E	POWER ELECTRONICS (EI, IC, COMMON WITH V-SEM. EE, EEE, AEI)	3	1	-	4	50	100	-	150	3
IC-322-E	INSTRUMENTATION PROJECT LAB (EI,IC)	-	-	2	2	25	-	25	50	3
EE-330-E	DIGITAL SYSTEM DESIGN LAB (EL,EI, IC,CSE, AEI)	-	-	3	3	25	-	25	50	3
EE-331-E	ELECTRONIC CIRCUIT SIMULATION LAB (COMMON WITH V-SEM EL, AEI)	-	-	2	2	25	-	25	50	3
EE-321-E	POWER ELECTRONICS LAB (EI, IC & COMMON WITH V-SEM EE, EEE)	-	-	2	2	25	-	25	50	3
GPIC-302-E	GENERAL PROFICIENCY	-	-	-	-	50	-	-	50	
	TOTAL	**18**	**6**	**9**	**33**	**450**	**600**	**100**	**1150**	

Note:

1. **Each student has to undergone practical training of 6 weeks during summer vacation and its evaluation shall be carried out in the VII semester.**
2. **Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**
3. **The practical hour for the subject EE-330 E (Digital System Design Lab.) has been increased from 2 hours to 3 hours will be implemented from 2007-08.**

M.D. UNIVERSITY, ROHTAK
SCHEME OF STUDIES & EXAMINATION
B.E IV YEAR (INSTRUMENTATION AND CONTROL ENGINEERING)
SEMESTER – VII
Modified 'E' Scheme effective from 2006-07

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
IC-401-E	INDUSTRIAL PROCESS CONTROL (EI, IC)	3	1	-	4	50	100	-	150	3
IC-403-E	EMBEDDED SYSTEM DESIGN (EI, IC, EL)	3	1	-	4	50	100	-	150	3
EE-407-E	DIGITAL SIGNAL PROCESSING (EL,EI, IC,EE)	3	1	-	4	50	100	-	150	3
IC-407 E	INTELLIGENT INSTRUMENTATION	3	1	-	4	50	100	-	150	3
	*OPEN ELECTIVE-I	4	-	-	4	50	100	-	150	3
IC-409-E	INDUSTRIAL PROCESS CONTROL LAB (EI, IC)	-	-	2	2	25	-	25	50	3
IC-417-E	EMBEEDED SYSTEMS DESIGN LAB. (EI, IC, EL)	-	-	2	2	25	-	25	50	3
EE-427-E	DIGITAL SIGNAL PROCESSING LAB (EL,EI, IC,EE)	-	-	2	2	25	-	25	50	3
IC-411-E	PROJECT	-	-	4	4	50	-	-	50	3
IC-413-E	PRACTICAL TRAINING-II	-	-	2	2	-	-	-	-	-
	TOTAL	**16**	**4**	**12**	**32**	**375**	**500**	**75**	**950**	

List of Open Electives

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

Note:

1. **Students will be allowed to use non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.**
2. ***Student will be permitted to opt for any one elective run by the other departments. However, the departments will offer only those electives for which they have expertise. The choice of the students for any elective shall not be a binding for the department to offer, if the department does not have sufficient faculty strength.**
3. **Assessment of Practical Training-II, undergone at the end of VI 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.**
4. **Project load will be treated as 2 hours per week for Project Coordinator and 1 hour for each participating teacher. Project will commence in VII semester where the students will identify the Project problem, complete the design/procure the material/start the**

fabrication/complete the survey etc., depending upon the nature of the problem. Project will continue in VIII semester.

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SCHEME OF STUDIES & EXAMINATION
B.E IV YEAR (INSTRUMENTATION AND CONTROL ENGINEERING)
SEMESTER – VIII
Modified 'E' Scheme effective from 2006-07

Course No.	Course Title	Teaching Schedule				Marks of Class Work	Examination		Total Marks	Duration of Exam
		L	T	P	Total		Theory	Practical		
IC-402-E	STOCHASTIC PROCESSES (EI, IC)	3	1	-	4	50	100	-	150	3
IC-404-E	FUZZY CONTROL SYSTEMS (EI, IC)	3	1	-	4	50	100	-	150	3
	DEPT. ELECTIVE- I	4	-	-	4	50	100	-	150	3
	DEPT. ELECTIVE- II	4	-	-	4	50	100	-	150	3
IC-406-E	FUZZY CONTROL SYSTEMS LAB (EI, IC)	-	-	2	2	50	-	50	100	3
IC-408-E	INDEPENDENT STUDY SEMINAR	-	-	4	4	50	-	-	50	
IC-411-E	PROJECT	-	-	8	8	50	-	100	150	3
GFIC-402-E	GENERAL FITNESS FOR THE PROFESSION	-	-	-	-	50	-	100	150	
	TOTAL	**14**	**2**	**14**	**30**	**400**	**400**	**250**	**1050**	

DEPT. ELECTIVE-I

IC-458-E	Random Process in Control & Estimation
IC-462-E	Adaptive Control
EE-406-E	Advanced Control System (common with 8th sem. EE main paper)

DEPT. ELECTIVE-II

IC-464-E	Dynamic Behaviour of Processes
IC-466-E	Computer Aided Design of Control System
IC-456-E	Digital Control System

Note:

1) **Project load will be treated as 2 hrs. per week for the project coordinator and 1 hour for each participating teacher. Project involving design, fabrication, testing, computer simulation, case studies etc., which has been commenced by students in VII semester will be completed in VIII semester.**
2) **For the subject IC-408 E (Independent Study Seminar), a student will select a topic from emerging areas of Instrumentation & Control Engineering and study it thoroughly and independently. Later he will give a seminar talk on the topic.**
3) **A team consisting of Principal/Director, HOD of concerned department and external examiner appointed by University shall carry out the evaluation of the student for his/her General Fitness for the Profession.**
4) **Students will be allowed to use the non-programmable scientific calculator. However, sharing of calculator will not be permitted in the examination**

IC –417-E **EMBEDED SYSTEM DESIGN LAB**

L	T	P
-	-	2

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

8051 Micro Controller

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

PIC Microcontroller

.

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

General

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

HUM-201-E **ECONOMICS**

(COMMON FOR ALL BRANCHES)

L	T	P
3	1	-

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

COURSE OBJECTIVE : The purpose of this course is to :

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

UNIT-I

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

UNIT-II

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

UNIT-III

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.

UNIT-IV

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

Various concepts of cost - Fixed cost, variable cost, average cost, marginal cost, money cost, real cost opportunity cost. Shape of average cost, marginal cost, total cost etc. in short run and long run.

UNIT-V

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

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

UNIT-VI

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.

