M.D UNIVERSITY, ROHTAK

Scheme of Studies & Examination for
Bachelor of Technology (Electronics and Telecommunication)
SEMESTER –III
'F' Scheme Effective from 2011-2012

S No	Course No.	Course Title	Teaching Schedule				Marks of class work	Examination		Total Marks	Duration Of Exam
			L	T	P	Total		Theory	Practical		
1	ET-301F	Mathematics- III	3	1	-	4	50	100	-	150	3
2	ET-302-F	Network analysis and Synthesis	3	1	-	4	50	100	-	150	3
3	ET-303-F	Electromechanical & Energy Conversion	3	1	-	4	50	100	-	150	3
4	ET-304-F	Data Structure	3	1	-	4	50	100	-	150	3
5	ET-305-F	Semiconductor Devices And Circuits	3	1	-	4	50	100	-	150	3
6	ET-306-F	Analog Communication	3	1	-	4	50	100	-	150	3
7	ET-307-F	Electrical Machine Lab	-	-	3	3	50	-	25	75	3
8	ET-308-F	Semiconductor Devices and Circuit Lab	-	-	3	3	50	-	25	75	3
9	ET-309-F	Analog Communication Lab	-	-	2	2	50	-	25	75	3
10	ET-310-F	Data Structure Lab	-	-	3	3	50	-	25	75	3
		TOTAL	**18**	**6**	**11**	**35**	**450**	**600**	**100**	**1250**	

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 for
Bachelor of Technology (Electronics and Telecommunication)
SEMESTER – IV
'F' Scheme Effective from 2011-2012

S No	Course No.	Course Title	Teaching Schedule				Marks of class work	Examination		Total Marks	Duration Of Exam
			L	T	P	Total		Theory	Practical		
1	ET-401-F	Basics of Industrial Sociology , Economics and Management	3	1	-	4	50	100	-	150	3
2	ET-402-F	Computational Techniques	3	1	-	4	50	100	-	150	3
3	ET-403-F	Electronics Instrumentation and Measurements	3	1	-	4	50	100	-	150	3
4	ET-404-F	Digital Electronics	3	1	-	4	50	100	-	150	3
5	ET-405-F	Signals And Systems	3	1	-	4	50	100	-	150	3
6	ET-406-F	Field and Waves	3	1	-	4	50	100	-	150	3
7	ET-407-F	Electronics Measurement Lab	-	-	3	3	50	-	50	100	3
8	ET-408-F	Digital Electronics Lab	-	-	3	3	50	-	50	100	3
9	ET-409-F	Computational Techniques Lab	-	-	3	3	50	-	50	100	3
		TOTAL	**18**	**6**	**9**	**33**	**450**	**600**	**150**	**1200**	

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^{th} sem .**

M.D UNIVERSITY, ROHTAK

Scheme of Studies & Examination for
Bachelor of Technology (Electronics and Telecommunication)
SEMESTER –V
'F' Scheme Effective from 2011-2012

S No	Course No.	Course Title	Teaching Schedule				Marks of class work	Examination		Total Marks	Duration Of Exam
			L	T	P	Total		Theory	Practical		
1	ET-501-F	Antenna and Wave Propagation	3	1	-	4	50	100	-	150	3
2	ET-502-F	Computer Hardware Design	3	1	-	4	50	100	-	150	3
3	ET-503-F	Information Theory and Coding	3	1	-	4	50	100	-	150	3
4	ET-504-F	Linear IC Application	3	1	-	4	50	100	-	150	3
5	ET-505-F	Micro-Electronics	3	1	-	4	50	100	-	150	3
6	ET-506-F	Microprocessor and Interfacing	3	1	-	4	50	100	-	150	3
7	ET-507-F	Linear Integrated Circuit Lab	-	-	3	3	50	-	50	100	3
8	ET-508-F	Microprocessor Lab	-	-	3	3	50	-	50	100	3
9	ET-509-F	Practical Training	-	-	-	-	100	-	-	100	3
		TOTAL	**18**	**6**	**6**	**30**	**500**	**600**	**100**	**1200**	

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 -1, undergone at the end of IV semester, will be based on seminar, viva –voice, 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 repeat practical Training.**

M.D UNIVERSITY, ROHTAK

Scheme of Studies & Examination for
Bachelor Of Technology (Electronics and Telecommunication)
SEMESTER –VI
'F' Scheme Effective from 2011-2012

S No	Course No.	Course Title	Teaching Schedule				Marks of class work	Examination		Total Marks	Duration Of Exam
			L	T	P	Total		Theory	Practical		
1	ET-601-F	Fundamental Of Management	3	1	-	4	50	100	-	150	3
2	ET-602-F	Control system Engg	3	1	-	4	50	100	-	150	3
3	ET 603-F	VHDL and Digital Design	3	1	-	4	50	100	-	150	3
4	ET-604-F	Digital Signal Processing	3	1	-	4	50	100	-	150	3
5	ET-605-F	Digital Communication	3	1	-	4	50	100	-	150	3
6	ET-606-F	Computer Communication Network	3	1	-	4	50	100	-	150	3
7	ET-607-F	Digital Communication circuit lab	-	-	3	3	50	-	50	100	3
8	ET-608-F	Electronics Design Lab	-	-	3	3	50	-	50	100	3
9	ET-609-F	VHDL Lab	-	-	3	3	50	-	50	100	3
		TOTAL	**18**	**6**	**9**	**33**	**450**	**600**	**150**	**1200**	

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 VIIth sem .**

M.D UNIVERSITY, ROHTAK

Scheme of Studies & Examination for
Bachelor of Technology (Electronics and Telecommunication)
SEMESTER –VII
'F' Scheme Effective from 2011-2012

S No	Course No.	Course Title	Teaching Schedule				Marks of class work	Examination		Total Marks	Duration Of Exam
			L	T	P	Total		Theory	Practical		
1		Departmental Elective I	3	1	-	4	50	100	-	150	3
2		Departmental Elective II	3	1	-	4	50	100	-	150	3
3	ET-701-F	VLSI Design	3	1	-	4	50	100	-	150	-
4	ET-702-F	Television Engg	3	1	-	4	50	100	-	150	3
5	ET-703-F	Optical Communication	3	1	-	4	50	100	-	150	3
6	ET-704-F	Microwave Engg	3	1	-	4	50	100	-	150	3
7	ET-711-F	Digital Signal Processing Lab	-	-	3	3	50	-	50	100	3
8	ET-712-F	Minor Project	-	-	3	3	75	-	50	125	3
9	ET-713-F	Practical Training	-	-	-	-	75	-	-	75	3
		TOTAL	**18**	**6**	**6**	**30**	**500**	**600**	**100**	**1200**	

Elective I

1) **Microcontroller(ET-720-F)**
2) **Reliability(ET-722-F)**
3) **Nanotechnology(ET-724-F)**

Elective II

1) **Advance Microprocessor(ET-726-F)**
2) **Artificial Intelligence and Expert system(ET-728-F)**
3) **Power Electronics(ET-730-F**

Note –

1) Students will be allowed to use non –programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.
2) Assessment of Practical Training -1, undergone at the end of IV semester, will be based on seminar , viva –voice, 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 repeat practical Training.
3) Student will be permitted to opt for any one Elective run by the Department. However the department will offer only those elective for which they have expertise. The choice of the student for any elective shall not be a binding for the department to offer, if the department does not have expertise.
4) Project load will be treated as 2hr per week for Project coordinator and 1hr for each participating teacher. Project will commence in VII sem where the student will identify the project problem, complete the design /procure the material/ start the fabrication/complete the servey etc. depending upon the nature of the problem. Project will continue in VIIIth semester.

M.D UNIVERSITY, ROHTAK

Scheme of Studies & Examination for
Bachelor of Technology (Electronics and Telecommunication)
SEMESTER –VIII
'F' Scheme Effective from 2011-2012

S No	Course No.	Course Title	Teaching Schedule				Marks of class work	Examination		Total Marks	Duration Of Exam
			L	T	P	Total		Theory	Practical		
1		Departmental Elective III	3	1	-	4	50	100	-	150	3
2		Departmental Elective IV	3	1	-	4	50	100	-	150	3
3	ET-802-F	Wireless and Mobile Communication	3	1	-	4	50	100	-	150	3
4	ET-804-F	Radar Engineering	3	1	-	4	50	100	-	150	3
5	ET-806-F	Multimedia Communication	3	1	-	4	50	100	-	150	3
6	ET-808-F	Microwave Lab	-	-	3	3	50	-	50	100	3
7	ET-810-F	Audio Visual Electronics Lab	-	-	3	3	50	-	50	100	3
8	ET-812-F	Major project	-	-	4	4	50	-	50	100	
9	ET-814-F	seminar	2	-	-	2	25	-	-	25	
10	ET-816-F	Comprehensive Viva Voca			-	-	50		-	50	
11	ET-818-F	General Fitness and Professional aptitude			4	4	-		75	75	
		TOTAL	**17**	**5**	**14**	**36**	**475**	**500**	**225**	**1200**	

Elective III

1) **Transducers and Their Application(ET-830-F)**
2) **Electronic Switching system(ET-828-F)**
3) **Neuro Fuzzy system(ET-826-F)**

Elective IV

1) **Embedded System Design(ET-824-F)**
2) **Advanced Control system (ET-822-F)**
3) **Image Processing(ET-820-F)**

Note –

1) Students will be allowed to use non –programmable scientific calculator. However, sharing of calculator will not be permitted in the examination.
2) Project load will be treated as 2 hr per week for the project coordinator and 1 hr for each participating teacher. Project involve design , fabrication , testing, computer simulation, case studies etc, which has been commenced by students in VII sem will be completed in VIII sem.
3) A team consisting of Principal/Director , HOD of concern department and external examiner appointed by University shall carry out the evaluation of the student for his/ her general fitness for the profession
4) For the subject (Independent Study Seminar), a student will select a topic from emerging areas of Electronics and Communication Engineering and study it thoroughly and independently. Later he will give seminar talk on the topic

ET-301-F **MATHEMATICS-III**

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

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

Section-A

Fourier Series : Euler's Formulae, Conditions for Fourier expansions, Fourier expansion of functions having points of discontinuity, change of interval, Odd & even functions, Half-range series.

Fourier Transforms : Fourier integrals, Fourier transforms, Fourier cosine and sine transforms. Properties of Fourier transforms, Convolution theorem, Perseval's identity, Relation between Fourier and Laplace transforms, Fourier transforms of the derivatives of a function, Application to boundary value problems

Section-B

Functions of a Complex Variables : Functions of a complex variable, Exponential function, Trigonometric, Hyperbolic and Logarithmic functions, limit and continuity of a function, Differentiability and analyticity.

Cauchy-Riemann equations, Necessary and sufficient conditions for a function to be analytic, Polar form of the Cauchy-Riemann equations, Harmonic functions, Application to flow problems, Conformal transformation, Standard transformations (Translation, Magnification & rotation, inversion & reflection, Bilinear)

Section-C

Probability Distributions : Probability, Baye's theorem, Discrete & Continuous probability distributions, Moment generating function, Probability generating function, Properties and applications of Binomial, Poisson and normal distributions.

Section-D

Linear Programming : Linear programming problems formulation, Solution of Linear Programming Problem using Graphical method, Simplex Method, Dual-Simplex Method.

Text Book

1. Higher Engg. Mathematics : B.S. Grewal
2. Advanced Engg. Mathematics : E. Kreyzig

Reference Book

1. Complex variables and Applications : R.V. Churchil; Mc. Graw Hill
2. Engg. Mathematics Vol. II: S.S. Sastry; Prentice Hall of India.
3. Operation Research : H.A. Taha
4. Probability and statistics for Engineer : Johnson. PHI.

