YMCA University of Science & Technology, Faridabad
New Scheme of Studies & Examination
B. Tech II Year (Electronics & Communication Engineering)
Semester III

Course No.	Course Title	Teaching Schedule				Internal	Examination		Total Marks	Credits
		L	T	P	Total		Theory	Practical		
HAS-201	Mathematics III	4	-	-	4	40	60	-	100	4
E-203	Electrical Engineering Materials & Semiconductor Devices	4	-	-	4	40	60	-	100	4
E-205	Networks Analysis & Synthesis	4	-	-	4	40	60	-	100	4
EIC-207	Electromechanical Energy Conversion	4	-	-	4	40	60	-	100	4
E-209	Electrical Measurement & Measuring Instruments	4	-	-	4	40	60	-	100	4
E-211	Analog Electronics	4	-	-	4	40	60	-	100	4
E-213	Network Analysis & Synthesis Lab	-	-	2	2	30	-	20	50	1
E-215	Electrical Machine-1Lab	-	-	2	2	30	-	20	50	1
E-217	Electrical Measurement & Measuring Instruments Lab	-	-	2	2	30	-	20	50	1
E-219	Analog Electronics Lab	-	-	2	2	30	-	20	50	1
ECE-221	Workshop-III	-	-	8	8	120	-	80	200	4
	Total	24	-	16	40	480	360	160	1000	32

YMCA University of Science & Technology, Faridabad
New Scheme of Studies & Examination
BTech II Year (Electronics & Communication Engineering)
Semester IV

Course No.	Course Title	Teaching Schedule				Internal	Examination		Total Marks	Credits
		L	T	P	Total		Theory	Practical		
MGMT-201	Economics for Engineers	4	-	-	4	40	60	-	100	4
E-204	Electronics Instrumentation	4	-	-	4	40	60	-	100	4
E-206	Computational Techniques	4	-	-	4	40	60	-	100	4
E-208	Digital Electronics	4	-	-	4	40	60	-	100	4
ECE-210	Communication Systems-I	4	-	-	4	40	60	-	100	4
E-212	Electromagnetic Field Theory	4	-	-	4	40	60	-	100	4
E-214	Computational Techniques Lab	-	-	2	2	30	-	20	50	1
E-216	Digital Electronics Lab	-	-	2	2	30	-	20	50	1
ECE-218	Communication Systems Lab	-	-	2	2	30	-	20	50	1
ECE-220	Workshop-IV	-	-	10	10	150	-	100	250	5
	Total	24	-	16	40	480	360	160	1000	32

YMCA University of Science & Technology, Faridabad
New Scheme of Studies & Examination
BTech III Year (Electronics & Communication Engineering)
Semester V

Course No.	Course Title	Teaching Schedule				Internal	Examination		Total Marks	Credits
		L	T	P	Total		Theory	Practical		
ECE-301	Communication Engineering	4	-	-	4	40	60	-	100	4
ECE-303	Television Engineering	4	-	-	4	40	60	-	100	4
E-305	Analog Integrated Circuits	4	-	-	4	40	60	-	100	4
ECE-307	Antenna & Wave Propagation	4	-	-	4	40	60	-	100	4
E-309	Power Electronics	4	-	-	4	40	60	-	100	4
E-311	Microprocessors &Interfacing	4	-	-	4	40	60	-	100	4
ECE-313	Television Engineering Lab	-	-	2	2	30	-	20	50	1
ECE-315	Electronics Circuits Simulation Lab	-	-	2	2	30	-	20	50	1
E-317	Microprocessors &Interfacing Lab	-	-	2	2	30	-	20	50	1
E-319	Analog Integrated Circuits Lab	-	-	2	2	30	-	20	50	1
ECE-321	Workshop-V	-	-	8	8	120	-	80	200	4
	Total	24	-	16	40	480	360	160	1000	32

YMCA University of Science & Technology, Faridabad
New Scheme of Studies & Examination
BTech III Year (Electronics & Communication Engineering)
Semester VI

Course No.	Course Title	Teaching Schedule				Internal	Examination		Total Marks	Credits
		L	T	P	Total		Theory	Practical		
E-302	Digital Systems Design	4	-	-	4	40	60	-	100	4
EL-304	Control Systems Engineering	4	-	-	4	40	60	-	100	4
CE-201	Data Structures	4	-	-	4	40	60	-	100	4
ECE-308	MOSICs & Technology	4	-	-	4	40	60	-	100	4
ECE-310	Wireless Communication	4	-	-	4	40	60	-	100	4
ECE-312	Microwave & Radar Engineering	4	-	-	4	40	60	-	100	4
EL-314	Control Systems Engineering Lab	-	-	2	2	30	-	20	50	1
CE-215	Data Structure Lab	-	-	2	2	30	-	20	50	1
E-318	Digital systems design Lab	-	-	2	2	30	-	20	50	1
ECE-320	Microwave Engineering Lab	-	-	2	2	30	-	20	50	1
ECE-322	Workshop-VI	-	-	8	8	120	-	80	200	4
	Total	24	-	16	40	480	360	160	1000	32

YMCA University of Science & Technology, Faridabad
New Scheme of Studies & Examination
BTech IV Year (Electronics & Communication Engineering)
Semester VII

Course No.	Course Title	Teaching Schedule				Examination		Total Marks	Credits
		L	T	P	Total	Internal	External		
E-401	Industrial Training	8 hrs per day				300	200	500	10

A) Procedure for Annual Examination & Marks

1. Project Evaluation	50Marks
2. Project Seminar	50Marks
3. Project Viva	100 Marks
Total (a)	200 Marks

B) Continuous Assessment Marks

1. Assessment by Institute Faculty	100 Marks
2. Assessment by Industrial Guide	100 Marks
3. Conduct Marks	100 Marks
Total (b)	300 Marks

Total (a+b) 500 Marks

YMCA University of Science & Technology, Faridabad
New Scheme of Studies & Examination
BTech IV Year (Electronics & Communication Engineering)
Semester VIII

Course No.	Course Title	Teaching Schedule				Internal	Examination		Total Marks	Credits
		L	T	P	Total		Theory	Practical		
E-402	Digital Signal Processing	4	-	-	4	40	60	-	100	4
EIC-404	Embedded Systems Design	4	-	-	4	40	60	-	100	4
EIC-406	Operational Research	4	-	-	4	40	60	-	100	4
ECE-408	Optical Communication Systems	4	-	-	4	40	60	-	100	4
EIC-306	Computer Networks	4	-	-	4	40	60	-	100	4
ECE-412	Satellite Communication	4	-	-	4	40	60	-	100	4
EIC-316	Network Programming Lab	-	-	2	2	30	-	20	50	1
E-416	Digital Signal Processing Lab	-	-	2	2	30	-	20	50	1
ECE-420	Major Project	-	-	4	4	60	-	40	100	2
ECE-422	Workshop-VIII	-	-	8	8	120	-	80	200	4
	Total	24	-	16	40	480	360	160	1000	32

ANALOG ELECTRONICS

E-211

L	T	P	CR
4	-	-	4

CLASS WORK:		**40**
EXAM	**:**	**60**
TOTAL	**:**	**100**

UNIT 1 SEMICONDUCTOR DIODE & DIODE CIRCUITS:

Diode as a circuit element, Load line concepts, half wave & Full wave rectifier, Filter circuits (Capacitor & Inductor Filter), Clipping circuits, clamping circuits, Peak to peak detector, Voltage multiplier circuit.

UNIT 2 TRANSISTOR AT LOW FREQUENCIES:

Bipolar junction transistor operation, Characteristics, Analysis of a transistor amplifier circuits using h-parameters, emitter follower, Miller's theorem.