Books Recommended :

TEXT BOOKS :

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

REFERENCE BOOKS :

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

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

MATH-201-E **MATHEMATICS-III**
(COMMON FOR ALL BRANCHES)

L	T	P		
3	2	-	Class Work	: 50 Marks
			Exam.	: 100 Marks
			Total	: 150 Marks
			Duration of exam.	: 3 Hours

Part-A

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

Part-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 formula.

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

Part-C

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

Testing of a hypothesis, tests of significance for large samples, Student's t-distribution (applications only), Chi-square test of goodness of fit.
Linear Programming : Linear programming problems formulation, Solving linear programming problems using (i) Graphical method (ii) Simplex method (iii) Dual simplex method.

TEXT BOOKS :

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

REFERENCE BOOKS :

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

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

EE-201-E: ELECTRICAL ENGINEERING MATERIALS & SEMICONDUCTOR DEVICES

L T P		
3 1 0	CLASS WORK	: 50
	EXAM	: 100
	TOTAL	: 150
	DURATION OF EXAM	: 3 HRS

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

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

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

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

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

UNIT 6 BIPOLAR AND MOS DEVICES :
BJT, UJT, JFET, MOSFETS

UNIT 7 POWER DEVICES :
Thyristor, Diac, Triac, GTO, IGBT, VMOS

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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

EE-203-E **NETWORK THEORY**

L T P		
3 1 0	CLASS WORK	: 50
	EXAM	: 100
	TOTAL	: 150
	DURATION OF EXAM	:3 HRS

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

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

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

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

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

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

TEXT BOOKS:

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

REFERENCE BOOKS:

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

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

EE-205-E ELECTROMECHANICAL ENERGY CONVERSION

L T P	CLASS WORK	: 50
3 1 0	EXAM	: 100
	TOTAL	: 150
	DURATION OF EXAM	: 3 HRS

UNIT 1 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.

UNIT 2 PRINCIPLES OF ELECTROMECHANICAL ENERGY CONVERSION:
Force and torque in magnetic field system, energy balance, energy and force in singly excited magnetic field system, concept of co-energy, forces and torques in system with permanent magnets, dynamic equation.

UNIT 3 TRANSFORMERS :
Basic theory, construction , operation at no-load and full-load, equivalent circuit, phasor diagram, O.C. and S.C. tests for parameters determination, efficiency and regulation, auto-transformer, introduction to three-phase transformer ; Current and Potential Transformers : Principle, construction, analysis and applications.

UNIT 4 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.

UNIT 5 INDUCTION MOTOR:
Basic theory, construction, Phasor diagram, Equivalent circuit, Torque equation, Load characteristics, starting and speed control of induction motor, Introduction to single phase Induction motor and its applications, Fractional H.P. Motors, Introduction to stepper, servo reluctance and universal motors.

UNIT 6 SYNCHRONOUS MACHINES:
Construction and basic theory of synchronous generator, emf equation, model of generator, Phasor diagram, Regulation, Basic theory of synchronous motor, v-curves, synchronous condenser, applications.

TEXT BOOK:
1. Electrical Machines: Nagarath and Kothari; TMH

REFERENCE BOOKS:
1. Electrical Machines :P.S. Bimbhra; Khanna
2. Electrical Machines: Mukherjee and Chakravorti; Dhanpat Rai & Sons
3. Electrical Technology (Vol-II) : B.L Theraja; S. Chand.

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

ME-217-E **APPLIED MECHANICS**

L T P		
3 1 0	CLASS WORK	: 50
	EXAM	: 100
	TOTAL	: 150
	DURATION OF EXAM	:3 HRS

UNIT 1. BENDING AND SHEAR SRESSES IN BEAMS:
Review of centre of gravity of an area, moment of inertia of the sections, bending stress in beams with symmetrical] sections and subjected to pure bending, shear stresses in beams of symmetric sections, shear centre, Problems.

UNIT 2. TORSION OF CIRCULAR MEMBERS :
Torsion of tube, solid and hollow circular shafts, tapered shafts, stepped shaft & composite concentric shafts, combined bending & torsion, equivalent torque, effect of end thrust, Numericals.

UNIT 3. PLANE TRUSSES :
Review of equilibrium conditions, free body diagrams, types of trusses, reactions at supports of a truss, determination of axial forces in the members of truss by methods of joints & sections. Numericals.

UNIT 4. THEORIES OF FAILURE :
Concepts of various theories of elastic failure and governing equations with their graphical representation, applications, Numericals.

UNIT 5. GENERAL DESIGN CONSIDERATIONS:
Introduction , scope & meaning of design, design process, concept of tearing, wearing, shearing, crushing, bending etc., selection of materials, factor of safety, stress concentration factor, design stresses for variable & repeated loads, endurance limit, fatigue strength, fits & tolerances, Numericals.

UNIT 6. CABLES AND COLUMNS :
Derivations for cables subjected to concentrated loads and uniformly distributed load per unit horizontal distance separately and cable uniformly loaded per unit length along the cable itself, Derivation of Euler's Formula for crippling load of coloumn under different and conditions, Use of Rankin's Formula, Ecentic Loading of short columns of circular & rectangular cross-sections, Numericals.

UNIT 7. FLUID FLOW MECHANICS :
Review of fluid properties, flow regimes, types of flow, stream lines, path lines, streak lines, continuity equation, rotation, circulation, velocity potential, steam function, flow net, general energy equation for steady flow of any fluid, Bernoulli's equation with its applications & limitations, flow measuring devices, Numericals.

TEXT BOOKS :
1. Fluid Mechanics: A K Mohanty; Prentice Hall of India, N.D
2. Strength of Material : G.H. Ryder; ELBS.
3. Engg. Mechanics : A.K. Tayel; Umesh Publishing.
4. Machine Design : P.C. Sharma & D K Agarwal; S.K Kataria.

REFERENCE BOOKS:
1. Fluid Mechanics : A. K. Jain; Khanna publications.
2. Hydraulics & Fluid Mechanics : Jagdish Lal; Metropolitan Book Co.

NOTE : Five out of eight questions are to be attempted, at least one question should be set from each unit.

EE-221-E ELECTRICAL ENGINEERING MATERIALS AND SEMICONDUCTOR DEVICES 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 V-I characteristics of diode, and its use as a capacitance.
2. Study of the characteristics of transistor in Common Base configuration.
3. Study of the characteristics of transistor in Common Emitter configuration.
4. Study of V-I characteristics of a photo-voltaic cell.
5. Study of characteristics of MOSFET/JFET is CS configuration.
6. To plot characteristics of thyristor.
7. To plot characteristics of UJT .
8. To plot characteristics of diac & Triac.
9. Study of loss factor in a dielectric by an impedance bridge.
10. Study of photo-resist in metal pattern for planar technology/PCB technology.