ET-302-F **NETWORK ANALYSIS & SYNTHESIS**

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

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

Section- A

Topology: Principles of network topology , graph matrices, network analysis using graph theory.

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

Section-B

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.

Section-C

Characteristics and parameter of two port network: 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.

Section-D

Types of filters and their characteristics: Filter fundamentals, high-pass, low-pass, band-pass, and band-reject Filters.

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.

ET : 303 -F ELECTROMECHANCIAL ENERGY CONVERSION

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

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

Section-A

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

Transforms : Basic theory, construction, operation at no-load and full-load, equivalent circuit, phasor diagram, O.C. tests for parameters determination, efficiency and regulation, auto-transformer, introduction to three-phase transformer; Scott connection, parallel operation of transformer.

Section-B

Principles Of Electromechnical Energy Conversions : 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 is system with permanent magnets, dynamic equation.

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, Types of DC generator & motors Armature reaction, communication, characteristics of DC machines.

Section-C

Induction Motor: Basic theory, construction, Phasor diagram, advantage of IM over other conventional machines Equivalent circuit, Torque equation, Load characteristics, starting speed control of induction motor, Introduction to single phase Induction motor double field revolving theory, types of single phase IM and its applications, open circuit & block rotor test.

Section-D

Synchronous Machines: Construction and basic theory of synchronous generator, emf equation, advantages of stationary armature, Regulation, Basic theory of synchronous motor, v-curves, starting of synchronous motor, comparison between synchronous & induction, open circuit & block rotor teat of 3 phase and 1 phase motor.

Text Book :

1. Electrical Machines : P.S. Bimbhra; Khanna

Reference Books :

1. Electrical Machines : Nagarath and Kothari; TMH
2. Electrical Machines : Mukherjee and Chakravorti; Dhanpat Rai & Sons.
3. Electrical Technology (Vol-II) : B.L. Theraja; S. Chand

ET-304 -F **DATA STRUCTURES**

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

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

Section-A

Introduction to Data Structures: Definition & abstract data types, Static and Dynamic implementations, Examples and real life applications; built in and user defined data structures, Ordered list and Operations on it

Arrays : Definition, implementation, lower bound, upper bound, addressing an element at a particular index for one dimensional arrays, Two dimensional arrays and Multi-dimensional arrays. Implementation of Data Structures like structure/ Record, Union, Sparse matrices : implementation of transpose.

Section-B

Stacks : Sequential implementation of stacks, operations, Polish-notations, Evaluation of postfix expression,Converting Infix expression to Prefix and Postfix expression, Applications

Queues: Definition, Sequential implementation of linear queues, Operations. Circular queue: implementation (using arrays), Advantage over linear queue, Priority queues & Applications.

Section-C

Linked Lists : Need of dynamic data structures, continuous & linked implementation of lists.Operations on lists. Dynamic implementation of linked lists, Operations. Comparison between Array and Dynamic Implementation of linked list. Linked implementation of stacks and queues. Circular lists, implementation of primitive operations. Doubly linked lists : continuos & dynamic implementation, operations.

Section-D

Trees: Definition, Basic terminology, Binary tree, Array and Dynamic Implementation of a binary tree, primitive operations on binary trees. External and internal nodes. Binary tree traversals : preorder, inorder and postorder traversals. Representation of infix, postifix and prefix expressions using trees.Representation of lists as binary trees. Introduction to Binary Search Trees, B trees, B+ trees , AVL Trees, threaded trees, balanced multi way search trees.

Text Book:

- Data Structures using C by A. M. Tenenbaum, Langsam, Moshe J. Augentem,

PHI Pub.

Reference Books:

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

ET-305-F **SEMICONDUCTOR DEVICES AND CIRCUITS**

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

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

Section-A

P-N Junction Diode: P-N junction and its V-I characteristics, P-N junction as rectifier, diode as a circuit element, the load line concept, half-wave and full-wave rectifiers, filter circuits. Photoelectric devices & their applications.

Regulated power supplies: Series and shunt voltage regulators, power supply parameters, three terminal IC regulators, SMPS.

Section-B

Transistors: Review of BJT and its Hybrid model, analysis of a transistor amplifier circuit using h- parameters, Emitter follower, Miller's theorem, Frequency response of R-C coupled amplifier, Multistage amplifier, classification of amplifiers, Transistor Biasing; Operating point, Bias stability, Collector to Base bias, Self-bias, emitter bias, bias compensation, Thermistor and sensitor compensation, High frequency limitations on BJT'S.

Section-C

Feedback oscillators and power amplifiers: Feedback in amplifiers: Basic feedback topologies. Oscillators: Barkhausen's criterion, sinusoidal oscillators, Phase shift oscillators, Resonant circuit oscillator, a general form of oscillator, the Wein Bridge oscillator, Crystal oscillator. Introduction to power amplifiers and its various types with applications.

Section-D

Field effect transistors: JFET, pinch-off voltage, Volt-ampere characteristics, small signal model, MOSFET-Enhancement & Depletion mode, V-MOSFET, JFET & MOSFET amplifiers, Biasing of JFETS and MOSFETS.

Text Books:

1. Integrated Electronics: Millman & Halkias; Mc Graw Hill.
2. Electronic circuit analysis and design (Second Edition): D.A. Neamen; TMH

Reference Books:

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

ET-306 -F **ANALOG COMMUNICATION**

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

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

Section-A

Noise:Classification of Noise, Various sources of Noise, Methods of Noise Calculation in networks and inter connected networks. Addition of noise due to several sources; noise in amplifiers in cascade, noise in reactive circuits, Noise figure, its calculation and measurement. Noise temperature, Mathematical representation of random noise, narrow band noise and its representation. Transmission of noise through linear systems, signal to noise ratio, noise bandwidth.

Section-B

Modulation Techniques: Basic constituents of Communication Systems, need of modulation, Amplitude modulation, spectrum of AM wave, modulation index, DSBSC modulation, SSB Modulation, Collector modulation, Square law modulation methods, Methods of generating SSB Signals, vestigial side band modulation, Detection of AM Signal; Diode detector, Square Law Detector. Time Constant RC in diode detector. Diode detector with filter. FDM, Power relations in AM wave.

Section-C

Angle modulation: Frequency and phase modulation, spectrum of FM Wave, modulation index and Bandwidth of FM Signal, NBFM and WBFM, Comparison between FM and PM Signals, FM and AM signals, AM and NBFM Signals, FM generation methods, Demodulation methods; slope detector, ratio detector, Foster-Seeley discriminator. Pre-emphasis & De-emphasis, effect of noise on carrier; noise triangle.

Section-D

Transmiter and reciver: Classification of radio transmitters, Block diagram of AM transmitter, Frequency Scintillation, Frequency drift, Radio broadcast transmitter, Radio telephone transmitter, Privacy devices, Armstrong FM transmitter, Simple FM transmitter using Reactance modulator.Classification of radio receivers, TRF receives, superheterodyne receivers, Image Signal rejection, frequency mixers. Tracking and alignment of receivers, Intermediate frequency, AGC, AFC, SSB receiver.

Reference Books:

1. Taub & Schilling, Principles of Communication Systems, TMH.
2. Mithal G K, Radio Engineering, Khanna Pub.
3. Sirnon Haykin, Communication Systems, John Wiley.
4. Dungan F.R., Electronics Communication System, Thomson-Delmar
5. Electronics Communication System: Kennedy; TMH

ET – 307 -F **ELECTRICAL MACHINES LAB**

L	T	P
0	0	3

Cass Work Marks : 50
Pract. Viva Marks : 25
Total Marks : 75

LIST OF EXPERIMENTS

1. To perform open and short circuit tests on 1-phase transformer and to calculate efficiency.
2. To perform Sumpner's back to back test on-phase transformer.
3. Parallel operation of two 1-phase transformers.
4. Study of construction of a DC machine.
5. To plot magnetizing of a DC SE Generator and find its critical resistance & critical speed.
6. Speed Control of a DC motor by armature control & field control methods.
7. Open circuit & Block test of 1-phase induction motor.
8. Light running & block rotor test of 3-phase I.M. with starting.
9. To plot V curve of a synchronous motor.
10. To study scott connection of transformer.
11. To study starting running & reversal of direction of 3-phase I.M.
12. To perform load test on a 3-phase I.M. D.C. generator set & to determine the efficiency of I.M.

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

ET-308 -F **SEMICONDUCTOR DEVICES & CIRCUITS LAB**

L	T	P	Class Work Marks :	50
0	0	3	Pract. Viva Marks:	25
			Total Marks :	75

LIST OF EXPERIMENTS:

1. Measurement & study of P-N junction diode-I-V and C-V characteristics.
2. Study of Half-wave and Full-wave rectifier.
3. Measurement and study of solar cell –I-V characteristics.
4. Study of Active filters.
5. Study of diode as Clipper and Clamper.
6. Study of Zener diode as Voltage Regulator.
7. Measurement and study of Input and Output characteristics of a BJT.
8. Study of CE amplifier-Current & Power gains and Input, Output Impedances.
9. To study the frequency response of RC coupled amplifier.
10. Measurement and study of Output characteristics of JFET.
11. Measurement and study of Output characteristics of MOSFET.
12. Study of SCR/Thyristor characteristics.
13. Study of UJT characteristics.
14. Study of Push-Pull amplifier.

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

ET-309 -F **ANALOG COMMUNICATION LAB**

L	T	P	Class Work Marks : 50
0	0	2	Pract.Viva Marks : 25
			Total Marks : 75

LIST OF EXPERIMENTS:

1. Study of AM Modulation/Demodulation
2. Study of FM Modulation/Demodulation.
3. Study of Diode detector and AGC.
4. To study Sampling theorem.
5. Sensitivity of a superhet Receiver.
6. Selectivity of a superhet Receiver.
7. Fidelity of a superhet Receiver.
8. Study of Pulse Amplitude Modulation/Demodulation.
9. Study of Pulse Width Modulation/Demodulation.
10. Study of Pulse Position Modulation/Demodulation.

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

ET-310 -F **DATA STRUCTURES LAB**

L	T	P	Class Work Marks : 50
0	0	3	Pract.Viva Marks : 25
			Total Marks : 75

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

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

BASICS OF INDUSTRIAL SOCIOLOGY, ECONOMICS& MANAGEMENT

ET – 401 -F	Class Work Marks : 50
L T P	Theory Marks : 100
3 1 0	Total marks : 150
	Duration of Exam. : 3 Hrs.

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

Section-A

Meaning of social change, nature of social change, theories of social change. The direction of social change, the causes of social change, the process of social change. Factors of social change – the technological factors, the cultural factors, effects of technology on major social institutions, social need of status system, social relations in industry.

Section-B

Meaning of Industrial Economic, Production Function, its types, Least Cost Combination, Law of Variable.Proportion, Laws of Return – Increasing, Constant & Diminishing.Fixed & variable costs in short run & long run, opportunity costs, relation between AC & MC, U-shaped short run AC Curve.

Price & Output Determination under Monopoly in short run & long run. Price Discrimination, Price Determination under Discriminating Monopoly. Comparison between Monopoly & Perfect Competition.

Section-C

Meaning of Management, Characteristics of Management, Management Vs. Administration, Management –Art, Science & Profession, Fayol's Principles of Management. Personnel Management – Meaning & Functions, Manpower – Process of Manpower Planning, Recruitment & Selection – Selection Procedure.

Training – Objectives & Types of Training, Various Methods of Training. Labour Legislation in India –Main provisions of Industrial disputes Act 1947;

Section-D

Marketing Management – Definition & Meaning, Scope of Marketing Management, Marketing Research –Meaning, Objectives.