UNIT3 TRANSISTOR BIASING:

Operating point, Selection of operating point, bias stability, Stability factor, Different methods for transistor biasing: fixed bias, collector to base bias, emitter bias, voltage divider biasing, compensation techniques (thermistor & Sensistor compensation).

UNIT4 TRANSISTOR AT HIGH FREQUENCIES:

Hybrid Pi model, CE short circuit gain, frequency response, alpha cut off frequency, Gain Bandwidth product, Emitter follower at high frequencies .

UNIT5 FET & FET CIRCUITS:

Junction field effect transistor, Pinch off voltage, Volt ampere characteristics, small signal model, common source amplifier, source follower, biasing of FET, application of FET as voltage variable resistance.

UNIT6 REGULATED POWER SUPPLY:

Block Diagram of Power supply, Voltage regulation, Series and Shunt voltage regulator, IC Regulator.

TEXT BOOKS:

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

REFERENCE BOOKS:

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

ELECTRICAL ENGINEERING MATERIALS AND SEMICONDUCTOR DEVICES

E-203

L T PCR	**CLASS WORK :**	**40**
4 - - 4	**EXAM :**	**60**
	TOTAL :	**100**

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

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

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

UNIT 4 SEMICONDUCTORS:
Review of Si and Ge as semiconducting materials, Intrinsic and extrinsic semiconductors, Effect of temperature on Intrinsic and extrinsic semiconductors. Continuity Equation, P-N junction, P-N Junction diode: V-I characteristics, static and dynamic resistance, Ideal Diode, Drift & Diffusion current, Diffusion & Transition capacitances of P-N junction, breakdown mechanism : Zener and avalanche breakdown.

UNIT 5 CONSTRUCTION AND CHARACTERISTICS OF DEVICES:
Brief introduction to Planar Technology for device fabrication., metal -semiconductor junctions (ohmic and non-ohmic), Zener diode, Zener diode as constant voltage regulator, electrical and optical excitation in diodes: LED, solar cells and photo-detectors.

UNIT 6 CONSTRUCTION AND CHARACTERISTICS OF BIPOLAR AND MOS DEVICES:
BJT:CB, CE,CC configuration, current amplification factors and their relationship , comparison of CB, CC,CE, Transistor amplifying action, UJT, UJT as relaxation oscillator, Comparison between: BJT/FET, JFET/MOSFET JFET, JFET parameters, MOSFETS: depletion and enhancement type.

UNIT 7 POWER DEVICES: CONSTRUCTION AND CHARACTERISICS
Thyristor, Two transistor analogy of thyristor, Diac, Triac, GTO, IGBT, VMOS

TEXT BOOKS:

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

REFERENCE BOOKS:

1. Electrical Engineering Materials: S.P Seth & P.V Gupta; Dhanpat Rai.
2. Power Electronics : P.S Bhimra : Khanna Publications
3 Electronic Devices & Circuit Theory : Boylestad & Nashelsky; Pearson.
4. Semiconductor devices: Jaspreet Singh; John Wiley.
5. Basic Electronics and linear circuits: N N Bhargava, Kulshreshtha.

EIC-207 ELECTROMECHANICAL ENERGY CONVERSION

L T P CR	CLASSWORK	40
4 - - 4	EXAM:	60
	TOTAL:	100

UNIT1 ELECTROMECHANICAL ENERGY CONVERSION:
Principles Of Force and torque in magnetic field system, energy balance, energy and force in singly excited magnetic field system, concept of co-energy, forces and torques in system with permanent magnets, dynamic equation.

UNIT 2 TRANSFORMERS:
Basic theory, construction , operation at no-load and full-load, equivalent circuit, phasor diagram, O.C. and S.C. tests for parameters determination, efficiency and regulation, auto-transformer, introduction to three-phase transformer ; Current and Potential Transformers : Principle, construction, analysis and applications.

UNIT 3 DC MACHINES:
Basic theory of DC generator, brief idea of construction, emf equation, load characteristics, basic theory of DC motor, concept of back emf, torque and power equations, load characteristics, starting and speed control of DC motors, applications.

UNIT 4 INDUCTION MOTOR:
Basic theory, construction, Phasor diagram, Equivalent circuit, Torque equation, Load characteristics, starting and speed control of induction motor, Introduction to single phase Induction motor and its applications, Fractional H.P. Motors, Introduction to stepper, servo reluctance and universal motors.

UNIT 5 SYNCHRONOUS MACHINES:
Construction and basic theory of synchronous generator, emf equation, model of generator, Phasor diagram, Regulation, Basic theory of synchronous motor, v-curves, synchronous condenser, applications.

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

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

E-209 ELECTRICAL MEASUREMENT AND MEASURING INSTRUMENTS

L T P CR	CLASS WORK	:40
4 - - 4	EXAM :	60
	TOTAL :	100

UNIT 1 UNITS STANDARDS AND ERRORS:

S.I. units,Absolute standards(International,Primary,Secondary,and Working standards),True value,Errors(Gross,Systematic and Random);Static Characteristic of instruments(Accuracy,Precision,Sensitivity,Resolution and threshold).

UNIT 2 MEASURING SYSTEM FUNDAMENTALS:

Classification of Instruments (based upon mode of measurement- Indicating , Recording and Integrating Instruments), Generalized Instrument (block diagram and description of various blocks) , the three forces in an electromechanical indicating instrument (deflecting controlling and damping forces and the interplay between them), Comparison between gravity and spring controls : Comparison of methods of damping and their suitability for bearing supports , Pivot –less supports (simple suspension and taut band suspension , scale , information , instrument cases (covers) .

UNIT 3. MEASURING INSTRUMENTS:

Construction , Operating principle , torque equation , shape of scale , use as Ammeter or as voltmeter (Extension of range) , use on AC / DC or both , advantages and disadvantages, errors(both on AC/DC)of PMMC types, electrodynamic type, moving iron type(attraction , Repulsion and combined attraction, repulsion types). Hot Wire type and induction type, electrostatic type instruments.

UNIT 4 WATTMETERS AND ENERGY METERS:

Construction, Operating principle, Torque Equation, Shape of Scale, Errors, Advantages and Disadvantages of
Electrodynamic and induction type wattmeters; and single phase induction type energy meter, compensation and creep in energy meter.

UNIT-5 INSTRUMENT TRANSFORMER:

Current and Voltage transformer, Constructional features, Ratio and Phase angle errors

UNIT 6 LOW AND HIGH RESISTANCE MEASUREMENTS:

Limitations of wheatstone bridge , Kelvin's double Bridge method , difficulties in high resistance measurements , measurement of high resistance by direct deflection , Loss of Charge method , Megohm Bridge and Meggar .

UNIT 7 A.C. BRIDGES:

General Balance equation, Circuit Diagram, Phasor Diagram, Advantages, Disadvantages and Application of Maxwell's inductance, Maxwell's inductance capacitance bridge, Hay's, Anderson's, Owen's, De-sauty's, Schering and Wein's Bridges, Shielding and Earthing.

TEXT BOOK:

A course in Electrical And Electronic measurement and instrumentation : A.K. Sawhney, Dhanpat Rai Publication

REFERENCE BOOKS:

1. ELECTRICAL MEASUREMENTS: E.W. GOLDING
2. Electrical And Electronic measurement and instrumentation: J.B. Gupta, Kataria and Sons.
3. Electronic instrumentation and measurement technique : W.D. Cooper & A.D. Helfrick
4. Measuring systems: E.O. Doeblin; TMH.