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

EE-223-E **NETWORK THEORY LAB**

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

LIST OF EXPERIMENTS :

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

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

EE-225-E **ELECTROMECHANICAL ENERGY CONVERSION LAB**

L T P		
0 0 3	CLASS WORK	: 50
	EXAM	: 50
	TOTAL	: 100
	DURATION OF EXAM	:3 HRS

LIST OF EXPERIMENTS:

1. To find turns ratio and polarity of a single phase transformer.

2. To perform open and short circuit tests on a single phase transformer.

3. To perform Sumpner's back to back test on single phase transformers.

4. Parallel operation of two single phase transformers.

5. Study of construction of a DC machine.

6. To plot O.C.C of a DC shunt generator and find its Critical Resistance.

6. 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 & set by the concerned institution as per the scope of the syllabus.

EE-231-E **ELECTRICAL WORKSHOP**

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

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 fluorescent tube light.
5. To study high pressure mercury vapour lamp (H.P.M.V).
6. To study Sodium lamp.
7. To study repairing of home appliances such as heater, electric iron, fans etc.
8. To study construction of moving iron, moving coil, electrodynamic & induction type meters.
9. To design & fabricate single phase transformer.
10. To study fuses, relays, contactors, MCBs and circuit breakers.
11. Insulation testing of electrical equipments.
12. To design, fabricate a PCB for a circuit, wire-up and test.

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

HUM-202-E FUNDAMENTALS OF MANAGEMENT

L	T	P
3	1	-

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

UNIT-I

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.

UNIT-II

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.

UNIT-III

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.

UNIT-IV

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.

UNIT-V

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

BOOKS RECOMMENDED :

TEXT BOOKS :

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

REFERENCE BOOKS :

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

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

MATH-202-E NUMERICAL METHODS
(COMMON FOR EE,EL,CHE,EI,IC & ELECTIVE FOR CSE,IT IN 8th SEM.)

L T P

3 1 -

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

Part-A

Interpolation and curve fitting : Interpolation problem, Lagrangian polynomials, Divided differences, Interpolating with a cubic spline, Bezier curves and B-spline curves, 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 Differentiation and Integration: Derivatives from differences tables, Higher order derivatives, Extrapolation techniques, Newton-cotes integration formula, Trapezoidal rule, Simpson's rules, Boole's rule and Weddle's rule, Romberg's Integration.

Part-B

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.

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

TEXT BOOKS :

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

REFERENCE BOOKS:

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

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

EE-202-E **ANALOG ELECTRONICS**

L T P			
3 1 0	CLASS WORK	:	50
	EXAM	:	100
	TOTAL	:	150
	DURATION OF EXAM	:	3 HRS

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

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

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

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

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

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

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

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

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

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

EE-204-E **DIGITAL ELECTRONICS**

L T P			
3 1 0	CLASS WORK	:	50
	EXAM	:	100
	TOTAL	:	150
	DURATION OF EXAM	:	3 HRS

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

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

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

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

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

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

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

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

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

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

EE-208-E **ELECTROMAGNETIC THEORY**

L T P			
3 1 0	CLASS WORK	:	50
	EXAM	:	100
	TOTAL	:	150
	DURATION OF EXAM	:	3 HRS

UNIT1.STATIC ELECTRIC FIE0LDS:
Coulomb's Law, Gauss's Law, potential function, field due to a continuous distribution of charge, equi-potential surfaces, Gauss's Theorem, Poison's equation, Laplace's equation, method of electrical images, capacitance, electro-static energy, boundary conditions, the electro-static uniqueness theorem for field of a charge distribution, Dirac-Delta representation for a point charge and an infinitesimal dipole.

UNIT2. STEADY MAGNETIC FIELDS :
Faraday Induction law, Ampere's Work law in the differential vector form, Ampere's law for a current element, magnetic field due to volume distribution of current and the Dirac-delta function, Ampere's Force Law, magnetic vector potential, vector potential (Alternative derivation), far field of a current distribution, equation of continuity.

UNIT3. TIME VARYING FIELDS :
Equation of continuity for time varying fields, inconsistency of Ampere's law, Maxwell's field equations and their interpretation, solution for free space conditions, electromagnetic waves in a homogeneous medium, propagation of uniform plane-wave, relation between E & H in a uniform plane-wave, wave equations for conducting medium, Maxwell's equations using phasor notation, wave propagation in a conducting medium, conductors, dielectrics, wave propagation in good conductor and good dielectric, depth of penetration, polarization, linear, circular and elliptical,

UNIT4. REFLECTION AND REFRACTION OF E M WAVES:
Reflection and refraction of plane waves at the surface of a perfect conductor & perfect dielectric (both normal incidence as well as oblique incidence), Brewester's angle and total internal reflection, reflection at the surfaces of a conductive medium, surface impedance, transmission-line analogy, poynting theorem, interpretation of E x H, power loss in a plane conductor.

UNIT5.TRASMISSION LINE THEORY :
Transmission line as a distributed circuit, transmission line equation, travelling ,standing waves , characteristic impedance, input impedance of terminated line, reflection coefficient, VSWR, Smith's chart and its applications.

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

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

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

EE-210-E ELECTRICAL MEASUREMENT AND MEASURING INSTRUMENTS

L T P			
3 1 0	CLASS WORK	:	50
	EXAM	:	100
	TOTAL	:	150
	DURATION OF EXAM	:	3 HRS

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

UNIT 2. MEASURING SYSTEM FUNDAMENTALS:
Classification of Instruments (Based upon mode of measurement -Absolute and Secondary Instruments; Based upon Principle of Operation, Based upon function -Indicating, Recording and Integrating instruments), Generalized Instrument (Block diagram and description of various blocks), The three forces in an Electromechanical indicating instrument (Deflecting controlling and damping forces and the interplay between them), Comparison between gravity and spring controls; Comparison of methods of damping and their suitability for bearing supports, Pivot-less supports (Simple suspension and taut band suspension, scale, information, Instrument cases (Covers).

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

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

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

UNIT 6. LOW AND HIGH RESISTANCE MEASUREMENTS:
Limitations of wheatstone bridge, Kelvin's double bridge method, Difficulties in high resistance measurements, Measurement of high resistance by direct deflection, loss of charge method, Megohm bridge and Meggar.

UNIT 7. A.C. BRIDGES:
General balance Equation, Circuit diagram, Phasor diagram Advantages, Disadvantages and Applications of Maxwell's inductance, Maxwells Inducance-Capacitance bridge, Hays, Anderson, Owens, De-Sauty's, Schering and Weins bridges, Shielding and earthing.

TEXT BOOK:
1. A Course in Electrical and Electronic Measurement & Instrumentation : A. K. Sawhney; dhanpat rai

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.
4. Measuring Systems : E.O.Doeblin; TMH.