Purchasing Management – Meaning & Objectives, Purchase Procedure, Inventory Control Techniques.

Financial Management – Introduction, Objectives of Financial decisions, Sources of Finance.

Text Books :

1. "Modern Economic Theory" Dewett, K.K., S. Chand & Co.
2. "Economic Analysis" K.P. Sundharam & E.N. Sundharam (Sultan Chand & Sons).
3. "Micro Economic Theory" M.L. Jhingan (Konark Publishers Pvt. Ltd.).
4. "Principles of Economics" M.L. Seth (Lakshmi Narain Aggarwal Educational Publishers –Agra).
5. "An Introduction to Sociology", D.R. Sachdeva & Vidya Bhusan.
6. "Society – An Introductory Analysis", R.M. Maclver Charles H. Page.
7. "Principles and Practices of Management : R.S. Gupta; B.D. Sharma; N.S. Bhalla; Kalyani.

Reference Books

1. "Organization and Management : R.D. Aggarwal, Tata McGraw Hill.
2. Business Organization and Management : M.C. Shukla

ET-402 -F **COMPUTATIONAL TECHNIQUES**

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

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

Section-A

Matrix Inversion: -

Gauss Elimination Method, Gauss Jordan Method, Crout's Method, Doolittle Method, Choleski's Method, Improvement in the accuracy of an inverse, The Escalator Method for Matrix Inversion, Inverse of a complex matrix.

Operational Research:

Linear Programming Problems formulation, Solving linear programming problems using Graphical Method, Simplex Method, Dual Simplex Method.

Section –B

Numerical:

Methods with Programming in Language 'C'

Numerical Solution of Algebraic & Transcendental equation: -

Bisection Method, Regula Falsi Method, Newton Raphson Method, Secant Method, Convergence of Secant Method, Rate of Convergence of Newton's Method & Condition of Convergence of Newton Raphson'sMethod.

Solution of Simultaneous Equations:

Crout's Triangularisation Method, Jacobi's Iteration Method, Gauss Seidal Iteration Method, Relaxation Method, Newton's Method for Non Linear System of equation & Iterative Methods.

Numerical Solution of Ordinary Differential Equation: -

Picard's Method, Euler's Method, Modified Euler Method, Euler's improved Method, Runge-Kutte Method,Milne's & Adams-Bashforth Predictor-Corrector Method.

Section-C

Finite Differences: -

Difference Operators, Newton Forward & Backward Interpolation formula, Gauss central difference formulae, Bessel & Stirling formulae, Lagrange's & Newton Divided Difference, Interpolation formula for Unequal intervals, Numerical Differentiation, **N**umerical

Integration – Trapezoidal rule, Simpson's 1/3 Rule & 3/8 rule, Weddle's Rule

Difference Equations:

Formation of Difference Equation, Solution of Linear Difference Equations.

Reference Books : -

1. Numerical Methods for Scientific & Engineering Computation by M K. Jain, R.K. Jain, S.R.K. Iyengar, New Age Publications.
2. Numerical Analysis By Goel & Mittal, Pragati Prakashan.
3. Higher Engg. Mathematics by B. S. Grewal.
4. Mathematical Analysis in Engg. By Cang C. Mai
5. Numerical Mathematical Analysis by James B. Scarborough

ET-403 -F **ELECTRONICS INSTRUMENTATION AND MEASUREMENTS**

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

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

Section-A

Measurements and error: Functional elements arid generalized configuration of a measuring Instrument, Characteristics of instruments, errors in measurements and their statistical analysis.

Measurements of resistance: Wheat stone bridge, Carey-Foster Bridge, Kelvin double bridge, Measurement of Insulation resistance.

Section-B

A-C brides: Maxwell Inductance bridge. Maxwell Inductance Capacitance Bridge, Anderson's Bridge,Hay's Bridge, De-Sauty's Bridge, Schering's bridge and Wein's bridge.

Voltage indicating and recording devices: Analog voltmeters and Potentiometers, Self balancing potentiometer and X-Y recorders, Galvanometers - Oscillographs, Cathode - Ray Oscilloscopes, Magnetic Tape Recorders.

Section-C

Electronic instruments: Wave analyzer, Distortion meter: Q-meter. Measurement of Op-Amp parameters.

Digital instruments: Digital Indicating Instruments, Comparison with analog type, digital display methods, digital methods of time and frequency measurements, digital voltmeters.

Section-D

Transducers: Classification of Transducers, Strain Gauge, Displacement Transducers – Capacitive Transducers, LVDT, Piezo-electric Transducers, Temperature Transducers - resistance thermometer,Thermocouples and Thermistors, Liquid level measurement Low pressure (vacuum) measurement.

Data acquisition system: A to D and D to A converters, Analog and Digital Data Acquisition Systems, Multiplexing, Spatial Encoders, Telemetry.

Text Book:

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

Reference Books:

1. Electronics Instrumentation and Measurement Techniques: Cooper W.D & Helfrick A.D.; PHI
2. Doeblin E.O., Measurement Systems: Application & Design, Mc Graw Hill.

ET-404-F **DIGITAL ELECTRONICS**

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

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

Section-A

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 codes.

Combinational design using GATES: Design using gates. Karnaugh map and Quine Mcluskey methods of simplification.

Section-B

Combinational design using MST devices: Multiplexers and Demultiplexers and their use as logic elements. Decoders. Adders / Subtracters. BCD arithmetic Circuits. Encoders. Decoders / Drivers for display devices.

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.

Section-C

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.

Section-D

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

PROGRAMMABLE LOGIC DEVICES:

ROM, PLA. PAL, Introduction to FPGA and CPLDs.

Text Book:

1. Modem 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,

ET-405-F **SIGNAL AND SYSTEMS.**

L	**T**	**P**
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

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

Section-A

Types of signals: Deterministic and Stochastic, periodic and a periodic, impulse functional sequences, analog and discrete, singular functions. Signal representation in terms of singular functions, orthogonal functions and their use in signal representation. Fourier series, Fourier and La-place transforms.Convolution theorem, geometrical interpretation and application.

Section-B

Probability concepts- Random variable, pdf, cdf, moments, distributions, correlation functions. Characterization of stochastic signals.

Discretisation of analog signals–sampling, sampling theorem and its proof. Effect of under sampling, recovery of analog signals from sampled signal. Characterization of Discrete signals – in terms of impulse sequences, Z-transforms. Properties, inversion and applications of La-place, Fourierand Z-transforms.

Section-C

Classification linear and non-linear, time invariant and time varying, Lumped and distributed. Deterministic and Stochastic. Casual and non causal, Analog and Discrete/Digital memory and memory less, 1 port and N – port, SISO, SIMO, MISO, MIMO.

Section-D

System modeling in terms of differential, equations, state variables, difference equations and transfer functions.Linear time invariant system properties, elementary idea of response determination to deterministic and stochastic signals. Concept of impulse response.

Reference books :

1. Fred J Taylor –"Principles of Signals and System", MGH.
2. Simon Haykins – "Signal & Systems", Wiley Eastern
3. A Papoulis – "Circuit and System" Modern Approach HRW

ET-406-F **FIELDS & WAVES**

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

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

Section-A

Electric field and current: Coulomb's law. Electric field intensity, field due to a continuous volume charge distribution, field of a line charge, field of a sheet of charge, electric flux density, Gauss's law and applications, electric potential, the dipole, current density, continuity of current, metallic conductors, conductor properties and boundary conditions, the method of images, the nature of dielectric materials, boundary conditions for perfect dielectric materials, capacitance of two wire line, Poisson's and Lap lace's equations, uniqueness theorem.

Section-B

Magnetic field and Maxwell equation: Biot - Savart law. Ampere's law, magnetic vector potentials, force on a moving charge, differential current element, force and torque on a closed circuit, the boundary conditions, the magnetic circuit, potential energy and forces on magnetic materials.Faraday's law, Maxwell's equations in point form and integral form Maxwell's equations for sinusoidal variations, retarded potentials.

Section-C

The uniform plane wave: Wave motion in free space and perfect dielectrics, plane waves in lossy dielectrics. The Poynting vector and power considerations, propagation in good conductors, skin effect, reflection of uniform plane waves, SWR.

Section-D

Transmission lines and waveguides: The Transmission line equations, graphical methods, Smith chart, time-domain and frequency-domain analysis. TE, TM, TEM waves, TE and TM modes in rectangular and circular waveguides, cut-off and guide wavelength, wave impedance and characteristic impedance, dominant modes, power flow in waveguides, excitation of waveguides, dielectric waveguides.

References Books: :

1 Jordan E C & Balmain K G, Electromagnetic Waves and Radiating Systems, PHI.
2 David K. Chang, Field and Waves Electromagnetics, Addison Wesley.
3 Hayt W H JR., Engineering Electromagnetics, Tata McGraw Hill, Fifth edition

ET-407 -F ELECTRONICS MEASUREMENTS LAB

L	T	P			
0	0	3	Class Work Marks	:	50
			Pract. Viva Marks	:	50
			Total Marks	:	100

LIST OF EXPERIMENTS:

1. To measure the unknown Inductance in terms of capacitance and resistance by using Maxwell's Inductance bridge.
2. To measure unknown Inductance using Hay's bridge.
3. To measure unknown capacitance of small capacitors by using Schering's bridge.
4. To measure 3-phase power with 2-Wattmeter method for balanced and unbalanced bridge.
5. To measure unknown capacitance using De-Sauty's bridge.
6. To measure unknown frequency using Wein's frequency bridge.
7. To measure unknown low resistance by Kelvin's Double bridge.
8. To test the soil resistance using Meggar (Ohm meter).
9. To calibrate Energy meter using standard Energy meter.
10. To plot the B-H curve of different magnetic materials.
11. To calibrate the Voltmeter using Crompton Potentiometer.
12. To convert the Voltmeter into Ammeter using Potentiometer.
13. Insulation testing of cables using Digital Insulation Tester.

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

ET-408 -F **DIGITAL ELECTRONICS LAB**

L	T	P
0	0	3

Class Work Marks : 50
Prac. Viva Marks : 50
Total Marks : 100

LIST OF EXPERIMENTS:

1. Familiarization with Digital Trainer Kit and associated equipment.
2. Study of TTL gates AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.
3. Design and realize a given function using K-Maps and verify its performance.
4. To verify the operation of Multiplexer and Demultiplexer.
5. To verify the operation of Comparator.
6. To verify the truth table of S-R, J-K, T, D Flip-flops.
7. To verify the operation of Bi-directional shift register.
8. To design and verify the operation of 3-bit asynchronous counter.
9. To design and verify the operation of synchronous Up/down counter using J-K flip-flops & drive a seven-segment display using the same
10. To design and verify the operation of asynchronous Decade counter.
11. Study of TTL logic family characteristics.
12. Study of Encoder and Decoder.
13. Study of BCD to 7 segment Decoder.

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

ET-412 -F **COMPUTATIONAL TECHNIQUES LAB**

L	T	P
0	0	3

Class Work Marks : 50
Pract.Viva Marks : 50
Total Marks : 100

List of Experiments

1. Solution of Non-Linear Equation in single variable using the method of successive Bisection.
2. Solution to non-linear equation in single variable using the Newton-Raphons method.
3. Solution to non linear equation in single variable using the Secant method.
4. Solution to a system of simultaneous algebraic equations using the Gaussian elimination procedure.
5. Solution to a system of simultaneous algebraic equations using the Gauss-Seidel iterative method.
6. Numerical solution to an ordinary differential equation using the Eulers method.
7. Numerical solution to an ordinary differential equation using the Range-Kutta Method.
8. Numerical solution to an ordinary differential equation using the Predictor Corrector Method.
9. Numerical Solution to the Laplace equation using the method of finite differences.
10. Solution to system of simultaneous equations using Gauss-Seidaliterative method employing the technique of successive relaxation.