MATHEMATICS-III

HAS-201

L	T	P	CR			
4	-	-	4			

CLASSWORK:		**40**
EXAM	**:**	**60**
TOTAL	**:**	**100**

PART-A

UNIT1. COMPLEX VARIABLES:

Functions of complex variable,continuity, Derivative. Cauchy-Riemann equations, Analytic Function Harmonic functions, Integration of complex functions. cauchy theorem and cauchy's integral formula. Taylor's and Laurent's series, singularities, Residues, residue theorem, calculation of residues,evaluation of real definite integrals
(Around unit and semi circle only).

UNIT2. FOURIER SERIES:

Euler's formulae, conditions for a Fourier expansion,fourier expansion of functions having points of discontinuity, change of interval, Fourier expansion of odd and even functions, half range series. Parseval's formula, practical harmonic analysis.

PART-B

UNIT3. PARTIAL DIFFERENTIAL EQUATIONS:

Formation, solution. Linear partial differential Equations of the first order. Integral surfaces passing through a given curve.non-linear partial differential equations of the first order. Charpit's method. Classification of linear second order equations. Euler's equations. Linear equations with constant co-efficients.method of separation of variables. Applications to the wave equation, one dimensional heat flow, two dimensional heat flow .laplace equation (two dimensional) and laplace equation in polar co-ordinates.

UNIT4. FOURIER TRANSFORM:

Fourier transform-fourier sine and cosine transforms. Properties of F-transforms.convolution theorem.perseval's identity,relation between fourier and laplace transform. Fourier transforms of the derivatives of function. Applications to boundary value problem.

TEXT BOOKS:

1. Advanced Engg. Mathematics : F Kreyszig. Wiely Estern Ltd.
2. Higher Engg. Mathematics : B.S. Grewal, Khanna Publishers, New Delhi

REFERENCE BOOKS:

1. Advanced Engg. Mathematics: Michael D. Greenberg.
2. Operation Research: H.A. Taha.
3. Probability and statistics for Engineers: Johnson. PHI.

NETWORK ANALYSIS & SYNTHESIS

E-205

L T P CR	**CLASS WORK :**	**40**
4 - - 4	**EXAM :**	**60**
	TOTAL :	**100**

UNIT-1 -INTRODUCTION
Introduction to lumped element electrical systems,Dual networks,Solution to some typical problems,Thevenin's and Norton theorem,equivalent circuits.Analogus system Electrical analogus to mechanical translational and rotational system. f-v analogy, f-I analogy.

UNIT2 TRANSIENTS:
Transient response of simple R - L, R - C and R - L - C series and parallel circuits using classical differential equation approach and Laplace Transform method. Response of RL, RC, RLC circuits for impulse and pulse and non sinusoidal periodic functions, excitations using Laplace Transform method.

UNIT 3 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 behaviour from the pole-zero plot.

UNIT 4 CHARACTERISTICS AND PARAMETERS OF TWO PORT NETWORKS:
Relationship of two-port variables, short-circuit Admittance parameters, open circuit impedance, parameters, Transmission parameters, hybrid parameters, relationships between parameter sets, Inter-connection of two port networks.

UNIT 5 TOPOLOGY:
Principles of network topology , graph matrices, network analysis using graph theory.

UNIT 6 TYPES OF FILTERS AND THEIR CHARACTERISTICS:
Filter fundamentals, high-pass, low-pass, band-pass, and band-reject Filters.

UNIT 7 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.

3. Network Analysis: Van Valkenburg; PHI

REFERENCE BOOKS:

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

ANALOG ELECTRONICS LAB

E-219

L T P CR	**CLASS WORK: 30**
- - 2 1	**EXAM : 20**
	TOTAL: 50

LIST OF EXPERIMENTS:

1. Study of Half wave & Full wave rectifiers.
2. Study of Diode as clipper and clamper.
3. Study of Zener diode as a voltage regulator.
4. Study of CE amplifier for voltage, current & Power gains and input, output impedances.
5. Study of CC amplifier as a buffer.
6. To study the frequency response of RC coupled amplifier.
7. Study of 3-terminal IC regulator.
8. Study of FET common source amplifier.
9. Study of FET common Drain amplifier.
10. Study & design of a.d.c. voltage doubler.

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.

ELECTRICAL MACHINE-I LAB

E-215

L T P CR	**CLASS WORK: 30**
- - 2 1	**EXAM : 20**
	TOTAL: 50

LIST OF EXPERIMENTS:

1. To study construction and starting methods of DC motor.
2. To obtain magnetization characteristics of separately excited DC Machine.
3. To obtain magnetization characteristics of self-excited DC Machine.
4. To obtain Load characteristics D.C series generator.
5. To obtain Load characteristics of D.C Shunt Generator.
6. To obtain Load characteristics test on D.C Compound Generator.
7. To obtain speed torque characteristics of DC shunt motor.
8. Speed control of DC shunt motor by field control method
9. Speed control of DC shunt motor by armature voltage control method
10. Load test on DC shunt motor.
11. Load test on DC Series Motor
12. To obtain efficiency of dc machine using Swinburne's Test.
13. To perform Hopkinson's test and determine losses and efficiency of DC machine.
14. To perform parallel operation of DC shunts generators.
15. Field Test

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

ELECTRICAL MEASUREMENT AND MEASURING INSTRUMENTS LAB

E-217

L T P CR	**CLASS WORK: 30**
- - 2 1	**EXAM : 20**
	TOTAL: 50

LIST OF EXPERIMENTS:

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

NOTE: 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.

NETWORK ANALYSIS AND SYNTHESIS LAB

E-213

L T P CR	**CLASS WORK: 30**
- - 2 1	**EXAM: 20**
	TOTAL: 50

LIST OF EXPERIMENTS:

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

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

MGMT-201 ECONOMICS FOR ENGINEERS

L T P CR	CLASS WORK :	40
4 - - 4	EXAM :	60
	TOTAL :	100

Unit I

Introduction to the subject: Micro and Macro Economics, Relationship between Science, Engineering, Technology and Economic Development. Production Possibility Curve, Nature of Economic Laws.

Unit II

Time Value of Money: concepts and application. Capital budgeting; Traditional and modern methods, Payback period method, IRR, ARR, NPV, PI (with the help of case studies)

Unit III

Meaning of Demand. Law of Demand, Elasticity of Demand; meaning, factors effecting it and its practical application and importance. Demand forecasting (a brief explanation)

Unit IV

Meaning of Production and factors of production, Law of variable proportions and returns to scale. Internal and external economies and diseconomies of scale. Concepts of cost of production, different types of costs; accounting cost, sunk cost, marginal cost, Opportunity cost. Break even analysis, Make or Buy decision (case study). Relevance of Depreciation towards industry.

Unit V

Meaning of market, types of market, perfect competition, Monopoly, Monopolistic, Oligopoly. (main features). Supply and law of supply, Role of demand and supply in price determination.

Unit VI

Indian Economy, nature and characteristics. Basic concepts; fiscal and monetary policy, LPG, Inflation, Sensex, GATT, WTO and IMF. Difference between Central bank and Commercial banks

Books

1. Jain T.R., Economics for Engineers, VK Publication
2. Chopra P. N., Principle of Economics, Kalyani Publishers
3. Dewett K. K., Modern economic theory, S. Chand
4. H. L. Ahuja., Modern economic theory, S. Chand
5. Dutt Rudar & Sundhram K. P. M., Indian Economy
6. Mishra S. K., Modern Micro Economics, Pragati Publications
7. Pandey I.M., Financial Management; Vikas Publishing House
8. Gupta Shashi K., Management Accounting, Kalyani Publication

ELECTRONICS INSTRUMENTATION

E-204

L T P CR	CLASS WORK :	40
4 - - 4	EXAM :	60
	TOTAL :	100

UNIT1. OSCILLOSCOPE:
Block diagram, study of various stages in brief, high frequency CRO considerations. Sampling and storage oscilloscope.