NOTE : Eight questions are to be set taking atleast one question should be set from each unit. Five out of eight questions are to be attempted

EE-222-E **ANALOG ELECTRONICS-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 Half wave & full wave rectifiers.
2. Study of power supply filters.
3. Study of Diode as clipper & clamper.
4. Study of Zener diode as a voltage regulator.
5. Study of CE amplifier for voltage, current & Power gains and input, output impedances..
6. Study of CC amplifier as a buffer.
7. To study the frequency response of RC coupled amplifier.
8. Study of 3-terminal IC regulator.
9. Study of transistor as a constant current source in CE configuration.
10. Study of FET common source amplifier.
11. Study of FET common Drain amplifier.
12. Graphical determination of small signal hybrid parameters of bipolar junction transistor.
13. Study & design of a d.c. voltage doubler.

NOTE : At least ten experiments are to be performed, 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-224-E **DIGITAL ELECTRONICS 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 TTL gates – AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.

2. Design & realize a given function using K-maps and verify its performance.

3. To verify the operation of multiplexer & Demultiplexer.

4. To verify the operation of comparator.

5. To verify the truth tables of S-R, J-K, T & D type flip flops.

6. To verify the operation of bi-directional shift register.

7. To design & verify the operation of 3-bit synchronous counter.

8. To design and verify the operation of synchronous UP/DOWN decade counter using J K flip-flops & drive a seven-segment display using the same.

9. To design and verify the operation of asynchronous UP/DOWN decade counter using J K flip-flops & drive a seven-segment display using the same.

10. To design & realize a sequence generator for a given sequence using J-K flip-flops.

11. Study of CMOS NAND & NOR gates and interfacing between TTL and CMOS gates.

12. Design a 4-bit shift-register and verify its operation . Verify the operation of a ring counter and a Johnson counter.

NOTE : At least ten experiments are to be performed, 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-230-E ELECTRICAL MEASURMENT AND MEASURING INSTRUMENT LAB

L	T	P
0	0	2

Class Work : 25
Exam : 25
Total : 50
Duration of Exam : 3hrs

LIST OF EXPERIMENTS:

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

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

MATH-204-E **NUMERICAL METHODS LAB.**
(COMMON FOR EE,EL,CHE,EI)

L T P
- - 2

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

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

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

BOOKS SUGGESTED :

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

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

GPIC-202- E GENERAL FITNESS FOR THE PROFESSION

L	T	P
-	-	8

Class Work : 50 Marks
Practical : 100 Marks
Total Marks : 150 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 Principal/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. _____
_____
_____

Hostel 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

IC-301-E TRANDUCERS & SIGNAL CONDITIONING

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

UNIT 1. INTRODUCTION:
Overview, primary & secondary transducers,. Active & passive transducers.

UNIT 2. INDUCTIVE TRANSDUCERS:
LVDT, RVDT & uses. Transducers using L, Mu(u), G, N & Reluctance change.

UNIT 3 CAPACITIVE TRANSDUCERS:
Use of changes in A, d, Ed(Epsilon), differential arrangement.

UNIT 4. RESISTIVE TRANSDUCERS:
Potentiometers, loading effect, power rating linearity & sensitivity, Helipots, Strain gauges, unbounded & bounded types, wire & foil strain gauges.

UNIT 5. MEASUREMENT OF NON-ELECTRICAL QUANTITIES:
Measurement of linear & rotatory displacements, strain, linear & angular velocity, liquid level & flow, thickness & temperature.

UNIT 6 . SIGNAL CONDITIONING:
Instrumentation amplifier characteristics, CMRR, Balanced modulator & demodulator, filters, voltage sensitive bridge & current sensitive bridge. Push-pull transducers, Blumlein bridge, integration, differentiation & sampling, A/D & D/A conversion, choppers, voltage to time A/D conversion, voltage to freq. Conversion concept & methods.

TEXT BOOK:
1. A course in Electrical & Electronic Measurement & Instrumentation : A.K.Sawhney; Dhanpat Rai.

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

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

IC-303-E **LINEAR CONTROL SYSTEM**

L T P	CLASS WORK	: 50
3 1 0	EXAM	: 100
	TOTAL	: 150
	DURATION OF EXAM	:3 HRS

UNIT1. INTRODUCTORY CONCEPTS :
System/Plant Model, Types of models illustrative examples of plants and their inputs and outputs, controller, servomechanism, regulating systems, linear time-invariant (LTI), Time-varying, and causal systems; open loop control system, closed control system, illustrative examples of open-loop and feedback control systems, continuous time and sampled data systems. Effects of feedback on sensitivity (to parameter variations), stability, external disturbance (noise), overall gain etc. Introductory remarks about non-linear control systems.

UNIT 2. MATHEMATICAL MODELLING :
Concept of Transfer function, relationship between transfer function and impulse response, order of a system, introduction to state variable modelling approach, state variable models (only equations) of LTD, time varying, continuous time and discrete-time systems. Block diagram, block diagram algebra, signal flow graphs and associated terms/definitions, Mason's formula & its application, characteristic equation, derivation of transfer functions of liquid level, electro-mechanical, mechanical & electrical systems.

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

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

UNIT5. FREQUENCY DOMAIN ANALYSIS:
Relationship between frequency response and time-response for 2nd order system, polar, Nyquist, Bode plots; stability , GM and PM, relative stability frequency response specifications.

UNIT 6. CONTROL SYSTEM COMPONENTS:
Synchros, AC and DC techo-generators, servo motors, stepper motors & their applications.

TEXT BOOK:
1. Control System Engg : I.J.Nagrath & M.Gopal; New Age India.

REFERENCE BOOKS:
1. Automatic Control Systems : B.C.Kuo; PHI.
2. Modern Control Engg : K.Ogate; PHI.
3. Control Systems: Principles & Designing : Madan Gopal; TMH.
4. Modern Control Engg. :R.C.Dorf; Addison Wesley.

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

CSE- 210 E **Computer Architecture & Organization**

L	T	P
3	1	-

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

Unit-1: Basic Principles: Boolean algebra and Logic gates, Combinational logic blocks(Adders, Multiplexers, Encoders, de-coder), Sequential logic blocks(Latches, Flip-Flops, Registers, Counters)

Unit-2: General System Architecture: 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.

Unit-3: Instruction Set Architecture: Instruction set based classification of processors (RISC, CISC, and their comparison); addressing modes: register, immediate, direct, indirect, indexed; Operations in the instruction set; Arithmetic and Logical, Data Transfer, Control Flow; Instruction set formats (fixed, variable, hybrid); Language of the machine: 8086 ; simulation using MSAM.

Unit-4: Basic non pipelined CPU Architecture: 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.