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

ANTENNA AND WAVE PROPAGATION

ET-501-F

L T P	
3 1 0	Theory Marks : 100
	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section –A

Basic principles and definitions: Retarded vector and scalar potentials. Radiation and induction fields. Radiation from elementary dipole (Hertzian dipole, short dipole, Linear current distribution), half wave dipole, Antenna parameters: Radiation resistance, Radiation pattern, BeamWidth, Gain, Directivity, Effective height, Effective aperture, Bandwidth and Antenna Temperature.

Section-B

Radiating wire structures and antenna arrays: Folded dipole, Monopole, Biconical Antenna, Loop Antenna, Helical Antenna. Principle of pattern multiplication, Broadside arrays, End fire arrays, Array pattern synthesis, Uniform Array, Binomial Array, Chebyshev Array, Antennas for receiving and transmitting TV Signals e.g. Yagi-Uda and Turnstile Antennas.

Section-C

Aperture type antennas: Radiation from rectangular aperture, E-plane Horns, H-plane Horns, Pyramidal Horn, Lens Antenna, Reflector Antennas .

Broadband and frequency independent antennas: Broadband Antennas. The frequency independent concept : Rumsey's principle, Frequency independent planar log spiral antenna, Frequency independent conical spiral antenna and Log periodic antenna.

Section-D

Propagation of radio waves : Different modes of propagation, Ground waves, Space waves, Surface waves and Tropospheric waves, Ionosphere, Wave propagation in the ionosphere, critical frequency, Maximum Usable Frequency (MUF), Skip distance, Virtual height, Radio noise of terrestrial and extra terrestrial origin. Multipath fading of radio waves.

Text Books:

1. Robert E.Collin, Antenna & Wave Propagation, McGraw Hill
2. John D. Kraus, Antennas, McGraw Hill.
3. E.C.Jordan and K.G.Balmain, Electromagnetic Waves and Radiating Systems, PHI

COMPUTER HARDWARE DESIGN

ET-502-F

L T P	Theory Marks : 100
3 1 0	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section-A

Basic structure of computer hardware and software: Functional Sections, historical Perspective, Register transfer and micro-operations. Information representation, Instruction format, Instruction types, Addressing modes, Machine and Assembly Language programming, Macros and Subroutines.

Section-B

Processor design: Fixed – point and floating-point arithmetic addition, subtraction, Multiplication and division, Decimal arithmetic Section – BCD adder, BCD subtraction, decimal arithmetic operations, ALU design, Forms of Parallel processing classification of Parallel structures, Array Processors, Structure of general purpose Multiprocessors.
Control design: Hardwired Control: design methods, Multiplier Control Section, CPU Control Section, Micro programmed Control: basic concepts, Multiplier Control Section, Micro programmed Computers, CPU Control Section.

Section-C

Memory organization: Memory device characteristics,Random access memories: Semiconductor RAMS, Serial – access Memories – Memory organization, Magnetic disk memories, Magnetic tape memories, Optical memories, Virtual memory, Main Memory Allocation, Interleaved memory, Cache Memory, Associative Memory.

Section-D

System organization: Input-Output Systems – Programmed IO, DMA and Interrupts, IO Processors, Interconnection networks – single bus, crossbar networks, multistage networks, hypercube networks, mesh networks, Tree networks, ring networks, Pipelining – basic concept.

Text Books:

1. J.P.Hayes, Computer Architecture and Organization, Mc Graw Hill.
2. M.M. Mano , Computer System Architecture, PHI.
1. V.C.Hamacher, Z.G.Vianesic & S.G.Zaky, Computer Organization , Mc-Graw Hill.

INFORMATION THEORY AND CODING

ET-503-F

L T P	
3 1 0	

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

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

Section – A

Probability and random processes : Probability, random variables, Probability distribution and density functions, Joint Statistics, Conditional Statistics, independence, Functions of random variables & random vectors, Expectation, moments, Characteristic Functions, Convergence of a sequence of random variables, Central Limit Theorem, Random Processes, mean and Auto Correlation, Stationary ergodicity, Power Spectral density, Response of memory- less and linear systems, Gaussian Poisson, Markov processes.

Section – B

Elements of information theory and source coding: Introduction, information as a measure of uncertainty, Entropy, its properties, discrete memory less channels, Mutual information, its properties, BSC, BEC. Channel capacity, Shanon's theorem on coding for memory less noisy channels. Separable binary codes, Shanon–Fano encoding, Noiseless coding, Theorem of decodability, Average length of encoded message, Shanon's binary encoding, Fundamental theorem of discrete noiseless coding, Huffman's minimum redundancy codes.

Section – C

Linear block codes: Introduction to error control coding, Types of codes, Maximum Likelihood decoding, Types of errors and error control strategies, Galois fields, Linear block codes, Error detecting and correcting capabilities of a block code, Hamming code, cyclic code, B.C.H. codes.

Section – D

Convolutional codes and arq: Transfer function of convolutional code, Syndrom decoding, Majority logic decodable codes, Viterbi decoding, distance properties of binary convolutional codes, Burst error correcting convolutional codes, general description of basic ARQ strategies, Hybrid ARQ schemes.

Text Books:

1. Papoulis, A. Probability, Random Variables and Stochastic Processes, MGH.
2. Gray, R.M. Davission,L.D,Introduction to Statistical Signal Processing-
Web Edition-1999.
3. F. M. Reza, Information Theory, McGraw Hill.
4. Das, Mullick and Chatterjee, Digital Communication, Wiley Eastern Ltd.
5. Shu Lin and J. Costello, Error Control Coding, Prentice Hall.
6. B. R. Bhat, Modern Probability Theory, New Age International Ltd.

LINEAR IC APPLICATIONS

ET-504-F

L T P	
3 1 0	Theory Marks : 100
	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section-A

Differential and cascade amplifiers: Balanced, unbalanced output differential amplifiers, FET differential amplifier, current mirrors, level Translators, cascade configuration of amplifiers, operational amplifiers, Introduction to ideal OP-AMP, characteristic parameters, Practical OP-AMP, its equivalent circuit and op-amp circuit configurations.

Section-B

Op-amp with negative feedback and frequency response: Block diagram representation of feedback amplifier, voltage series feedback, voltage shunt feedback differential amplifiers, frequency response compensating network, frequency response of internally compensative op-amp and non compensating op-amp. High frequency op-amp equivalent circuit, open loop gain V/s frequency, closed loop frequency response, circuit stability, slew rate.

Section-C

Op-amp application: DC, AC amplifiers, peaking amplifier, summing, scaling, averaging and instrumentation amplifier, differential input output amplifier, voltage to current converter, current to voltage converter, very high input impedance circuit, integration and differential circuit, wave shaping circuit, active filters, oscillators.

Section-D

Specialized liner ic applications:555 timer IC (monostable & astable operation) & its applications , Universal active filter, PLL, power amplifier, 8038 IC.

Text Books:

1. R.A. Gayakwaed , OP-amps and Linear Integrated circuits .
2. K.R.Botkar , Integrated circuit

MICRO-ELECTRONICS

ET-505-F

L T P	Theory Marks : 100
3 1 0	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section-A

Crystal Growth: MGS, EGS, Czochralspi crystal Puller, Silicon shaping, Wafe Preparation.

Oxidation: Thermal Oxidation Kinetics, Oxidation Techniques, Oxide Properties, Oxidation induced defects. Thin film deposition techniques: Epitaxy, VDE, CVD, PECVD, MOCVD, PVD, Sputtering , MBE and epitaxial layer evaluations.

Section-B

LithoGraphy, Photolithography, E-beam lithography, X-ray Lithography, reactive Plasma Etching, Plasma Properties, Feature Size control and anisotropic etching, Plasma etching techniques and equipment.

Section-C

Diffusion : A Qualitative view of atomic diffusion in Solids, diffusion mechanisms, Fick's one dimensional diffusion equation, constant source and limited source diffusion, Diffusion of Grp3 and 5 impurities in Silicon Impurity Sources, diffusion apparatus, Characterization of diffused layers. Ion Implantation: Introduction, Range Theory, Implantation Equipment Annealing.

Section-D

Isolation Techniques, Bipolar IC fabrication Process Sequence, N-MOS IC fabrication Process Sequence. C-MOS IC fabrication Process Sequence .Assembly & Packaging: Package Types, design considerations, Package fabrication technologies, Future trends reference to MEMS packaging.

Text Books:

1. S.M.Sze, VLSI Technology, Mc Graw Hill.
2. S.K.Ghandhi, VLSI Fabrication Principles.

MICROPROCESSORS AND INTERFACING

ET-506-F

L T P	
3 1 0	Theory Marks : 100
	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section-A

Introduction : Evolution of microprocessors, technological trends in microprocessor development. The Intel family tree. CISC Versus RISC. Applications of Microprocessors.

8086 cpu architecture: 8086 Block diagram; description of data registers, address registers; pointer and index registers, PSW, Queue, BIU and EU. 8086 Pin diagram descriptions. Generating 8086 CLK and reset signals using 8284. WAIT state generation. Microprocessor BUS types and buffering techniques, 8086 minimum mode and maximum mode CPU module.

Section-B

8086 instruction set: Instruction formats, addressing modes, Data transfer instructions, string instructions, logical instructions, arithmetic instructions, transfer of control instructions; process control instructions; Assembler directives.

8086 programming techniques : Writing assembly Language programs for logical processing, arithmetic processing, timing delays; loops, data conversions. Writing procedures; Data tables, modular programming. Macros.

Section-C

Main memory system design :Memory devices, 8086 CPU Read/Write timing diagrams in minimum mode and maximum mode. Address decoding techniques. Interfacing SRAMS; ROMS/PROMS. Interfacing and refreshing DRAMS. DRAM Controller – TMS4500.

Section-D

Basic i/o interface : Parallel and Serial I/O Port design and address decoding. Memory mapped I/O Vs Isolated I/O Intel's 8255 and 8251- description and interfacing with 8086. ADCs and DACs, - types, operation and interfacing with 8086. Interfacing Keyboards, alphanumeric displays, multiplexed displays, and high power devices with 8086.

Interrrupts and dma: Interrupt driven I/O. 8086 Interrupt mechanism; interrupt types and interrupt vector table. Intel's 8259. DMA operation. Intel's 8237. Microcomputer video displays.

Text Books:

1. D.V.Hall , Microprocessors and Interfacing , McGraw Hill 2
2. J Uffenbeck , The 8086/8088 family , (PHI).
3. Liu,Gibson , Microcomputer Systems – The 8086/8088 family

LINEAR INTEGERATED CIRCUITS (PR.)

ET-507-F

L T P

0 0 3

Class Work Marks:50
Pract Viva Marks : 50
Total Marks : 100

LIST OF EXPERIMENTS

1. To study OP-AMP as adder and sub tractor circuits(IC-741).
2. To study clipping circuits using OP-AMP(IC-741).
3. To study clamping circuits using OP-AMP(IC-741).
4. To study OP-AMP as Schmitt trigger(IC-741).
5. To study an instrumentation amplifier using OP-AMP(IC-741).
6. Study of current to voltage and voltage to current converter using OP AMP(IC-741).
7. To study Astable multivibrator circuit using timer IC-555.
8. To study monostable multivibrator circuit using timerIC-555.
9. To study Voltage Controlled Oscillator using timer IC-555.
10. To study Frequency divider using IC-555.
11. To design 2 order low pass butterworth filter
12. To design 2 order high pass butterworth filter.