UNIT2. ELECTRONIC INSTRUMENTS:
Instruments for measurement of voltage, current & other circuit parameters, Q-meters, R.F. power measurements, introduction to digital meters.

UNIT3. GENERATION & ANALYSIS OF WAVEFORMS:
Block diagram of pulse generators, signal generators, function generators wave analysers, distortion analysers, spectrum analyser, Harmonic analyser, introduction to power analyser.

UNIT4. FREQUENCY & TIME MEASUREMENT:
Study of decade counting Assembly(DCA), frequency measurements, period measurements, universal counter, introduction to digital meters.

UNIT5. DISPLAY DEVICES:
Nixie tubes, LED's LCD's, discharge devices.

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

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

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

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

COMMUNICATION SYSTEMS-1

ECE-210

L	T	P	CR
4	-	-	4

CLASS WORK	**:**	**40**
EXAM	**:**	**60**
TOTAL	**:**	**100**

UNIT1. INTRODUCTION TO COMMUNICATION SYSTEMS:

The essentials of a Communication system, modes and media's of Communication, Classification of signals and systems, Fourier analysis of signals.

UNIT2. AMPLITUDE MODULATION:

Amplitude modulation, Generation of AM waves, Demodulation of AM waves, DSBSC, Generation of DSBSC waves, Coherent detection of DSBSC waves, single side band modulation, generation of SSB waves, demodulation of SSB waves, vestigial sideband modulation (VSB).

UNIT3. ANGLE MODULATION:

Basic definitions: Phase modulation (PM) & frequency modulation (FM), narrow band frequency modulation, wideband frequency modulation, generation of FM waves, Demodulation of FM waves.

UNIT4. PULSE MODULATION:

Sampling theory, pulse amplitude modulation (PAM), pulse time modulation., Elements of pulse code modulation,Quantization, Uniform & nonuniform Quantization, Necessicity of nonuniform quantization, A law of Companding, μ law of companding, Quantization error in PCM, transmission BW of PCM, Differential Pulse Code Modulation, Delta Modulation, Adaptive Delta Modulation, TDM, FDM.

UNIT5. DIGITAL MODULATION TECHNIQUES:

ASK, Generation and detection of ASK, FSK Generation and detection of FSK, BPSK , Generation & detection of BPSK, QPSK, generation and detection of QPSK, DPSK, M-ary PSK.

UNIT6. INTRODUCTION TO NOISE:

External noise, internal noise, S/N ratio, noise figure, noise temperature.

TEXT BOOKS:

1. Communication systems (4th edn.): Simon Haykins; John wiley & sons.
2. Communication systems: Singh & Sapre; TMH.

REFERENCE BOOKS:

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

DIGITAL ELECTRONICS

E-208

L T P CR	**CLASS WORK :**	**40**
4 - - 4	**EXAM :**	**60**
	TOTAL :	**100**

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

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

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

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

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

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

UNIT 7 MEMORIES AND PLD'S
Classification of memories –RAM organization l-Bipolar RAM cell – MOSFET RAM cell –Dynamic RAM cell – ROM- PROM –EPROM –EEPROM –EAPROM –Programmable Logic Devices –Programmable Logic Array (PLA)-Programmable Array Logic (PAL)-Field Programmable Gate Arrays (FPGA).

TEXT BOOK:

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

REFERENCE BOOKS:

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

ELECTROMAGNETIC FIELD THEORY

E-212

L T P CR	**CLASS WORK :**	**40**
4 - - 4	**EXAM :**	**60**
	TOTAL :	**100**

UNIT1.STATIC ELECTRIC FIELDS:
Coulomb's Law, Introduction to Del operation, Study of Del operation on scalar and vector and its physical interpretation, Laplacian operator, Stoke's Theorem and Divergence Theorem, Gauss's Law, potential function, field due to a continuous distribution of charge, equi-potential surfaces, Poison's equation, Laplace's equation, method of electrical images, capacitance, electro-static energy, boundary conditions, the electro-static uniqueness theorem for field of a charge distribution, Dirac-Delta representation for a point charge and an infinitesimal dipole.

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

UNIT3. TIME VARYING FIELDS:
Introduction to conduction current, convection current and displacement current; Equation of continuity for static and time varying fields, inconsistency of Ampere's law, Maxwell's field equations and their interpretation, solution for free space conditions, electromagnetic waves in a homogeneous medium, Discussion on : Group velocity, Phase velocity, Attenuation constant, Phase constant, Refractive index; propagation of uniform plane-wave, relation between E & H in a uniform plane-wave, wave equations for conducting medium, Maxwell's equations using phasor notation, wave propagation in a conducting medium, Loss Tangent, conductors, dielectrics, wave propagation in good conductor and good dielectric, depth of penetration, polarization, linear, circular and elliptical,

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

UNIT5.TRASMISSION LINE THEORY:
Transmission line as a distributed circuit, Primary and Secondary constant, Transmission line equation, input impedance of terminated line, infinite transmission line, Distortion

less and Loss less transmission line, Open circuit and short circuit transmission line, Reflection coefficient, Standing waves, VSWR, Smith's chart and its applications.

TEXT BOOK:

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

REFERENCE BOOKS:

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

COMPUTATIONAL TECHNIQUES

E-206

L T P CR	CLASS WORK : 40
4 - - 4	EXAM ; 60
	TOTAL : 100

PART-A

UNIT1 FINITE DIFFERENCES AND INTERPOLATION:
Various difference operators and relation between them .Newton's forward and backward interpolation formulae. Central difference interpolation formula. Gauss forward and backward interpolation formulae. Langrages interpolation formula and Newton's divided difference formulae.

UNIT2 SOLUTION OF ALGEBRAIC AND TRANSCENDENTAL EQUATIONS:
Bisection method, method of false position,secant method, iteration method, Newton's Raphson method, Generalised Newton-Raphson method

UNIT3 SOLUTIONS OF SIMULTANEOUS ALGEBRIC EQUATIONS:

Jacobi's method, Gauss-Seidal method, Relaxation method.
UNIT4 NUMERICAL DIFFERENTIATION AND INTEGRATION: Formula for derivatives Trapezoidal rule, Simpson's $1/3^{rd}$ and $3/8^{th}$ rules, Boole's rule and Weddle's rule, Romberg's Integration.

PART-B

UNIT5 NUMERICAL SOLUTION OF O.D.E:
Taylor series,Picard's method, Eule , Modified Euler method, Runge-Kutta second and fourth order methods, predictor collector methods(Adams-Bashforth and Milne's method only),
UNIT6 NUMERICAL SOLUTION OF P.D.E:

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

1. Numerical Methods in Engg. & Science: B.S. Grewal;khanna.
2. Numerical Methods for Scientific and Engg. Computations:
   M.K. Jain, S.R.K. Iyenger and R.K. Jain-Wiley Eastern Ltd

REFERENCE BOOKS:

1 Computer oriented Numerical Methods: U.Ra
2. Introduction to Numerical Analysis C.E.Froberg;Addison Wesly
3. Numerical methods in Engg. & Science: B.S Grewal

COMMUNICATION SYSTEMS LAB

ECE-218

L T P CR	**CLASS WORK: 30**
- - 2 1	**EXAM: 20**
	TOTAL: 50

LIST OF EXPERIMENTS:

1. Study of Amplitude Modulation and determination of Modulation index.

2. Study of Frequency Modulation and determination of Modulation index.

3. Study of Phase Modulation.

4. Study of Pulse Amplitude Modulation.

5. Study of Pulse Width Modulation.

6. Study of Pulse Frequency Modulation.

7. Study of Pulse Code Modulation.

8. Study of frequency Shift Keying.

9. Study of ASK

10. Study of PSK

11. Project related to the scope of the course.

12. Study of Delta modulation

NOTE: At least ten experiments are to be performed; 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.