Unit-5: Memory Hierarchy & I/O Techniques: The need for a memory hierarchy (Locality of reference principle, Memory hierarchy in practice: Cache, main memory and secondary memory, Memory parameters: access/ cycle time, cost per bit); Main memory (Semiconductor RAM & ROM organization, memory expansion, Static & dynamic memory types); Cache memory (Associative & direct mapped cache organizations.

Unit-6: Introduction to Parallelism: 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).

Unit-7: Computer Organization [80x86]: 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. Computer Organization and Design, 2nd Ed., by David A. Patterson and John L. Hennessy, Morgan 1997, Kauffmann.
2. Computer Architecture and Organization, 3rd Edi, by John P. Hayes, 1998, TMH.

Reference Books:

1. Operating Systems Internals and Design Principles by William Stallings,4th edition, 2001, Prentice-Hall Upper Saddle River, New Jersey
2. Computer Organization, 5th Edi, by Carl Hamacher, Zvonko Vranesic,2002, Safwat Zaky.
3. Structured Computer Organisation by A.S. Tanenbaum, 4th edition, Prentice-Hall of India, 1999, Eastern Economic Edition.
4. Computer Organisation & Architecture: Designing for performance by W. Stallings, 4th edition, 1996, Prentice-Hall International edition.
5. Computer System Architecture by M. Mano, 2001, Prentice-Hall.
6. Computer Architecture- Nicholas Carter, 2002, T.M.H.

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

EE-303-E **ELECTRONIC MEASUREMENT AND INSTRUMENTATION**

L T P		
3 1 0	CLASS WORK	: 50
	EXAM	: 100
	TOTAL	:150
	DURATION OF EXAM	:3 HRS

UNIT 1. OSCILLOSCOPE:
Block diagram, study of various stages in brief, high frequency CRO considerations. Sampling and storage oscilloscope.

UNIT 2. ELECTRONIC INSTRUMENTS:
Instruments for measurement of voltage, current & other circuit parameters, Q-meters, R.F. power measurements, introduction to digital meters.

UNIT 3. GENERATION & ANALYSIS OF WAVEFORMS:
Block diagram of pulse generators, signal generators, function generators wave analysers, distortion analysers, spectrum analyser, Harmonic analyser, introduction to power analyser.

UNIT 4. FREQUENCY & TIME MEASUREMENT:
Study of decade counting Assembly(DCA), frequency measurements, period measurements, universal counter, introduction to digital meters.

UNIT 5. DISPLAY DEVICES:
Nixie tubes, LED's LCD's, discharge devices.

UNIT 6 TRANSDUCERS:
Classification, Transducers of types: RLC photocell, thermocouples etc. basic schemes of measurement of displacement, velocity, acceleration, strain, pressure, liquid level & temperature.

UNIT 7 INTRODUCTION TO SIGNAL CONDITIONING:
DC signal conditioning system, AC signal conditioning system, data acquisition and conversion system

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

REFERENCE BOOKS.

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

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

EE-305-E **ANALOG ELECTRONIC CIRCUITS**

L T P	CLASS WORK	: 50
3 1 0	EXAM	: 100
	TOTAL	: 150
	DURATION OF EXAM	:3 HRS

UNIT1. 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 .

UNIT2. FEEDBACK AMPLIFIERS:
Feedback concept, transfer gain with feedback, general characteristics of negative feedback amplifiers, input resistance, output resistance, voltage series feedback, current series feedback, current shunt feedback, voltage shunt feedback.

UNIT3. OSCILLATORS:
Sinusoidal oscillators, Barkhausen criteria, R-C phase shift oscillator, generalform of oscillator circuit, wien-bridge oscillator, crystal oscillator.

UNIT4. 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.

UNIT5. OPERATIONAL AMPLIFIERS :
Ideal and practical operational amplifiers, inverting and non-inverting amplifier, differential amplifier, emitter coupled differential amplifier, transfer characteristics of a differential amplifier, offset error : voltage and current, common mode rejection ratio (CMRR) .

UNIT6. 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.

UNIT7. NON-LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIERS:
Comparators, sample & hold circuits, Logarithmic amplifier, anti-log amplifier, logarithmic multiplier, waveform generators , Miller & Bootstrap sweep generators, regenerative comparator (Schmitt Trigger), multivibrators, ADC.

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

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

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

EE-309-E **MICROPROCESSORS AND INTERFACING**

L T P		
3 1 0	CLASS WORK	: 50
	EXAM	: 100
	TOTAL	: 150
	DURATION OF EXAM	:3 HRS

PART A

UNIT1. THE 8085 PROCESSOR :
Introduction to microprocessor, 8085 microprocessor: Architecture, instruction set, interrupt structure, and assembly language programming.

UNIT2. 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.

UNIT3. 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 B

UNIT4. INTERFACING DEVICE :
The 8255 PPI chip: Architecture, control words, modes and examples.

UNIT 5. DMA :
Introduction to DMA process, 8237 DMA controller,

UNIT6. INTERRUPT AND TIMER :
8259 Programmable interrupt controller, Programmable interval timer chips.

TEXT BOOKS :

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

REFERENCE BOOKS:

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

NOTE: 8 questions are to be set selecting FIVE questions from PART A and THREE questions from PART-B .Students have to attempt any five questions.

EE-323-E ELECTRONIC MEASUREMENT AND INSTRUMENTATION-LAB

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

LIST OF EXPERIMENTS:

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

NOTE : 1. At least ten experiments have to be performed in the semester.
2. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus of EE-303-C.

EE-325-E **ANALOG ELECTRONIC CIRCUITS LAB**

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

LIST OF 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. Design & realize using op amp 741, Wein -bridge oscillator.
10. To design & realize using op amp 741, square wave generator.
11. To design & realize using op amp 741, logarithmic amplifier & VCCS.

NOTE: At least ten experiments are to be performed. Seven experiments should be performed from the above list and the remaining three experiments can be either from the above list or set by the concerned institution as per the scope of the syllabus of EE-305-C.

EE-329-E **MICROPROCESSORS AND INTERFACING LAB**

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

LIST OF EXPERIMENTS:

1. Study of 8085 Microprocessor kit.

2. Write a program using 8085 and verify for :
   a. Addition of two 8-bit numbers.
   b. Addition of two 8-bit numbers (with carry).

3. Write a program using 8085 and verify for :
   a. 8-bit subtraction (display borrow)
   b. 16-bit subtraction (display borrow)

4. Write a program using 8085 for multiplication of two 8- bit numbers by repeated addition method. Check for minimum number of additions and test for typical data.

5. Write a program using 8085 for multiplication of two 8- bit numbers by bit rotation method and verify.

6. Write a program using 8085 for division of two 8- bit numbers by repeated subtraction method and test for typical data.