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

MICROPROCESSORS (PR.)

ET-508-F

L T P
0 0 3

Class Work Marks:50
Pract Viva Marks : 50
Total Marks : 100

Before starting with the experiments, teacher should make the students conversant with the
following essential theoretical concepts.

A. i) Programming Model of Intel's 8086.
ii) Addressing Modes of Intel's 8086.
iii) Instruction formats of Intel's 8086

B. Instruction set of Intel's 8086.
C. Assembler , and Debugger.

LIST OF EXPERIMENTS:

1. a) Familiarization with 8086 Trainer Kit.
b) Familiarization with Digital I/O, ADC and DAC Cards.
c) Familiarization with Turbo Assembler and Debugger S/Ws.
2. Write a program to arrange block of data in
i) ascending and (ii) descending order.
3. Write a program to find out any power of a number such that $Z = X^N$. Where N is programmable and X is unsigned number.
4. Write a program to generate.
i) Sine Waveform (ii) Ramp Waveform (iii) Triangular Waveform Using DAC Card.
5. Write a program to measure frequency/Time period of the following functions.
(i) Sine Waveform (ii) Square Waveform (iii) Triangular Waveform
using ADC Card.
6. Write a program to increase, decrease the speed of a stepper motor and reverse its direction of rotation using stepper motor controller card.
7. Write a programmable delay routine to cause a minimum delay = 2MS and a maximum delay = 20 minutes in the increments of 2 MS
8. a) Use DOS interrupt to read keyboard string/character.
b) Use BIOS interrupt to send a string/character to printer.
9. Write a program to :
i) Create disk file.

ii) Open, write to and close- a disk file.
iii) Open, read from and close a disk file.
iv) Reading data stamp of a file using BIOS interrupt.

10. i) Erasing UVPROMs and EEPROMs
ii) Reprogramming PROMs using computer compatible EPROM Programmer.

11. Studying and Using 8086 In-Circuit Emulator.

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

FUNDAMENTALS OF MANAGEMENT

ET-601-F

L T P	Theory Marks : 100
3 1 0	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section-A

Financial Management: Introduction of Financial Management, Objectives of Financial Decisions, Status an duties of Financial Executives. Financial Planning – Tools of financial planning. Management of working capital, Factors affecting requirements of working capital.Capital structure decisions. Features of appropriate capital structure. Sources of finance.

Section-B

Personnel Management: Personnel Management – Meaning, Nature and Importance; Functions of Personnel Management – (a) Managerial Functions and (b) Operative functions. Job Analysis:Meaning and Importance; Process of Job Analysis; Job Description and Jobspecification.Human Resource Development-Meaning and concept.

Section-C

Production Management: Production Management: Definition and Objectives Plant location: Ideal plant location. Factors affecting plant location.

Plant Layout : Ideal plant layout, factors affecting plant layout.

Work Measurement : Meaning, Objectives and Essentials of work Measurement.Production **Control** : Meaning and importance of production control and steps involved in production control.

Section-D

Marketing Management: Nature, scope and importance of marketing management.Modern Marketingconcepts. Role of marketing in economic development. Marketing Mix. MarketingInformation System. Meaning, nature and scope of International Marketing.

Text Books:

1. Business Environment – Francis Charurilam (Himalaya Publishing House).
2. Management – Harold, Koontz and Cyrilo' Donell (Mc Graw Hill)
3. Principles of Personnel Management – Edwin B. Flippo (Mc Graw Hill)
4. Personnel Management and Industrial Relations – D.C. Sharma and R.C. Sharma(SJ Publications, Meerut)
5. Basic Marketing – Cundiff and Still (PHI, India)
6. Marketing Management – S.A. Sherlekar (Himalaya Publishing House Bombay)
7. Principles and Practice of Management – L.M. Prasad
8. Financial Management – I.M. Pandey (Vikas Publishing House, New Delhi)
9. International Marketing – Vorn terpestre and Ravi Sasathy.
10. Production Management – E.S. Buffa & W. H. Tausart, Richand D. Irwin, Homewood, Illionis.
11. Personnel Management – C.B. Mamoria, (Himalaya Publishing House)

CONTROL SYSTEM ENGINEERING

ET-602-F

L T P	Theory Marks	: 100
3 1 0	Class Work Marks	: 50
	Total Marks	: 150
	During of exam	: 3Hrs

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

Section-A

Introduction: The control system-open loop & closed loop, servomechanism, stepper motor.

Mathematical models of physical systems: Differential equation of physical systems, transfer function, block diagram algebra, signal flow-graphs , Mason's formula & its application.

Feedback characteristics of control systems: Feedback and non-feedback systems, Effects of feedback on sensitivity (to parameter variations), stability, overall gain etc.

Section-B

Time response analysis: Standard test signals, time response of first order and second order systems, steady-state errors and error constants, design specification of second-order-systems.

Stability:The concept of stability ,nITssary conditions for stability, Hurwitz stability criterion, Routh stability criterion, Relative stability analysis.

The root locus technique:The Root locus concept, construction /development of root loci for various systems, stability considerations.

Section-C

Frequency response & stability analysis: Correlation between time and frequency response, Polar Plots, Nyquist plots, Bode Plots, Nyquist stability criterion, Gain margin & Phase margin, relative stability using Nyquist Criterion, frequency response specifications.

Section-D

Compensation of control systems: Necessity of compensation, Phase lag compensation, phase lead compensation , phase lag lead compensation, feedback compensation .

State variable analysis : Concept of state,state variable and state model, state models for linear continuous time systems, diagonalization solution of state equations, concept of controllability and observability.

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.Ogata; PHI.
3. Control Systems: Principles & Designing : Madan Gopal; TMH.

VHDL AND DIGITAL DESIGN

ET-603-F

L T P	Theory Marks : 100
3 1 0	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section-A

Introduction: History. Why use VHDL ? Hardware design construction, design levels, HDLs Hardware simulation and synthesis. Using VHDL for design synthesis, terminology.

Programmable logic devices :Why use programmable logic ? What is a programmable logic device ? Block diagram, macrocell structures and characteristics of PLDs and CPLDs. Architecture and features of FPGAs. Future direction of programmable logic.

Section-B

Behavioral modeling:Entity declaration, architecture body, process statement, variable assignment, signal assignment. Wait, If, Case, Null, Loop, Exit, Next and Assertion statements. Inertial and transport delays, Simulation deltas, Signal drivers.

Data flow and structural modelling: Concurrent signal assignment, sequential signal assignment, Multiple drivers, conditional signal assignment, selected signal assignment, block statements, concurrent assertion statement, component declaration, component instantiation.

Section-C

Generics and configurations :Generiecs, Why configurations ?, default configurations, component configurations. Generiecs in configuration. Generic value specification in architecture, block configurations, architecture configurations.

Subprograms and packages :Subprograms – functions, procedures, declarations. Package declarations, package body, use clause, predefinal package standard. Design libraries, design file.

Section-D

Advanced topics :Generate Statements, Aliases, Qualified expressions, Type conversions, Guarded signals, User defined attributes, Predefined attributes., VHDL synthesis.

Text Books

1. D. Perry , VHDL, 3 Ed.- TMH.
2. J.Bhasker, A.VHDL- Primer, PHI.
3. Skahil, VHDL for Programmable logic-2 Ed – Wiley.

DIGITAL SIGNAL PROCESSING

ET-604-F

L T P	
3 1 0	Theory Marks : 100
	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section-A

Discrete transforms: Z- transform and its properties, Inversion of Z-transform, One sided Z-transform and solution of differential equations. Analysis of LTI systems in Z-domain, causality, stability, schur-cohn stability test; relationship between Z-transform and Fourier transform. Frequency selective filters; all pass filters, minimum-phase, maximum-phase and mixed-phase systems. Frequency domain sampling and DFT; properties of DFT, Linear filtering using DFT, Frequency analysis of signals using DFT, radix 2, radix-4, goertzel algorithm, Chirp Z-transform, applications of FFT algorithm, computation of DFT of real sequences. Quantization effects in computation of DFT.

Section-B

Implementation of discrete time systems: Direct form, cascade form, frequency sampling and lattice structures for FIR systems. Direct forms, transposed form, cascade form parallel form. Lattice and lattice ladder structures for IIR systems. State space structures Quantization of filter co-efficient structures for all pass filters.

Section-C

Design of fir filters: Characteristics of practical frequency selective filters. Filters design specifications peak pass band ripple, minimum stop band attenuation. Four types of FIR filters Design of FIR filters using windows. Kaiser window method comparison of design methods for FIR filters Gibbs phenomenon, design of FIR filters by frequency sampling method, design of optimum equiripple FIR filters, alternation theorem.

Section-D

Design of iir filters: Design of IIR filters from analog filters, Design by approximation of derivatives, Impulse invariance method bilinear transformation method characteristics of Butterworth, Chebyshev, and Elliptical analog filters and design of IIR filters, Frequency transformation, least square methods, design of IIR filters in frequency domain.

Text Books:

1. John G. Proakis, Digital Signal Processing, PHI
2. S. K. Mitra, Digital Signal Processing , TMH
3. Rabiner and Gold, Digital Signal Processing, PHI
4. Salivahan, Digital Signal Processing , TMH
5. Digital Signal Processing: Alon V. Oppenhelm;PHI

DIGITAL COMMUNICATION

ET-605-F

L T P	Theory Marks : 100
3 1 0	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section-A

Pulse modulation: sampling process, PAM and TDM; aperture effect. PPM noise in PPM, channel Bandwidth, Recovery of PAM and PPM signals Quantization process, quantization noise, PCM, μ Law and A- law compressors. Encoding, Noise in PCM, DM, delta sigma modulator, DPCM, ADM.

Section-B

Base band pulse transmission: Matched filter and its properties average probability of symbol error in binary enclosed PCM receiver, Intersymbol interference, Nyquist criterion for distortionless base band binary transmission, ideal Nyquist channel raised cosine spectrum, correlative level coding Duo binary signalling, tapped delay line equalization, adaptive equalization, LMS algorithm, Eye pattern.

Section-C

Digital pass band transmission: Pass band transmission model; gram Schmidt orthogonalization procedure, geometric Interpretation of signals, Response of bank of correlaters to noise input, detection of known signal in noise, Hierarchy of digital modulation techniques, BPSK, DPSK, DEPSK, QPSK, systems; ASK, FSK, QASK, Many FSK, MSK, Many QAM, Signal space diagram and spectra of the above systems, effect of intersymbol interference, bit symbol error probabilities, synchronization.

Section-D

Spread spectrum modulation: Pseudonoise sequence, A notion of spread spectrum, direct sequence spread spectrum with coherent BPSK, signal space dimensionality & processing gain, probability of error, frequency spread spectrum, CDM.

Text Books:

1. John G. Proakis, Digital Communication, PHI
2. Taub & Schilling, Principles of Communication, TMH
3. Simon Haykin, Communication systems, John Wiley & Sons

COMPUTER COMMUNICATION NETWORKS

ET-606-F

L T P
3 1 0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

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

Section-A

Introduction: Uses of Computer Networks, Network Hardware, Network Software, Reference models, Examples of Networks & Data communication Services, Network Standardization.

The physical layer: The Theoretical basis for Data communication, Transmission media, Wireless Communication, The Telephone System, Narrowband ISDN, Broadband ISDN and ATM, Cellular Radio, Communication Satellites.

Section-B

The data link layer: Data Link Layer Design issues, Error Detection & correction, Elementary Data Link protocols, Sliding Window Protocols, Protocol Specification & Verification, Example of Data Link Protocols.