COMPUTATIONAL TECHNIQUES LAB

E-214

L T P CR	**CLASS WORK: 30**
- - 2 1	**EXAM: 20**
	TOTAL: 50

LIST OF EXPERIMENTS:

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

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

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

DIGITAL ELECTRONICS LAB

E-216

L T P CR	**CLASS WORK: 30**
- - 2 1	**EXAM: 20**
	TOTAL: 50

LIST OF EXPERIMENTS:

1. Study of TTL gates – AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR.

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

3. To verify the operation of multiplexer & Demultiplexer.

4. To verify the operation of comparator.

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

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

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

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

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

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

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

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

13. To realize the given function using decoder and OR gate.

NOTE: At least ten experiments are to be performed; 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.

COMMUNICATION ENGINEERING

ECE-301

L	T	P	CR			
4	-	-	4			

CLASS WORK	**:**	**40**
EXAM	**:**	**60**
TOTAL	**:**	**100**

UNIT 1 SPECTRAL ANALYSIS:

Fourier Series, Fourier tranforms, Convolution Theorem, Correlation, Cross-Correlation and autocorrelation.

UNIT 2 INFORMATION THEORY:

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

UNIT 3 RANDOM SIGNAL THEORY:

Representation of random signals, concept of probability, probability of joint occurrence, conditional probability, discrete probability theory, continuous random variables, probability distribution function, probability density function, joint probability density functions. Statistical average and moments, Ergodic processes, correlation function, power spectral density, central limit theory, response of linear system to random signals. Error function, regularity, covariance relation among the spectral densities of the two input-output random processes. Cross spectral densities, optimum filters.

TEXT BOOK:

1. Principles of Communication Systems : Taub Schiling; TMH

REFERENCE BOOKS:

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

TELEVISION ENGINEERING

ECE-303

L T P CR	CLASS WORK :	40
4 - - 4	EXAM :	60
	TOTAL :	100

UNIT1 ELEMENTS OF A TELEVISION SYSTEM:

Picture transmission, sound transmission, picture reception, sound reception synchronization, receiver controls, color television.

Analysis and Synthesis of Television Pictures: Gross structure, image continuity, no. of scanning lines, flicker, fine structure.

UNIT2. COMPOSITE VIDEO SIGNAL:

Video signal dimensions, horizontal sync details, vertical sync details, scanning sequence details, functions of vertical pulse train, and sync details of 525 line system.

UNIT3. SIGNAL TRANSMISSION AND CHANNEL BANDWIDTH:

Amplitude Modulation, channel bandwidth, vestigial side band transmission, Transmission efficiency, complete channel bandwidth, reception of vestigial side band signals, frequency modulation, FM channel bandwidth, channel bandwidth for color transmission, allocation of frequency bands for television signal transmission, television standards.

UNIT4. THE PICTURE TUBE:

Monochrome picture tube, Beam deflection, screen phosphor, face plate, picture tube characteristics, Television Camera Tubes: Basic principal, Image orthicon, Vidicon.

UNIT5. BASIC TELEVISION BROADCASTING:

Television transmitter, positive & negative modulation.

Television Receiver: Receiver sections, vestigial side band correction, choice of intermediate frequencies, picture tube circuitry & controls, sound signal separation, sound section, Sync processing & AFC circuit, vertical Deflection circuit, Horizontal deflection circuit.

UNIT6. ESSENTIALS OF COLOR TELEVISION:

Compatibility, natural light, color perception, three color television camera, the luminance signal, values of Luminance & color difference signals on Colors, color television display tubes (Delta gun, PIL, Trinitron).

UNIT7. COLOR SIGNAL TRANSMISSION AND RECEPTION:

Color signal transmission, bandwidth for color signal transmission.

UNIT8. TELEVISION APPLICATIONS:

Cable television, CCTV, picture phone, television via satellite(DTH), Remote Control (Electronic control system), Introduction to Digital TV Technology and their merits,IPTV.

TEXT BOOK:

Monochrome and Color Television : R.R.Gulati ; New Age.

REFERENCE BOOK :

TV and Video Engineering : Dhake ; TMH.

ANTENNA AND WAVE PROPAGAT1ON

ECE-307

L	T	P	CR
4	-	-	4

CLASS WORK	**:**	**40**
EXAM	**;**	**60**
TOTAL	**:**	**100**

UNIT1. INTRODUCTION:

Physical concept of Radiation in single wire, two wire, and dipole, Current Distribution on a thin wire antenna

UNIT2. ANTENNA PARAMETERS:

Radiation Pattern, Radiation Power Density, Radiation intensity, Directivity, Gain, Antenna efficiency, Beamwidth, Bandwidth ,Polarisation, Antenna Input Impedance, Elementary idea about self and mutual impedance, Radiation efficiency, Effective aperture, Antenna Temperature

UNIT3. ELEMENTAL LINEAR ANTENNA:

Retarded potential, Infinitesimal dipole, Current distribution of short dipole and half wave dipole, Far-field, Radiating near-field and reactive near-field region, Monopole and Half wave dipole

UNIT 4: PRACTICAL ANTENNA:

Microwave Antenna's-Antennas with parabolic reflectors, Horn Antenna's, Lens Antenna's, folded dipole - Yagi-uda Antenna, Helical Antenna, Discone antenna, Log-periodic Antenna, Loop antenna, Principle of Broad Band Antenna

UNIT5. ANTENNA ARRAY:

Array of two point sources, Array factor, n-element linear array with uniform amplitude and spacing, Analysis of Broadside array, Ordinary end-fire array, n-element linear array with non-uniform spacing, ,Analysis of Binomial and Dolph-Tschebyscheff array, Scanning Array, Superdirective array

UNIT6. PROPAGATION:

Ground waves, Space waves, effect of Earth, Duct formation, ionosphere, and sky waves.

TEXT BOOKS:

I. Antennas by J.D.Kraus, 1M11.

2. Antenna & Wave Propagation by K.D Prasad.

REFERENCES BOOKS :

I .Antenna & Radio wave propogation by CoIlin,TMII

2.Electromagnctic Waves & Radiating Systems by Jordan & Balman, PIll.

ANALOG INTEGRATED CIRCUITS

E-305

L	T	P	CR			
4	-	-	4			

CLASS WORK	**:**	**40**
EXAM	**;**	**60**
TOTAL	**:**	**100**

UNIT1. SINGLE AND MULTISTAGE AMPLIFIERS:

Classification of amplifiers, distortion in amplifiers, frequency response of an amplifier, step response of an amplifier, pass-band of cascaded stages, RC-coupled amplifier, low frequency response of RC coupled stage, effect of an emitter bypass capacitor on low Frequency response, multistage CE amplifier.

UNIT2. FEEDBACK AMPLIFIERS:

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

UNIT3. OSCILLATORS:

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

UNIT4. POWER AMPLIFIERS:

Class A, B, and C operations; Class A large signal amplifiers, higher order harmonic distortion, efficiency, transformer coupled power amplifier, class B amplifier : efficiency & distortion; class A and class B push-pull amplifiers; Cross over distortion, Class C power amplifier.

UNIT5. OPERATIONAL AMPLIFIERS:

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

UNIT6. LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIERS:

Scale changer, phase shifter, adder, voltage to current converter, current to voltage converter, DC voltage follower, Bridge amplifier, AC coupled amplifier, AC voltage follower, Integrator, differentiator.