7. Write a program using 8085 for dividing two 8- bit numbers by bit rotation method and test for typical data.

8. Study of 8086 microprocessor kit

9. Write a program using 8086 for division of a defined double word (stored in a data segment) by another double Word division and verify.

10. Write a program using 8086 for finding the square root of a given number and verify.

11. Write a program using 8086 for copying 12 bytes of data from source to destination and verify.

12. Write a program using 8086 and verify for:
    a. Finding the largest number from an array.
    b. Finding the smallest number from an array.

13. Write a program using 8086 for arranging an array of numbers in descending order and verify.

14. Write a program using 8086 for arranging an array of numbers in ascending order and verify.

15. Write a program for finding square of a number using look-up table and verify. .

16. Write a program to interface a two digit number using seven-segment LEDs. Use 8085/8086 microprocessor and 8255 PPI.

17. Write a program to control the operation of stepper motor using 8085/8086 microprocessor and 8255 PPI.

NOTE: At least ten experiments have to be performed in the semester out of which 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 of EE-309-C.

IC-321-E **LINEAR CONTROL SYSTEM LAB**

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

LIST OF EXPERIMENTS:

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

2. To study D.C. servo motor and to plot its torque speed characteristics.

3. To study the magnetic amplifier and to plot its load current v/s control current characteristics for :
   (a) series connected mode
   (b) parallel connected mode.

4. To plot the load current v/s control current characteristics for self exited mode of the magnetic amplifier.

5. To study the synchro & to:
   (a) Use the synchro pair (synchro transmitter & control transformer) as an error detector.

   (b)Plot stator voltage v/s rotor angle for synchro transmitter i.e. to use the synchro transmitter as position transducer.

6. To use the synchro pair (synchro transmitter & synchro motor) as a torque trans mitter.

7. (a) To demonstrate simple motor driven closed loop position control system.
   (b) To study and demonstrate simple closed loop speed control system.

8. To study the lead, lag, lead-lag compensators and to draw their magnitude and phase plots .

9. To study a stepper motor & to execute microprocessor or computer-based control of the same by changing number of steps, direction of rotation & speed.

10. To implement a PID controller for level control of a pilot plant.

11. To implement a PID controller for temperature control of a pilot plant.

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

NOTE : At least ten experiments have to be performed in the semester, at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus of EE-304-C.

IC-405-E **COMPUTER BASED INSTRUMENTATION AND CONTROL**

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

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

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

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

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

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

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

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

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

IC-302-E **NON-LINEAR CONTROL SYSTEM**

L T P		
3 1 0	CLASS WORK	: 50
	EXAM	: 100
	TOTAL	: 150
	DURATION OF EXAM	:3 HRS

UNIT 1. INTRODUCTION:
Nonlinear components such as dead band, backlash, relay, saturation. Difficulties in nonlinear modelling & control

.

UNIT 2. PHASE-PLANE ANALYSIS:
Phase portraits of 2nd order systems, method of isoclines, phase portrait of 2nd order system with non-linearities, limit cycles, singular points.

UNIT 3. DESCRIBING FUNCTION ANALYSIS:
Definition, limitations, use of DF for stability analysis, DF of ideal relay, relay with hysteresis, dead zone, saturation, coulomb friction, backlash etc.

UNIT 4. STATE VARIABLE TECHNIQUES:
State space modelling, state transition matrix. State models for linear continuous time systems, State variables and linear discrete time systems, Diagonalisation, solution of state equations, conversion of state variable model to transfer function, conversion of transfer function to canonical state variable model. Concept of Controllability and Observability, test for Controllability and Observability.

UNIT 5. LYAPUNOV STABILITY ANALYSIS:
Introduction, basic concepts, stability definitions, stability theorems, lyapunov function for non-linear systems and linear systems. Model reference adaptive system, discrete time system.

TEXT BOOK:
1. Control System Engineering (Third Edition): I.J Nagrath and M.Gopal; New Age Internatinal

REFERENCE BOOKS:
1. Control Systems Principles and Design (second edition) : M.Gopal; TMH.
2. Digital Control And State Variable Methods : M.Gopal; TMH.

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

IC-304-E **TELEMETRY DATA-PROCESSING AND RECORDING**

L T P		
3 1 0	CLASS WORK	: 50
	EXAM	: 100
	TOTAL	: 150
	DURATION OF EXAM	: 3 HRS

UNIT 1. INTRODUCTION:
Overview, Block diagram of a generalized instrument & description of its various blocks.

UNIT 2. 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, TDM.

UNIT 3. DATA PROCESSING & RECORDING:
Digital V/s analog processing, quantization, aperture, Electronic counters, R S flip flop, decade counter, Digital display methods, SS display, LED, LCD, Nixie Tube, Decade counting assembly (DCA), Decimal decoders, BCD to S-S converter, BCD to dot-matrix converter, resolution & sensitivity & accuracy in digital meters.

TEXT BOOK:
1. A course in Elec. & Elect. Measurement & Instrumentation :A.K. Sawhney; Dhanpat Rai & Sons.

REFERENCE BOOKS:
1. Measurement Systems & Analysis: E.O. Doeblien; TMH.
2 Electronics Instrumentation & Measurement Techniques: W.D.Cooper and A.D.Helfrick.

NOTE : Eight questions are to be set - at least one question from unit 1 and at least three each from units 2 and 3. Students will be required to attempt five questions in all.

IC-306-E **BIO- MEDICAL INSTRUMENTATION**

L T P	CLASS WORK	: 50
3 1 0	EXAM	: 100
	TOTAL	: 150
	DURATION OF EXAM	: 3 HRS

UNIT 1. INTRODUCTION:
Origin of bio-electric signals, recording systems, source of low level recording circuits, preamplifiers, main amplifier and driver stage, writing systems, types of recorders and transducers used.

UNIT 2. BIO-MEDICAL RECORDERS AND DISPLAY SYSTEMS:
ECG, EEG, EMG, photo-cardiograph and electrodes used for ECG, EEG and EMG, oscilloscopes used for biomedical measurements, multi-channel display.

UNIT 3. BLOOD GAS ANALYSERS:
B.P measurement, patient monitoring system, blood PH measurement, blood PO_2, PCO_2, complete blood gas analyser.

UNIT 4. SPECIAL MACHINES:
MRI, and ultrasonic imaging systems, x-ray machine, x-ray computed tomography, basic NMR components, physics of ultrasonic rays, A-scanner, B-scanner, echocardiograph, display devices for ultra sonic imaging.

UNIT5. CARDIAC PACEMAKERS AND DEFIBRILLATORS:
External pacemaker, implantable pace maker, programmable pace maker, leads and electrodes used , DC defibrillators, electrodes used, implantable defibrillators.