The medium access sublayer: Aloha Protocols, LAN Protocols, IEEE Standards, Fiber optic Networks, Satellite Networks, Packet switching, radio Networks.

Section-C

Network layer: Design issues, routing algorithms, congestion control Algorithms, internetworking.

Transport & session layer: Protocol design issues, connection Management, remote procedure calls.

Section-D

Presentation layer: Design issues, abstract Syntax notation, data compression technique, cryptograph.

Application layer: Design issues, file transfer, access and management, electronic mail, virtual terminals, applications and examples.

Text Books :

1. Tanenbaum A.S, Computer Networks, PHI.
2. Forouzan B.A, Data Communications and Networking, Tata-Mc-Graw Hill.
3. Stallings W, Data and Computer Communications, PHI.
4. Ahuja V, Design and Analysis of Computer Communication, McGraw Hill.
5. Bee K.C.S, Local Area Networks, NCC Pub.
6. Davies D. W. Barber, Computer Networks and their Protocols, John Wiley.

DIGITAL COMMUNICATION PRACTICAL

ET-607-F

L T P
- - 3

Class Work Marks:50
Pract Viva Marks : 50
Total Marks : 100

LIST OF EXPERIMENTS:

1. To Study PSK
2. To Study FSK
3. To Study IF Amplifier
4. To Study Balanced Modulator & Demodulator
5. To Study PCM
6. Setting up a Fiber Optic Analog Link
7. Setting up a Fiber Optic Digital Link
8. Losses in Optical Fiber
9. Measurement of Numerical Aperture
10. Time Division multiplexing of signals.

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

ELECTRONICS DESIGN PRACTICAL

ET-608-F

L T P
0 0 3

Class Work Marks:50
Pract Viva Marks : 50
Total Marks : 100

LIST OF EXPERIMENTS:

1. Design a single stage R C Coupled amplifier and plot its gain frequency response.
2. Design a two stage R C Coupled amplifier and plot its gain frequency response.
3. Design a R C Phase shift oscillator using IC 741.
4. Design a wein bridge oscillator.
5. Design a square wave generator using IC 555.
6. Design a 4 : 1 multiplexer and 1 : 4 demultiplexer using logic gates.
7. Design a parallel parity bit generator using ICs.
8. Design a digital to analog converter using ICs.
9. Design a digital frequency meter (0-999HZ) using IC 555 for monoshot, IC-7404,7408,7490,7447.
10. Design a controller such that LEDs glow in pairs sequentially using IC 7490 and LEDs.

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

VHDL PRACTICAL

ET-609-F

L T P
0 0 3

Class Work Marks:50
Pract Viva marks : 50
Total Marks : 100

LIST OF EXPERIMENTS:

1. Write a VHDL Program to implement a 3 :8 decoder.
2. Write a VHDL Program to implement a 8:1 multiplexer using behavioral modeling.
3. Write a VHDL Program to implement a 1 :8 demultiplexer using behavioral modeling.
4. Write a VHDL Program to implement 4 bit addition/subtraction.
5. Write a VHDL Program to implement 4 bit comparator.
6. Write a VHDL Program to generate Mod- 10 up counter.
7. Write a VHDL Program to generate the 1010 sequence detector. The overlapping patterns are allowed.
8. Write a program to perform serial to parallel transfer of 4 bit binary number.
9. Write a program to perform parallel to serial transfer of 4 bit binary number.
10. Write a program to design a 2 bit ALU containing 4 arithmetic & 4 logic operations.

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

VLSI DESIGN

ECE-701-F

L T P	Theory Marks : 100
3 1 0	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section: A

NMOS & CMOS Fabrication Process Sequence, Basic electrical properties of NMOs CMO Sinverters, MOS Design Process: Stick Diagram & Design rules.

Section: B

Delay in MOS Circuits, Scaling of MOS Circuits, Some design examples, inverter, NAND gates,Multiplexer, Logic Function Block.Introduction to physical design of IC's Layout rules & circuit abstractor, Cell generation, Layout environments, Layout methodologies, Packaging, Computational Complexity, Algorithmic Paradigms.

Section: C

Placement: Partitioning, Floor planning, Placement.Routing: Fundamentals, Global Routing, Detailed Routing, Routing in FPGA's.

Section: D

Perfoffi1ance issues in Circuit Layout Delay models, Timing Driven placement, Timing DrivenRouting, Via Minimization, Power Minimization, other issues

Text Books:

1.Puchnell DA & Eshraghian K, Basic VLSI Design , PHI

2.John P. Uyemura , Introduction to VLSr circuits and systems, John Wiley

TELEVISON ENGINEERING

ET-702-F

L T P	Theory Marks : 100
3 1 0	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section-A

Elements of a television system: Picture transmission, sound transmission, picture reception.sound reception synchronization, receiver controls. Analysis and Synthesis of Television Pictures: Gross structure, image continuity, no. of scanning lines, flicker, fine structure, tonal gradation.Composite Video signal, channel B.W. Vestigial side band transmission and reception, TV standards.

Section -B

The picture tube: Monochrome picture tube, Beam deflection, screen phosphor, face plate,picture tube characteristics, picture tube circuit controls.Television Camera Tubes: Basic principal,Image orthicon, Vidicon, plumbicon. MONOCHROME SIGNAL TRANSMISSION AND RECEPTION :Block diagram of Monochrome Signal Transmitter and Receiver, Explanation of different sections, Transmitting and receiving antennas.

Section -C

Elements of colour tv :Introduction, compatibility considerations, Interleaving process, Three color theory, Chrominance Signal, composite color signal, comparison of NTSC, PAL and SECAM Systems.color television display tubes (Delta gun, PIL, Trinitron).Color signal transmission, bandwidth for color signal transmission.

Section - D

Adv anced topics in tv. Engineering :Introduction, & working and block diagram of the Projector TV, 3D-TV, HDTV, Digital TV, Camcorders.TELEVISION APPLICATIONS: Cable television, CCTV, picture phone & fascimile, television via
satellite, Remote Control (Electronic control system), Introduction to Digital TV Technology and their merits.

Text Books:

1.AM Dhake, Monochrome and Colour TV, TMH
2.R.R.Gulati, Colour TV.Engg. Wiley Eastern Ltd.
3.SP Bali, Colour TV theory & practice, TMH
4.Merrill!. Skolnik, lntroducion to Radar, Systems, TMH

OPTICAL COMMUNICATION

ET-703-F

L T P	Theory Marks	: 100
3 1 0	Class Work Marks	: 50
	Total Marks	: 150
	During of exam	: 3Hrs

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

Section-A

Introduction: Propagation within the fiber, Numerical aperture of fiber, diffraction, step index and graded index fiber, Modes of propagation in the fiber, Single mode and multi mode fibers. Splices and connectors.

Section -B

Losses in optical fiber: Rayleigh Scanering Losses, Absorption Losses, Leaky modes, mode coupling losses, Bending Losses, Combined Losses in the fiber.DISPERSION EFFECT: Effect of dispersion 011 the pulse transmission Intermodal dispersion, Material dispersion, Wave guide dispersion, Total dispersion, Transmission rate.

Section -C

Light sources: LEDS, Laser Action in semiconductor Lasers, Semiconductor Lasers for optical communication - Laser modes, Spectral Characteristics, Power Voltage Characteristics, Frequency response. DETECTORS: P-I-N Photodiode, APD Noise Analysis in detectors, Coherent and non-coherent detection, The fiber-optic Communication System, Infrared sensors(eg: TSOP 1738).

Section -D

Optical networks: Optical coupler, space switches, linear divider-combiners, wavelength division multiplexer and de-multiplexer, optical amplifier, optical link network-single hop ,multi-hop, hybrid and photonic networks.

Text Books :

1. John Power, An Introduction to Fiber Optic System, McGraw Hill International.
2. John Gowar, Optical communication Systems.
3. R. Ramaswamy, Optieal Networks, Narosa Publication

MICROWAVE ENGINEERING

ET-704-F

L T P	Theory Marks : 100
3 1 0	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section -A

Microwave resonators: Brief description of waveguides, coplanar waveguides, cavity resonators: rectangular, cylindrical, spherical and coaxial, excitation and coupling of cavities, Q factor.MICROWAVE MEASUREMENTS: Measurement of frequency, impedance (using slotted section)attenuation, power, dielectric constant, measurement of V.S. W. R., insertion loss and permeability

Section -B

Microwave generators: Construction, characteristics, operating principle and typical applications of Klystron(two cavity, multifamily), Reflex Klystron, magnetron (Cylindrical magnetron and description of n mode applications) and Traveling Wave Tube(TWT).

Section -C

Matrix description of microwave circuits: Scattering matrix-its properties,measurement of scattering coefficients, of scattering coefficients, scattering matrices for common microwave systems.MICROWAVE COMPONENTS: Waveguide tees. E-plane, H-plane, magic tee, rat race,directional coupler, tuning screwsand stubs, isolators and circulators-their constructional features and applications. Microwave filters, Phase shifters, attenuators, Wavemeters.

Section -D

Solid state microwave devices:Tranferred electron devices- GUNN EFFECT; negative diffrerential resistance phenomenon, field domam formation. GUNN diode structu"e. Avalanche transit time devices:, IMPATT, TRAPATT, BARITT diodes, Parametric amplifiers.

Text Books :

1. Samuel Y. Liao, Microwave Devices and Circuits, Prentice-Hall of India.
2. David M. Pozar, Microwave Engineering, John Wiley and sons Inc.
3. Das, Annapurna & Sisir K. Das, Microwave Engineering, Tata McGraw-Hili

DIGITAL SIGNAL PROCESSING PRACTICAL

ET-705 -F
L T P
0 0 3

Class Work Marks:50
Pract. Viva Marks: 50
Total Marks: 100

LIST OF EXPERIMENTS:

1. Define a function to compute DTFT of a finite length signal. Plot the magnitude and phase plots using subplots. Use this function to obtain DTFT of a 21 point triangular pulse over the domain 10<n<10: Plot the results over.
2. Write a program to plot the following functions: a)impulse function b)unit step c)unit ramp d) exponential e) sinusoidal
3. Verify the Symmetry, time shifting and modulating properties of DTFT with a rectangular pulse of length 21.
4 Study the aliasing effect by using a Sinusoidal Signal. Show the plots of' continuous time Signal. Sampled Signal and reconstructed signals by using subplot.
5. Study different window functions available in signal processing toolbox and their Controlling parameters.
6. Write a program to plot real, imaginary phase and magnitude of exponential function.
7 Verify the properties of Discrete Fourier Transform (DFT).
8 Write a program to find the convolution of two sequences using in built convolution function
9 Study of Digital Signal Processing Kit (TMSI ADSP)
10. Implementation of FlR/digital filter using DSP Kit.

NOTE: At least 10 experiments are to be performed with atleast 7 from above list, remaining 3 may either be perfol111ed from the above list or designed & set by concerned institution as per the scope of the syllabus.

MICROCONTROLLER

ET-720-F

L T P	Theory Marks : 100
3 1 0	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section A

Introduction :Comparing Microprocessors andMicrocontrollers. Technological trends in Microcontrollers development. .survey of microcontrollers- 4 bit, 8 bit, 16 bit, 32 bit microcontrollers.Applications of microcontrollers.

Section B

8051 architecture :Block diagram, pin.Diagram of 8051.Functional descriptionsof internal units, registers, PSW, internal RAM, ROM, Stack, Oscillator and Clock. *U* Pins.Connecti external memory. Counters and timers. Serial data interrupt Serial data transmission Ireception and transmission modes. Timer flag interrupt. External interrupt,software generated interrupts. External memory and memory space decoding, expanding I/Os, memory mapped I/O Reset& ClK Circuits.