UNIT7. NON-LINEAR APPLICATIONS OF OPERATIONAL AMPLIFIERS:

Comparators sample & hold circuits, Logarithmic amplifier, anti-log amplifier, logarithmic multiplier, waveform generators, regenerative comparator (Schmitt Trigger), multivibrators , 555 timer IC (monostable & Astable operation) & its application.

TEXT BOOKS:

1. Integrated Electronics: Milman Halkias, TMH.
2. Operational Amplifiers:Gaikwad

REFERENCE BOOKS:

1. Electronic Circuit Analysis and Design (Second edition) : D.A.Neamen; TMH
2. Integrated Circuits: K R Botkar.
3. Linear Integrated Circuits : D R Chaudhary (WEL)

POWER ELECTRONICS

E-309

L	T	P	CR			
			40			
4	-	-	4			

CLASS WORK :
EXAM ; 60
TOTAL : 100
DURATION OF EXAM :

3HRS

UNIT1 INTRODUCTION:
Introduction to Thyristors, Their static and dynamic characteristics, Turn-on and Turn - off methods and circuits, Ratings and protection of SCR'S, Other members of thyristor family, Series and parallel operation of thyristors, Firing circuits for SCRs.Commutation circuits.

UNIT2 PHASE CONTROLLED CONVERTERS:
Principle of phase control, Single phase half wave circuit with different types of loads, Single phase and three phase semi converter and full converter bridge circuits with line commutation, Continuous and discontinuous conduction effect of source inductance on single phase and three phase full converters, Single phase and three phase dual converters and their operation with circulating and non circulating currents.

UNIT3 DC CHOPPERS:
Principle of chopper operation, Control strategies, Types of choppers, Step upand step down choppers, Types of choppers, Steady state time domain analysis with R, L, and E type loads, Voltage, Current and Load commutated choppers.

UNIT4 INVERTERS:
Single phase VSI, Half bridge and full bridge inverters and their steady state analysis,Introduction of Series and parallel inverters, and Three phase bridge inverters with 180^0 and 120^0 modes. Single-phase PWM inverters. Current source inverters,CSI with R load (qualitative approach).

UNIT5 AC VOLTAGE CONTROLLERS:
Types of single-phase voltage controllers, Single-phase voltage controller with R and RL type of loads. Three phase voltage controller configurations R Load.

UNIT6 CYCLOCONVERTERS:
Principles of operation, Single phase to single phase step up and step down cycloconverters. Three phase to single phase and three-phase to three-phase cycloconverters, Output voltage equation for a cycloconverter.

TEXT BOOKS:
1. Dubey, G.K., Doradla, S.R., Joshi, A. and Sinha, R.M.K., Thyristorised Power Controllers, New Age International (P) Limited, Publishers (2004).

2. Rashid, M., Power Electronics, Prentice−Hall of India (2006) 3rd ed.
3. Bhimbra P.S., Power Electronics,Khanna Publisher

REFERENCE BOOKS:

1. Mohan, N., Underland, T. and Robbins, W. P., Power Electronics: Converter Applications and Design, John Wiley (2007) 3rd ed.

MICROPROCESSORS AND INTERFACING

E-311

L	T	P	CR
4	-	-	4

CLASS WORK	:	40
EXAM	:	60
TOTAL	:	100

PART A

UNIT1. ARCHITECTURE OF 8085:

Functional block diagram—Registers, ALU, Bus systems. Pin configuration, Timing and control signals, Machine cycle and timing diagrams.
Interrupts—Types of interrupt, interrupt structure.

UNIT2. PROGRAMMING OF 8085:

Instruction format, Addressing modes, Instruction set. Development of assembly language programs.

PART B

UNIT3. INTERFACING DEVICES:

(a).The 8255 PPI chip: Architecture, pin configuration, control words, modes and Interfacing with 8085.
(b). The 8254 PIC chip: Architecture, pin configuration, control words, modes and Interfacing with 8085.

UNIT4. INTERRUPT AND DMA CONTROLLER:

(a). The 8259 Interrupt controller chip: Architecture, pin configuration, control words, modes
(b). The 8257 DMA controller chip: Architecture, pin configuration, control words, modes

PART C

UNIT5. ARCHITECTURE OF 8086:

Functional block diagram of 8086, details of sub-blocks such as EU, BIU, memory segmentation, physical address computations, pin configuration, program relocation,
Minimum and Maximum modes of 8086— Block diagrams and machine cycles.
Interrupts—Types of interrupt, interrupt structure.

UNIT6. PROGRAMMING OF 8086:

Instruction format, Addressing modes, Instruction set. Development of assembly language programs. Assembler directives.

TEXT BOOKS :

1. Microprocessor Architecture, Programming & Applications with 8085 : Ramesh S Gaonkar; Wiley Eastern Ltd.
2. Microprocessor and applications – A.K.Ray.

REFERENCE BOOKS:

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

TELEVISION ENGINEERING LAB

ECE313

L T PCr	CLASSWORK	:	30
- - 21	EXAM	:	20
	TOTAL	:	50

1. To study of the block Diagram of monochorome TV receiver.
2. To study of different blocks of TV receiver on TV trainer kit.
3. To study of Internal and External Controls.
4. To study of operating unit and Tuner section.
5. To study of Video I.F. section
6. To study of Sound I.F. section
7. To study of Horizontal Oscillator and Sync Separator Section
8. To study of Vertical Oscillator and output section.
9. To study TV kit for Faults Creation and Faults Removal.
10. To study of Fault finding methods.
11. Measurement of Test Point Voltages in TV trainer kit.
12. To study and Observe Test Point Waveforms.
13. Study of Technical Words used in T.V. technology.
14. To study complete Circuit Diagram

NOTE: At least ten experiments are to be performed. Seven experiments should be performed from the above list and the remaining three experiments can be either from the above list or as per the scope of the syllabus of ECE-303.

ELECTRONICS CIRCUITS SIMULATION LAB

ECE-315

L T P CR	CLASS WORK: 30
- - 2 1	EXAM: 20
	TOTAL: 50

LIST OF EXPERIMENTS:

1. Simulate and study RL, RC, RLC using PSPICE windows.

2. Simulate and study half-wave, full-wave, and bridge-rectifier using PSPICE windows

3. Simulate and study diode clipper and clamper circuits using PSPICE windows

4. Simulate and study emitter bias and fixed bias BJT and JFET circuits using PSPICE windows, and determine quiescent conditions.

5. Simulate a common emitter amplifier using self biasing and study the effect of variation in emitter resistor on voltage gain , input and output impedance using PSPICE windows .

6. Determine the frequency response of Vo/Vs for CE BJT amplifier using PSPICE windows. Study the effect of cascading of two stages on band width.

7. Simulate and study Darlington pair amplifier circuit using PSPICE windows and determine dc bias and output ac voltage.

8. Study an operational amplifier using PSPICE windows and find out: CMMR, gain band width product, slew rate, 3-db frequency, and input offset voltage.

9. Simulate and study active low pass, high pass, and band pass filters using PSPICE windows.

10. Simulate and study class A, B, C, and AB amplifier using PSPICE windows.

11. Simulate and study monostable multiviberator using PSPICE windows.

12 .Simulate and study astable multiviberator using PSPICE windows.

13 Simulate logic expression……..and determine its truth table.

14 Simulate logic expression of full adder circuit and determine its truth table.

15 Simulate a synchronous 4-bit counter and determine its count sequence.

16Simulate a master-slave flip-flop using NAND gates and study its operation. Study the operation of asynchronous preset and clear .