UNIT6. LASER APPLICATIONS IN BIOMEDICAL FIELDS:
Lasers: ruby laser , argon laser, helium- neon laser, CO_2 laser, Nd-YAG laser

TEXT BOOKS:
1. Introduction to Bio-medical Instrumentation : R.S khandpur.
2. Bio-medical instrumentation: Crambell.

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

EE-310-E **DIGITAL SYSTEM DESIGN**

L T P		
3 1 0	CLASS WORK	: 50
	EXAM	: 100
	TOTAL	: 150
	DURATION OF EXAM	: 3 HRS

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

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

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

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

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

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

REFERENCE BOOKS:

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

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

EE-317-E **POWER ELECTRONICS**

L T P	CLASS WORK	: 50
3 1 0	EXAM	: 100
	TOTAL	: 150
	DURATION OF EXAM	: 3 HRS

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

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

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

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

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

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

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

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

TEXT BOOK:
1. Power Electronics : MH Rashid; PHI

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

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

IC-322-E **INSTRUMENTATION PROJECT LAB**

L	T	P
-	-	2

Practical : 25 Marks
Class work : 25 Marks
Total : 50 Marks
Duration of Exam : 3 Hours

In this lab, the students will carry out, in group of 2-5, or even individually, projects involving hardware/software/analysis etc. relating to the area of instrumentation.

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

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

LIST OF EXPERIMENTS:

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
10. Implement any three (given above) on FPGA/CPLD kit

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

EE-331-E **ELECTRONIC CIRCUIT SIMULATION LAB**

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

LIST OF EXPERIMENTS:

1. Simulate and study half-wave, full-wave, and bridge-rectifier using PSPICE windows
2. Simulate and study diode clipper and clamper circuits using PSPICE windows
3. Simulate and study emitter bias and fixed bias BJT and JFET circuits using PSPICE windows, and determine quescient conditions.
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 using PSPICE windows .
5. Determine the frequency response of Vo/Vs for CE BJT amplifier using PSPICE windows. Study the effect of cascading of two stages on band width.
6. Simulate and study Darlington pair amplifier circuit using PSPICE windows and determine dc bias and output ac voltage .
7. Study an operational amplifier using PSPICE windows and find out: CMMR, gain band width product, slew rate, 3-db frequency, and input offset voltage.
8. Simulate and study active low pass, high pass, and band pass filters using PSPICE windows.
9. Simulate and study class A, B, C, and AB amplifier using PSPICE windows.
10. Study the operation of 555 timer oscillator using PSPICE.
11. Simulate logic expression……..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. Study the operation of asynchronous preset and clear .

NOTE**:** 1. At least ten experiments have to be performed in the semester; out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution.

EE-321-E **POWER ELECTRONICS-LAB**

L T P		
3 1 0	CLASS WORK	: 50
	EXAM	: 100
	TOTAL	: 150
	DURATION OF EXAM	:3 HRS

LIST OF EXPERIMENTS:

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

NOTE : At least ten experiments have to be performed in the semester. At least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution as per the scope of the syllabus of EE-308-C.

GPIC-302- E GENERAL FITNESS FOR THE PROFESSION

L	T	P
-	-	8

Class Work : 50 Marks
Practical : 100 Marks
Total Marks : 150 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 Principal/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. _____
_____
_____

Hostel 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

IC- 401-C **INDUSTRIAL PROCESS CONTROL**

L T P
3 1 -

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

UNIT-1.BASIC CONSIDERATIONS

Introduction to process control system, control loop study-Generalization with load-changes at arbitrary points in the loop, offset and its analysis, modelling consideration for control purposes, degree of freedom and process controllers, formulating the scope at modelling for process control. Computer simulation and linearization of non linear system transfer function and input output models, Dynamic behaviour of first order lag system, process with variable time constant and gain. Dynamic behaviour of second order and higher order system-multicaplacity process, real time process, inverse response process, Introduction to feedback control and effects P, I & D controllers.

UNIT-2. DESIGNING FEED BACK CONTROLLER :

Outline of the design problems, Selection of type of feedback controller. Time-Integral performance criterion, Process Reaction Curveand frequency response characteristic, Ziegler-Nichol Rule, effect of dead time, dead time compensator and inverse response cdompensator.

UNIT-3.CONTROL SYSTEMS WITH MULTIPLE LOOPS:

Cascade, spilt-range feedforward, ratio inferential and adaptive control.

UNIT-4. INTERACTION & DE-COUPLING OF CONTROL LOOP :

Interaction of control loops, relative gain array and selection of the loops, Design of non-interacting control loop.

UNIT-5. COMPUTER PROCESS INTERFACE FOR DATA ACQUISITION & CONTROL :

Introduction to digital computer control of processes. Design of control system for complete plant.

Text Book: Chemical process Control – George Stephanopoulos. Pub. PHI

Ref. Books:

1) Digital Computer Process Control-C.L.Smith Pub: Intext Educational Publisher
2) Process Control-F.G.Shinskey, Pub. Mc-Graw Hill
3) Advanced Process Control-W.H.Ray, Pub. Mc Graw Hill
4) Process system and analysis and control-D.R.Coushanour, TMH
5) Process Instrument & Control handbook-D.M.Considins,Pub: Mc -Graw Hill

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

IC-403-E **EMBEDDED SYSTEM DESIGN**

L	T	P
3	1	-

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

UNIT 1 : INTRODUCTION
Different types of microcontrollers: Embedded microcontrollers, External memory microcontrollers; Processor Architectures: Harvard V/S Princeton , CISC V/S RISC; microcontrollers memory types; microcontrollers features : clocking, i/o pins, interrupts, timers, peripherals.

UNIT 2 : MICROCONTROLLER ARCHITECTURE (PIC & 8051 Microcontroller)
Introduction to microcontrollers, Architecture and pipelining, program memory considerations, Addressing modes, CPU registers, Instruction set, simple operations.

UNIT 3 : INTERRUPTS AND I/O PORTS (PIC & 8051 Microcontroller)
Interrupt logic, Timer2 scalar initialization, IntService Interrupt service routine, loop time subroutine, External interrupts and timers, Synchronous serial port module, Serial peripheral device, O/p port Expansion, I/p port expansion, UART.

UNIT 4 : SOFTWARE (PIC & 8051 Microcontroller)
Development tools/ environments, Assembly language programming style, Interpreters, High level languages, Intel hex format object files, Debugging.

UNIT 5 : PROGRAMMING WITH MICROCONTROLLERS (PIC & 8051 Microcontroller)
Arithmetic operations, Bit addressing, Loop control, Stack operation, Subroutines, RAM direct addressing, state machines, Oscillators, Timer Interrupts, Memory mapped I/O.