Section C

8051 instruction set and programming :8051 Instruction syntax, addressing modes, Data transfer instructions, logical instructions, arithmetic instructions, Jump and Call instructions. Interrupts and interrupt handler subroutines. Writing assembly Language programs. Time delays. Pure SlW time delays. S/W polled timer. Pure HIW delay. Lookup tables. Serial data transmission using time delays and polling. Interrupt driven serial transmission and reception.

Section D

8051 applications: Interfacing Keyboards Programs for small keyboards and matrix keyboards.Interfacing multiplexed displays, numeric displays and LCD displays. Measuring frequency and pulse width. Interfacing ADCs & DACs. Hardware circuits for handling multiple interrupts. 8051 Serial data communication modes- Mode 0, Mode I, Mode 2 and Mode 3.

Text Books :

1.KJ.A:ala, The 8051 Microcontroller - 2'd cd. Penram International.
2.Intel's manual on " Embedded Microcontrollers"

RELIABILITY

ET-722-F

L T P	
3 1 0	Theory Marks : 100
	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section A

Introduction: Definition of reliability, failure data analysis, mean failure ratio, MTTF, MTBF,graphical plot, MITF in terms of failure density, generalization, reliability in terms of failure density(integral form), reliability in other situation. HAZARD MODELS: Introduction, constant hazard linearly increasing hazard, Weibull model, on density function and distribution function, and reliability analysis, important distribution and its choice, expected value, standard deviation and variance, theorem concerning expectation and variance.

Section B

System reliability: Introduction, series system with identical component, reliability bounds classical approach Bayesian approach application of specification hazard models, an r-out-of-an structure methods for solving complex system, systems not reducible to mixed configuration, mean time to failure system, logic diagrams, Markov model and graph.

Reliability improvement and fault tree analysis: Introduction, improvement by component, redundancy, element redundancy, unit redundancy, optimization, stand by redundancy. Reliability cost trade off, fault tree construction, calculation of reliability from fault tree.

Section C

Maintainability, a v ailabity and repairable system: Introduction, maintainability, availability, system down time, reliability and maintainability trade off, instantaneous repair rate MITR, reliability and availability function.

BA YESIAN approximation and rellablty estimation: Introduction, Lindley's expansion, reliability estimation, normal, Weibull, inverse gaussian and Rayleigh.

Section D

Reliability allocation and application: Reliability allocation for a series system, approximation of reliability in a computer system and nuclear power plant, failure models and Effects analysis (FMEA)

Text Books :

1.S.K.Sinha, Reliability and life testing, (WEL New Delhi).
2.LASrinalh, Reliability engineering, (EWP New Delhi)
3.Bal Guru Swami, Quality control and Reliability, (Khanna publisher New Delhi).

NANOTECHNOLOGY

ET-724-F

L T P	Theory Marks : 100
3 1 0	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section A

Introduction to Nanotechnology, review of various techniques and tools, future prospects of nanotechnology, applications.

Section B

Synthesis techniques of clusters, nanoparticles : classical nucleation theory for cluster formation, sputtering and thermal evaporation and laser methods for nanoparticles' synthesis, particle synthesis by chemical routes.Synthesis of semiconductor nanoclusters.

Section C

Properties of nanostructured materials: Magnetic properties, electrical transport properties, non-linear optical properties.Special nanomaterials Porous silicon nanostructures - formation, optical properties; Fullerones - synthesis, properties and application.

Section D

Nano electronics - Nanodevices, nanotransistors, nanoelectro optics, Nano structures in electronics.

Text Books :

1. Camarata, R.C, Nanomaterials synthesis, properties and application. Institute of Physics Publication.
2. Madou. Fundamentals of microf2lbrication, Mcgraw Hill.
3. Sibelia, J.P , A Guide!O material characterization, Prentice Hall.

ADVANCED MICROPROCESSOR

ET-726-F

L	**T**	**P**
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

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

Section-A

Intel's x86 family :Introduction, Register set, data formats, addressing modes, interrupts, memory hierarchy, pipelining, segmentation, paging, real and virtual mode execution, protection mechanism, task management.

Section -B

Architecture of intel x86 f amil y :CPU block diagrams, Pin diagrams and internal descriptions of -80286.386,486 and Pentium. Instruction formats. Intel X86 Instruction set. Assembler directives.

Section -C

Arithmetic co-processors: Data formats; 80287 architecture - Pin diagram, internalarchitecture, status register, control register; tag register. Instruction set - data transfer, arithmetic,comparison, transcendental operations, constant operations and control instructions. Interfacing 80287 with 80286 Programming examples.

Section -D

Higher- co-processors : Introduction to 80387,80487

Text Books :

Daniel Tabak, Advanced Microprocessors (2nd cd) Mc Graw Hill Pub.
Barry B.Brey, The Intel Microprocessors (4''' ed) PHI Pub. ,
DV-Hall, Microprocessors & Interfacing (2nd ed) Mc Graw Hill Pub

ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEMS

ET-728-F

L T P	
3 1 0	Theory Marks : 100
	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section-A

Introduction: - Definition of AI, evolution of Computing, History of AI, Classical, Romantic and Modem period, subject area, Architecture of AI machines, logic family, conclusion. Production System: - Production rules, the working memory, Recognize-act cycle, conflict resolution strategies, refractoriness, Regency, specificity, alternative approach for conflict resolution, Architecture of production system, conclusion.

Section-B

Prepositional Logic: - Proposition, tautologies, Theorem proving in prepositional logic, Semantic method of theorem proving, forward chaining, backward chaining, standard theorems in prepositional logic, method of Substitution, theorem proving using Wang's algorithm conclusion, Predicate logic: - Alphabet of first order logic (FOL), predicate, well formed formula, clause torm, algorithm for writing sentence into clause form, inflict of predicates, unification algorithm, resolution Robinson's inference rule, conclusion.

Section -C

Logic Programming and Prolog: - Logic program, Horn clause, program for scene interpretation, unification of goals, definite perform clause, SLD resolution, SLD tree, controlling back tracking,common use of cut, implementation of backtracking using stack, risk of using cuts, fail predicate, application of cut-fail combination, replace cut-fail by not, conclusion. Default & Non monotonic reasoning: - Axiomatic theory, non-atomic reasoning using N\1L-I, problems with NML-I, reasoning with NML-II, truth maintenance system with example. conclusion.

Section -D

Imprecision & Uncertainty: - Definition, Probabilistic technicians, Fuzzy reasoning, certainty factor based reasoning conditional probability, Baye's Theorem and its limitations, Rayesian belief network, propagation of belief, Dempster-Shafer theory of uncertainty management, belief interval, Fuzzy ration, inverse Fuzzy relations, Fuzzy post inverse, Fuzzy Inversion scope of neural network, EX-OR classifier, clustering by neural network, function approximation by neural net, retrieval of content, Fuzzy association memory, cognitive reasoning using fuzzy neural net, Hebbian learning, stability analysis.

Intelligent Search Technique: - Heuristic function, AND-OR graph, Heuristic search, A'algorithm and examples.

Text Books:

E.Chamiak & D. McDermott, Introduction to Artificial Intelligence, Addison Wesley Longman

POWER ELECTRONICS

ET-730 -F

L T P	
3 1 0	Theory Marks : 100
	Class Work Marks : 50
	Total Marks : 150
	During of exam : 3Hrs

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

Section A

Introduction : Role of power electronics, review of construction and characteristics of power diode, Schottky diode, power transistor, power MOSFET, SCR, DlAC, Triac, GTO, IGBT & SIT.SCR: Ratings and protections, series and parallel connections, R, RC and UJT firing circuit and other firing circuits based on ICs and microprocessors

Section B

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 *I* dual converter, power factor improvement techniques, forced commutated converter, MOSFET and transistor based converters.

Section C

Inverters :Basic circuit. 120 degree mode and 1&0 degree mode conduction schemes, modified McMurray half bridge and full bridge inverters, McMurray -Bedford half bridge and bridge inverters, brief description of parallel and series inverters, current source inverter (CSI), transistor and MOSFET based inverters.

Section D

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

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

Text Books :

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

ET-830-F TRANSDUCERS AND THEIR APPLICATIONS

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

Note: For setting up question paper, Question 1 will be setup from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question which is compulsory and one question from each of the for section. Thus students will have to attempt five questions out of nine.

Section-A

Definition of transducer, Advantages of an electrical signal as out-put. Basic requirements of transducers, Primary and Secondary Transducer, Analog or digital types of transducers. Resistive, inductive, capacitive, piezoelectric, and photoelectric and hall effect transducers.

Section-B

Measurement of pressure – Manometers, Force summing devices and electrical transducers.

Measurement of temperature – Metallic resistance thermometers, semi conductor resistance sensors (Thermistors), thermo-electric sensors, pyrometers

Section-C

Measurement of displacement – Potentiometric resistance type transducers, inductive type transducers, differential transformer (L.V.D.T), capacitive transducers, Hall Effect devices, strain gage transducers.

Measurement of velocity – variable reluctance pick up, electromagnetic tachometers, photoelectric tachometer, toothed rotor tachometer generator.

Section-D

Measurement of Force – Strain-gage load cells, pneumatic load cell, LVDT type force transducer.

Measurement of Torque – Torque meter, torsion meter, absorption dynamometers, inductive torque transducer, digital methods.

Text Books

1. B.C. Nakra, K.K. Chaudhry, "Instrumentation Measurement and Analysis," Tata McGraw-Hill Publishing Company Limited, New Delhi.
2. Thomas G. Beckwith etc. All, "Mechanical Measurements (International Student Edition), Addison-Wesley Longman, Inc.England.
3. A.K. Sawhney, "A Course in Electrical and Electronic Measurements and Instrumentation," Dhanpat Rai & Sons, Delhi-6.

ET-828-F ELECTRONIC SWITCHING SYSTEMS

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

Note: For setting up question paper, Question 1 will be setup from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question which is compulsory and one question from each of the for section. Thus students will have to attempt five questions out of nine.

Section-A

Introduction: Statistical Bandwidth Sharing, Switching, network Configurations, Elements of switching systems, Electronic exchange, PBX**.**

Telephone Networks: Subscriber loop, Switching Hierarchy & Routing Transmission systems, Numbering Plan, Charging plan, Signaling techniques Common Channel Signaling.

Section-B

Electronic Space Division Switch: Stored Program Control (SPC): Centralized & Distributed SPC, Software Architecture, and n-stage networks.

Time Division Switching: Space Switching, Time Switching, Time multiplexed space switching & Time switching, n-stage combination switching.

Section-C

Traffic Engineering: Traffic load, Grade of service, blocking Probability models of switching systems, Markov processes, Birth-Death processes, delay systems, Models for packetized sources (voice and video), models for traffic flow in packet networks.

Cellular Mobile Telephony: Analog Switch System for Cellular Mobile, Cellular digital switching, centralized & remote controlled small switching system.

Section-D

Telephone Network Protocols: Protocols stacks, Digital Transmission hierarchy, SONET/SDH Signaling system. Multimedia Communication over global telephone N/W Introduction to Datagram switches, ATM Switches.

Text Books:

1. Thiagarajan Viswanathan, Telecommunication Switching Systems & Networks, PHI
2. Hui, J.Y., Switching & Traffic Theory for integrated broadband networks.
3. Keshav, S., Engineering. Approach to Computer Networking, Addison Wesley.

ET-826-F **NEURO FUZZY SYSTEM**

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

Note: For setting up question paper, Question 1 will be setup from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question which is compulsory and one question from each of the for section. Thus students will have to attempt five questions out of nine

Section-A

Introduction to fuzzy and neuron-fuzzy system: Merits of Fuzzy and Neuro Fuzzy systems. Introduction to Architecture of a Fuzzy system. Fuzzification Rule Base Inference engine, defuzzizication.