Note :

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

ANALOG INTEGRATED CIRCUITS LAB

E-319

L T P CR	CLASS WORK: 30
- - 2 1	EXAM: 20
	TOTAL: 50

LIST OF EXPERIMENTS:

1. Design & measure the frequency response of an RC coupled amplifier using discrete components.
2. Design a two stage RC coupled amplifier and determine the effect of cascading on gain and bandwidth.
3. Design & realize inverting amplifier, non-inverting and buffer amplifier using 741 Op Amp.
4. Verify the operation of a differentiator circuit using 741 op amp and show that it acts as a high pass filter.
5. Verify the operation of a integrator circuit using 741 op amp and show that it ac ts as a low pass filter.
6. Design and verify the operations of op amp adder and subtractor circuits.
7. To design & realize Schmitt trigger using op amp 741.
8. Design and realize Wein-bridge oscillator using op amp 741
9. To design & realize square wave generator using op amp 741.
10. To design & realize zero crossing detector using op amp 741

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.

MICROPROCESSORS AND INTERFACING LAB

E-317

L T P CR	**CLASS WORK: 30**
- - 2 1	**EXAM: 20**
	TOTAL: 50

LIST OF EXPERIMENTS:

1. Study of architecture of 8085 & familiarization with its hardware , commands & operation of Microprocessor kit.

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

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

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

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

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

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

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

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

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

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

12. Write a program to interface microprocessor with 8253 to generate square wave. Use 8085/8086 microprocessor.
13. Write a program to interface microprocessor with 8253 to generate interrupt on terminal count. Use 8085/8086 microprocessor.

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

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

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

DIGITAL SYSTEMS DESIGN

E-302

L T PCR	CLASS WORK :	40
4 - - 4	EXAM :	60
	TOTAL :	100

UNIT1. INTRODUCTION TO HDL:
Design flow, Design Methodologies, Capabilities, Hardware abstraction, Model analysis. Basic VHDL elements—Identifiers, data objects, data classes, data types, Operators.

UNIT2. TYPES OF MODELLINGS:
Behavioural modelling—Entity declaration, Architecture body, Various Sequential statements and constructs. Multiple processes, Postponed processes.
Dataflow modelling—Concurrent signal assignment statements, delta delay model, multiple drivers, block statement, concurrent assertion statement.
Structural modelling—Component Declaration, component instantiation, resolving signal values.

UNIT3. COMBINATIONAL CIRCUIT DESIGN:
VHDL Models and Simulation of combinational circuits such as Multiplexers, Demultiplexers, encoders, decoders, code converters, comparators, implementation of Boolean functions etc.

UNIT4. SUPPORTING CONSTRUCTS:
Generics, Configuration, subprogram overloading, operator overloading,
Package declaration, package body, design libraries, visibility, Introduction to Test bench.
Subprograms: Application of Functions and Procedures.

UNIT5. SEQUENTIAL CIRCUITS DESIGN:
VHDL Models and Simulation of Sequential Circuits such as flip-flops,
Shift Registers, Counters etc.

UNIT6. PROGRAMMABLE LOGIC DEVICES:
ROM, PLA, PAL, GAL, CPLD and FPGA. Designing using ROM, PLA and PAL.

TEXT BOOKS:
1. "A VHDL Primmer": Bhasker; Prentice Hall 1995.
2. Modern Digital Electronics- III Edition: R.P Jain; TMH (2003).

REFERENCE BOOKS:
1. IEEE Standard VHDL Language Reference Manual (1993).
2. Digital Design and Modelling with VHDL and Synthesis : KC Chang; IEEE Computer Society Press.
3. "Digital System Design using VHDL" : Charles. H.Roth ; PWS (1998).

4. "VHDL-Analysis & Modelling of Digital Systems" : Navabi Z; McGraw Hill.
5. VHDL-IV Edition :Perry; TMH (2002)
6. "Introduction to Digital Systems" : Ercegovac. Lang & Moreno; John Wiley (1999).
7. Fundamentals of Digital Logic with VHDL Design : Brown and Vranesic; TMH (2000)

CONTROL SYSTEMS ENGINEERING

EL-304

L T P CR	CLASS WORK :	40
4 - - 4	EXAM ;	60
	TOTAL :	100

UNIT1. INTRODUCTORY CONCEPTS:
System/Plant model, types of models, illustrative examples of plants and their inputs and outputs, servomechanism, regulating system, Synchros, AC and DC techo-generators, servomotors, stepper motors, & their applications, magnetic amplifier.
linear time-invariant (LTI) system, time-varying system, causal system, open loop control system, closed loop control system, illustrative examples of open-loop and feedback control systems, continuous time and sampled data control systems. Effects of feedback on sensitivity (to parameter variations), stability, external disturbance (noise), overall gain etc. Introductory remarks about non-linear control systems.

UNIT2. MATHEMATICAL MODELLING:
Concept of transfer function, relationship between transfer function and impulse response, order of a system, block diagram algebra, signal flow graphs : Mason's gain formula & its application, characteristic equation, derivation of transfer functions of electrical and electromechanical systems. Transfer functions of cascaded and non-loading cascaded elements. Introduction to state variable analysis and design.

UNIT3. TIME DOMAIN ANALYSIS:
Typical test signals, time response of first order systems to various standard inputs, time response of 2nd order system to step input, relationship between location of roots of characteristics equation, w and wn, time domain specifications of a general and an under-damped 2nd order system, steady state error and error constants.Effect of adding pole-zero to a system,controllers.

UNIT 4: STABILITY IN TIME DOMAIN:
Necessary and sufficient conditions for stability, Hurwitz stability criterion, Routh stability criterion and relative stability, Root Locus technique for stability.

UNIT5. FREQUENCY DOMAIN ANALYSIS:
Relationship between frequency response and time-response for 2nd order system, polar, Nyquist, Bode plots, stability, Gain-margin and Phase Margin, relative stability, frequency response specifications.

UNIT6. COMPENSATION:
Necessity of compensation, compensation networks, application of lag and lead compensation.

TEXT BOOKS:

1. Control System Engineering : I.J.Nagrath & M.Gopal; New Age

2. Modern Control Engg : K.Ogata; PHI.

REFERENCE BOOKS:

1. Automatic Control Systems: B.C.Kuo, PHI.
2. Control Systems - Principles & Design : Madan Gopal; Tata Mc Graw Hill.
3. Modern Control Engineering.R.C.Dorl & Bishop; Addison-Wesley

WIRELESS COMMUNICATION

ECE-310

L T P CR	**CLASS WORK:**	**40**
4 - – 4	**EXAM:**	**60**
	TOTAL:	**100**

UNIT1. INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS:

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

UNIT2. MODERN WIRELESS COMMUNICATION SYSTEMS:

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

UNIT3. INTRODUCTION TO CELLULAR MOBILE SYSTEMS:

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

UNIT4.CELLULAR SYSTEM DESIGN FUNDAMENTALS:

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

UNIT5.MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION:

Introduction to Multiple Access, FDMA, TDMA, Spread Spectrum multiple Access, space division multiple access**,**,CDMA.

UNIT6. WIRELESS NETWORKING:

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

TEXT BOOKS:

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

REFERENCE BOOK:

1. Mobile Communications: Jochen Schiller; Pearson

MICROWAVE AND RADAR ENGINEERING

ECE-312

L	T	P	CR
4	-	-	4

CLASS WORK	**:**	**40**
EXAM	**:**	**60**
TOTAL	**:**	**100**

UNIT1. WAVEGUIDES:

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

UNIT2 . MICROWAVE COMPONENTS:

Directional couplers, tees, hybrid ring, S-parameters, attenuators, cavity resonators ,mixers & detectors, matched Load, phase shifter ,wave meter, Ferrite devices: Isolators, circulators.