UNIT 6 : DESINING USING MICROCONTROLLERS (PIC & 8051 Microcontroller)
Music box, Mouse wheel turning, PWM motor control, Aircraft Demonstration, ultra sonic distance measuring, Temperature Sensor, Pressure Sensor, Magnetic Field Sensor.

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

REFERENCE BOOKS :
1. Programming and Customizing the 8051 Microcontroller : Predko ; TMH.
2. Designing Embedded Hardware : John Catsoulis ;SHROFF PUB. & DISTR. ND.
3. Programming Embedded Systems in C and C++ : Michael Barr; SHROFF PUB. & DISTR. ND.

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

IC-407-E **INTELLIGENT INSTRUMENTATION**

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

UNIT 1. INTRODUCTION:
Definition of an intelligent instrumentation system; feature of intelligent instrumentation ; components of intelligent instrumentation; Block diagram of an intelligent instrumentation.

UNIT 2. INTERFACING INSTRUMENTS & COMPUTERS:
Basic issue of interfacing; Address decoding; Data transfer control; A/D converter; D/A converter; Other interface consideration.

UNIT 3. 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.

UNIT 4. SOFTWARE FILTERS :
Description of Spike Filter, Low pass filter, High pass filter etc.

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

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

EE-407-E **DIGITAL SIGNAL PROCESSING**

L T P			
3 1 0	CLASS WORK	:	50
	EXAM	:	100
	TOTAL	:	150
	DURATION OF EXAM	:	3 HRS

UNIT1. DISCRETE-TIME SIGNALS:
Signal classifications, frequency domain representation, time domain representation, representation of sequences by Fourier transform, properties of Fourier transform, discrete time random signals, energy and power theorems.

UNIT2. DISCRETE-TIME SYSTEMS:
Classification, properties, time invariant system, finite impulse Response (FIR) system, infinite impulse response (IIR) system.

UNIT3. SAMPLING OF TIME SIGNALS:
Sampling theorem, application, frequency domain representation of sampling, reconstruction of band limited signal from its samples. discrete time processing of continuous time signals, changing the sampling rate using discrete time processing.

UNIT4. DFT & FFT WITH APPLICATIONS:
Discrete Fourier transform, properties of DFT, Circular Convolution, Fast Fourier Transform, Realizations of DFT.

UNIT5: Z TRANSFORM WITH APPLICATIONS:
The Z-transform, the system function of a digital filter, Digital Filter implementation from the system function, the inverse Z- transform, properties & applications, Special computation of finite sequences, sequence of infinite length & continuous time signals, computation of fourier series & time sequences from spectra.

UNIT6. 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.

UNIT7. MULTIRATE DIGITAL SIGNAL PROCESSING:
Introduction to multirate digital signal processing, sampling rate conversion, filter structures, multistage decimator and interpolators, digital filter banks.

TEXT BOOKS :

1. Digital Signal Processing : Proakis and Manolakis; PHI
2. Digital Signal Processing: Salivahanan, Vallavaraj and Gnanapriya;TMH
3. Rabiner & Gold, “Theory & application of digital Signal Processing”, PHI 1992.

REFERENCE BOOKS:

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

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

IC-409-E **INDUSTRIAL PROCESS CONTROL 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 response of single & multiple Ist order systems in series.
   a) Coupled
   b) on-coupled
2. To perform PID control on Ist order system without lag(on a pilot plant).
3. To perform PID control on a non-coupled & coupled two-tank system(Pilot plant)
4. To perform PID control on a 2nd order system with lag.
5. To determine the system T.F. by conducting step test.
6. To determine system T.F. by conducting freq. Test.
7. PLC programming.

NOTE: At least ten experiments have to be performed in the semester, taking seven experiments of the above list and three be set by the concerned institution as per the scope of syllabus contents of IC-401-C.

IC –417-E **EMBEDED SYSTEM DESIGN LAB**

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

8051 Micro Controller

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

PIC Microcontroller

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

General

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

EE-427-E **DIGITAL SIGNAL PROCESSING LAB**

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

LIST OF EXPERIMENTS:

Perform the experiments using MATLAB:

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

NOTE: At least ten experiments have to be performed in the semester; out of which at least seven experiments should be performed from above list. Remaining three experiments may either be performed from the above list or designed & set by the concerned institution.

IC-402-E **STOCHASTIC PROCESSES**

L T P			
3 1 0	CLASS WORK	:	50
	EXAM	:	100
	TOTAL	:	150
	DURATION OF EXAM	:	3 HRS

UNIT 1 INTRODUCTION:
Overview, limitations of deterministic control & processes.

UNIT 2 PROBABILITY & AXIOMS:
Definition, axioms of probability , conditional probability.

UNIT 3 REPEATED TRIALS:
Combined experiments, Bernoulli trials, Asymptotic theorems, Poisson theorem, Baye's theorem & statistics.

UNIT 4 RANDOM VARIABLES:
Distribution & density functions, conditional distributions, Total probability & Baye's theorem. Mean and variance, moments, characteristics. Functions, two random variables, moments & conditional statistics.

UNIT 5 STOCHASTIC PROCESSES:
Stationary processes systems with stochastic inputs; Ergodicity correlation and spectra.

TEXT BOOK:
1. Probability, Ranbdom variables & Stochastic Processes : Athanasios Papoulis; Mc Graw-Hill.

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

IC-404-E **FUZZY CONTROL SYSTEMS**

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

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

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

UNIT 3. FKBC DESIGN PARAMETERS:
The PKBC architecture, choice of variables & content of rules, Derivation of rules, choice of membership functions, choice of scaling factors, choice of fuzjfication procedure, choice of defuz:zjfication procedure, comparison and evaluation of defuz:zjfication methods.

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

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

UNIT 6. STABILITY OF FUZZY CONTROL SYSTEMS:
The State space approach, Stability and robust-ness Ll'ldices, input-output stability, circle criterion, the conicity criterion.

TEXT BOOK :
1. "An Introduction to Fuzzy Conu'ol" : D.,Driankov, H.Hellendoom & M.Reinfrank.; Narosa

REFERENCE BOOK:
1. "Fuzzy Control Systems" : Abraham Kandel & Gideon Imngholz ; Narosa New Delhi.

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

IC-424-E **FUZZY CONTROL LAB**

L	T	P
0	0	2

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

At least ten experiments based on the syllabus of IC-402-C (Fuzzy Control Systems) be developed at the Institution Level. The students will be required to perform at least eight experiments in the semester.

GFIC-402- E GENERAL FITNESS FOR THE PROFESSION

L	T	P
-	-	8

Class Work : 50 Marks
Practical : 100 Marks
Total Marks : 150 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 Principal/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. _____
_____
_____

Hostel 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