Fuzzy Mathematics: Fuzzy sets and operations of fuzzy sets, properties of fuzzy sets, fuzzy relations, fuzzy graphs & Fuzzy arithmetic.

Section-B

Architecture and Design Issue: Fuzzification, fuzzy Rule- Base and Fuzzy–Rule Based models–implication process, defuzzification Techniques.

Analog Design of Fuzzy Processors: Modular design, design of a fuzzifier, knowledge base and inference engine , defuzzifier design.

Section-C

Implementation of a Complete Analog Fuzzy System: Design and microprocessor based implementation of fuzzy systems

Fuzzy Model Identification: Structure Specifications, Parameter estimation, model validation.

Section-D:

Neuro Fuzzy Systems: Introduction to Neural Networks, Neuro Fuzzy Architecture, Learning methodologies, genetic Algorithm, neural networks in communications.

Text Books:

1. Klir & Yuan, Fuzzy Sets and Fuzzy Logic.
2. Chin – Teng Lin & Lee C S G Neural Fuzzy Systems, Prentice Hall International.
3. Bose N K, Liang P, Neural Networks Fundamentals with graphs, Algorithm and Applications, Tata McGraw Hill

ET-824-F EMBEDDED SYSTEM DESIGN

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

Note: For setting up question paper, Question 1 will be setup from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question which is compulsory and one question from each of the for section. Thus students will have to attempt five questions out of nine

Section-A

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

Section-B

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

Section-C

Interrupts and I/0 Ports: Interrupt logic, Timer2 scalar initialization, IntService Interrupt service routine, loop time subroutine, External interrupts and timers, Synchronous serial port module, Serial peripheral device, O/P port Expansion, I/p port expansion, UART.

Section-D

Programming with Microcontrollers: Arithmetic operations, Bit addressing, Loop control, Stack operation, Subroutines, RAM direct addressing, state machines, Oscillators, Timer Interrupts, and Memory mapped I/O.

Designing Using Microcontrollers: Music box, Mouse wheel turning, PWM motor control, Aircraft Demonstration, ultra sonic distance measuring, Temperature Sensor, Pressure 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.

ET-822-F **ADVANCED CONTROL SYSTEMS**

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

Note: For setting up question paper, Question 1 will be setup from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question which is compulsory and one question from each of the for section. Thus students will have to attempt five questions out of nine

Section-A

State variable representation of systems by various methods, solution of state equations-state transition matrix, Transfer function from state variable model, Controllability and observability of state variable model.

Section-B

Phase portrait of linear second order systems, Method of isoclines, Phase portrait of second order system with non-linearities, limit cycle, singular points

Section-C

Definition, limitations, use of describing function for stability analysis, describing function of ideal relay, relay with hysteresis and dead zone saturation/coulomb friction and backlash. Linear approximation of nonlinear systems Taylor series, Liapunov's 2^{nd} Method.

Section-D

Sampling process, impulse modulation, mathematical analysis of sampling process, application of Laplace transform, Shanon's theorem, reconstruction of sampled signal zero order and first order hold Z-transform, definition, evaluation of Z-transform, inverse z-transform pulse transfer function, limitation of z-transform, state variable formulation of discrete time systems. Solution of discrete time state equations, stability, definition, the Schur-Cohn stability criterion, Jury's test of stability of extension of Routh-hurwitz criterion to discrete time systems.

Text Books:

1. Gopal M, Digital Control and State Variable Methods, TMH PUBLN
2. Kuo, B C, Digital control systems, PUBLN
3. Slotine J E & Li W P, Applied Non-Linear Control, Prentice Hall, USA

ET-820-F **IMAGE PROCESSING**

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

Note: For setting up question paper, Question 1 will be setup from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question which is compulsory and one question from each of the for section. Thus students will have to attempt five questions out of nine

Section-A

Introduction: Image Processing Fourier Transform and Z-transform Causality and stability Toeplit and Circulate Metrics orthogonal and unitary Matrices and Kronecker product, Markov Processes KI Transform Mean square Estimates and orthogonal Principles.

Image Sampling Quantization: Band Limited Image ,Sampling Versus Replication, Reconstruction of Image from samples, Sampling Theorem, Sampling Theorem for Random Fields, Optimal Sampling, Non-rectangular Grid Sampling, Sampling Aperture, Display Aperture/Interpolation Function, lagrange Interpolation Moire Effect. Image Quantization Uniform Optimal Quantizer, Properties of mean Square Quantizer, Commander Design Visual Quantization.

Section-B

Image Transforms: Two Dimensional Orthogonal and Unitary Transforms and their properties. One Dimensional and two Dimensional DFT. Cosine and Sine Transform. Hadarnard, Slant, Harr & KL, Transform and their properties, Approximation to KI Transform.

Image Representation By Stochastic Models: One Dimensional Casual Models, AR and ARMA models, Non Casual Representation Spectral factorization, Image Decomposition.

Section-C

Image Enhancement and Restoration: Point Operation, Histogram Modeling, Spatial Operations, Transform Operations, Multispectral Image Enhancement, Image Observation Models, Inverse and Wiener filtering, FIR Wiener Filters, Filtering using Image Transform Casual Models and recursive filtering Maximum entropy restoration. Extrapolation of band limited signal.

Section-D

Image Analysis And Compression: Spatial feature extraction, Edge detection & boundary extraction Boundary, region and moment representation structure, Texture, Image Segmentation, Reconstruction from Projections, Pixel Coding, Productive Technique, Transform Coding theory, Coding of Image, Coding of Two-tone image

Text Books:

1 Jain A, digital Image Processing, PHI
2 Gonzalez and woods, Image Processing, Addison Wesley.

ET-816-F **AUDIO VISUAL ELECTRONICS (Pr)**

L	T	P	Class Work Marks: 50
0	0	3	Pract. Viva Marks: 50
			Total Marks :100

LIST OF EXPERIMENTS

1. Familiarization of PCB's and Mechanical Components of Tape recorder/ CD Player/ VCD Player/Colour TV.
2. .Study of tuner section of a colour T.V.
3. Study of VIF section of a colour T.V.
4. Study of sound section of a colour T.V.
5. Study of Chroma section of a colour T.V.
6. Study of Mechanical portion of VCD player.
7. Study of Sound processing of VCD player.
8. Study of Camcorder's mechanical portion.
9. Study of Camcorder's Electronic portion

Note: Ten experiments are to be performed .Remaining experiments may either be designed & setup by the concerned institution as per the scope of the syllabus.

ET-806-F **MULTIMEDIA COMMUNICATIONS**

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

Note: For setting up question paper, Question 1 will be setup from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question which is compulsory and one question from each of the for section. Thus students will have to attempt five questions out of nine

Section-A

Multimedia communications: Introduction, multimedia networks, multimedia applications.

Multimedia information representation: Introduction, digitization principles, representation of text, images, audio & video.

Section-B

Text & Image compression: Various compression principles.

Text compression: Static Huffmann coding, dynamic Huffman coding, arithmetic coding, Lempel-ziv coding Image compression: Graphics Interchange format, tagged image file format, digitized document, digitized pictures, JPEG (Introduction)

Section-C

Audio & Video compression: Audio compression: Differential PCM, Adaptive differential PCM, Code excited LPC, MPEG audio coders, Dolby audio coders. Video Compression: Basic principles, Video compression standard H.26 J, h.263, MPEG (Basic introduction)

Section-D

Internet applications: Domain name system, name structure and administration, DNS resource records Electronic mail message structure, content transfer, Basic concept of internet telephony, World Wide Web.

Text Books:

I. Multimedia communications: Fred Hulsall; Pearson Education Asia.

2. Multimedia Systems-Design: K. Thakkar; PHI

3, Multimedia: Computing, Communications & Applications: Ralf Stein Metz & Klara Nahrstedt; Pearson '"

4. Advanced Multimedia Programming: Steve Rimmer; MB

5. Multimedia: Making it Work IlIrd edition: Tay Vaughan; TMH

ET-804-F **RADAR ENGINEERING**

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

Note: For setting up question paper, Question 1 will be setup from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question which is compulsory and one question from each of the for section. Thus students will have to attempt five questions out of nine

Section-A

Radar Basics: Radar Block Diagram & operation, Applications of Radar.
Radar Equation: Simple form of Radar Equation, Minimum detectable signal. Receiver noise, Signal to Noise ratio, Transmitter Power. Pulse repetition frequency) & range ambiguities, System losses, Propagation effects.

Section-B

CW & Frequency Modulated Radar: The Doppler Effect, CW Radar, FM- CW Radar, Multiple Frequency CW Radar .MTI & PULSE DOPPLER RADAR: Introduction, Delay Line Cancellors. Multiple or staggered, Pulse repetition frequencies. Range-Gated Doppler Filters, Other MTI delay line, Limitation of MTI, performance, Noncoherent MTI.

Section-C

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

Section-D

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

Text book:
I. Introduction to Radar Systems: Merrill! Skolnik,; MGH

Reference Book:

Electronic Communication Systems: Kennedy; TMH

ET-802-F WIRELESS AND MOBILE COMMUNICATION

L	T	P
3	1	0

Theory Marks : 100
Class Work Marks : 50
Total Marks : 150
During of exam : 3Hrs

Note: For setting up question paper, Question 1 will be setup from all the four sections which will be compulsory and of short answer type. Two questions will be set from each of the four sections. The students have to attempt first common question which is compulsory and one question from each of the for section. Thus students will have to attempt five questions out of nine

Section-A

Radio Propagation Characteristics, Models for Path loss, Shadowing & Multipath fading-delay spread ,Coherence bandwidth, Coherence Time, Doppler Spread Jake's Channel model.

Section-B

Digital Modulation for Mobile radio, Analysis under fading channel, diversity techniques and Rake demodulator. Introduction to Spread Spectrum Communication Multiple Access Techniques used in Mobile Wireless Communications: FDMA/TDMA/CDMA.

Section-C

The Cellular concept, Frequency Reuse basic theory of hexagonal cell layout, spectrum efficiency, FDM/TDM, Cellular System, channel allocation schemes, handover Analysis, cellular CDMA, Soft capacity, Erlang capacity comparison.

Section-D

Wireless standards-GSM, IS-95, UMTS-IMT-2000, Signaling, Call Control, Mobility Management and location Tracing.

Reference Books:

1. Theodore S.Reppeport, Wireless Communications Principles and Practice, IEEE Press, Prentice Hall.
2. William C.Y.Lec, Mobile Cellular Telecommunication, Analog and Digital Systems, McGraw Hill Inc.
3. Kamilo Feher, Wireless Digital Communications, Modernization & Spread Spectrum Applications, Prentice Hall of India, New Delhi.
4. Kaveh Pahlavan and Allen H. Levesque" Wireless Information Networks", Wiley Series, John Wiley and Sons Inc.

ET-808-F **MICROWAVE (Pr)**

L	T	P	Class Work Marks: 50
0	0	3	Pract.Viva Marks: 50
			Total Marks:100

LIST OF EXPERIMENTS

1. To study the microwave components.
2. To study the characteristics of the reflex Klystron tube and to determine its electronic tuning range.
3. To determine the frequency and wavelength in a rectangular waveguide working in TE 10 mode.
4. To determine the standing wave ratio and reflection coefficient.
5. To study the I-V characteristics of Gunn diode.
6. To study the magic tee.
7. To study the isolator and attenuator.
8. To measure the coupling coefficient and directivity of a wave guide directional coupler
9. To measure the polar pattern and the gain of a waveguide horn antenna.
10. To measure the insertion loss and attenuation.

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