UNIT3. MICROWAVE TUBES:

Limitation of conventional tubes; Construction, operation and properties of Klystron amplifier, reflex Klystron, magnetron, TWT, BWO , crossed field amplifiers.

UNIT4. MICROWAVE SOLID STATE DEVICES:

Varactor diode, Tunnel diode, Schottky diode, GUNN diode, IMPATT, TRAPATT and PIN diodes. MASER, parametric amplifiers.

UNIT5. MICROWAVE MEASUREMENTS:

Power measurement using calorimeter & bolometers, measurement of SWR, frequency , wavelength and impedance. Microwave bridges.

UNIT6. INTRODUCTION TO RADAR :

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

TEXT BOOKS:

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

REFERENCE BOOK:

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

MOS ICs and Technology

ECE-308

L T P CR	CLASS WORK: 40
4 - - 4	EXAM: 60
	TOTAL: 100

UNIT1. REVIEW OF MOS TECHNOLOGY :

Introduction to IC technology, MOS Transistor enhancement mode and depletion mode operations, fabrication of NMOS, CMOS and BiCMOS devices. Equivalent circuit for MOSFET and CMOS.

UNIT2. MOS TRANSISTOR THEORY:

MOS device design equations, MOS transistor, Evaluation aspects of MOS transistor, threshold voltage, MOS transistor transconductance & output conductance, figure of merit, determination of pull-up to pull-down ratio for an n-MOS inverter driven by another n-MOS inverter & by one or more pass transistor, alternative forms of pull-up, CMOS and BiCMOS-inverters. Latch up in CMOS circuitry.

UNIT3. MOS CIRCUITS AND LOGIC DESIGN :

Basic physical design of simple logic gates using n-MOS, p-MOS and CMOS, CMOS logic gate design considerations, CMOS logic structures,stick diagrams..

UNIT4.CIRCUIT CHARACTERIZATION AND PERFORMANCE ESTIMATION

Resistance estimation, capacitance estimation, inductance, switching characteristics, CMOS gate transistor sizing, power dissipation.

UNIT5. VLSI FABRICATION:

Crystal growth, wafer preparation, epitaxy, oxidation, lithography, etching, diffusion, dielectric and poly-silicon film deposition, ion implantation, yield and reliability, metalization.

UNIT6. DESIGN EXAMPLE USING CMOS :

Incrementer / decrementer, left/right shift serial/parallel register, comparator for two n-bit number.

TEXT BOOKS :

1. Introduction to Digital Integrated Circuits : Rabaey,Chandrakasan & Nikolic.
2. Principles of CMOS VLSI Design : Neil H.E. Weste and Kamran Eshraghian; Pearson.

REFERENCE BOOKS :

1. Introduction to Digital Circuits : Rabaey LPE (PHI)
2. VLSI Fabrication: S.K.Gandhi.
3. VLSI Technology: S.M. Sze; McGraw-Hill.
4. Integrated Circuits: K.R. Botkar; Khanna

CE-201 **Data Structures**

L T P Cr		
4 0 0 4	Theory	: 60 Marks
	Class work	: 40 Marks
	Total	: 100 Marks

Part-A

Overview of 'C': Introduction , Flow of Control, Input output functions, Arrays and Structures, Functions

Data structures and Algorithms: an overview: concept of data structure, choice of right data structures, types of data structures, basic terminology Algorithms, how to design and develop an algorithm: stepwise refinement, use of accumulators and counters; algorithm analysis, complexity of algorithms Big-oh notation.

Arrays: Searching Sorting: Introduction, One Dimensional Arrays,

Operations Defined: traversal, selection, searching, insertion, deletion, and sorting. Multidimensional arrays, address calculation of a location in arrays.

Searching: Linear search, Recursive and Non recursive binary Search.

Sorting: Selection sort, Bubble sort, Insertion sort, Merge sort, Quick sort, Shell sort, Heap sort

Stacks and queues: Stacks, array representation of stack, Applications of stacks. Queues, Circular queues, array representation of Queues, Deque, priority queues, Applications of Queues.

Part-B Pointers and Linked Lists;

Pointers: Pointer variables, Pointer and arrays, array of pointers, pointers and structures, Dynamic allocation.

Linked Lists: Concept of a linked list,. Circular linked list, doubly linked list, operations on linked lists. Concepts of header linked lists. Applications of linked lists, linked stacks, linked Queues.

Part-C Trees and Graphs

Trees: Introduction to trees, binary trees, representation and traversal of trees, operations on binary trees, types of binary trees, threaded binary trees, B Trees, Application of trees.

Graphs: Introduction, terminology, 'set, linked and matrix' representation, Graph traversal techniques: BFS, DFS, operations on graphs, Minimum spanning trees, Applications of graphs.

Part-D File Handling and Advanced data Structure

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

Text Books:

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

Reference Books:

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

CONTROL SYSTEMS ENGINEERING LAB

EL-314

L T P CR	**CLASS WORK: 30**
- - 2 1	**EXAM: 20**
	TOTAL: 50

LIST OF EXPERIMENTS:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

DIGITAL SYSTEMS DESIGN LAB

E-318

L T P CR	**CLASS WORK: 30**
- - 2 1	**EXAM: 20**
	TOTAL: 50

LIST OF EXPERIMENTS:

1. Design all gates using VHDL.
2. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
   a. half adder
   b. full adder
3. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
   a. multiplexer
   b. demultiplexer
4. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
   a. decoder
   b. encoder
5. Write a VHDL program for a comparator and check the wave forms and the hardware generated
6 Write a VHDL program for a code converter and check the wave forms and the hardware generated
7. Write a VHDL program for a FLIP-FLOP and check the wave forms and the hardware generated
8. Write a VHDL program for a up/down counter and check the wave forms and the hardware generated
9. Write a VHDL program for a mod-n counter and check the wave forms and the hardware generated
10. Write VHDL programs for the following circuits check the wave forms and the hardware generated
    a. Storage register
    b. Shift register
11. Write a VHDL program for ALU of microcomputer and check the wave forms and the hardware generated
12. Implement any three (given above) on FPGA/CPLD kit

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

MICROWAVE ENGINEERING LAB

ECE-320

L T P CR	**CLASS WORK: 30**
- - 2 1	**EXAM: 20**
	TOTAL: 50

LIST OF EXPERIMENTS:

1. Study of wave guide components.
2. To study the characteristics of reflex Klystron and determine its timing range.
3. To measure frequency of microwave source and demonstrate relationship among guide dimensions, free space wave length and guide wavelength.
4. To measure VSWR of unknown load and determine its impedance using a smith chart.
5. To match impedance for maximum power transfer using slide screw tuner.
6. To measure VSWR, insertion losses and attenuation of a fixed and variable attenuator.
7. To measure coupling and directivity of direction couplers.
8. To measure insertion loss, isolation of a three port circulator.
9. To measure the Q of a resonant cavity.
10. To study the V-I characteristics of GUNN diode.

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

EMBEDDED SYSTEMS DESIGN

EIC-404

L T PCR		
4 - - 4	CLASS WORK :	40
	EXAM :	60
	TOTAL :	100

UNIT1. INTRODUCTION:
Different types of Micro-controllers, embedded micro-controller, external memory micro-controller, Processor architectures: Harvard vs Princeton, CISC vs. RISC, Micro-controller memory types.
Development tools/environment, Intel Hex Format object files, debugging.

UNITS2 ARCHITECTURE OF 8051:
Block diagram, pin Configuration, Functional descriptions of internal
Units-- registers, PSW, internal RAM, ROM, Stack, Oscillator and Clock. **Other features**--I/O Pins, Ports and Circuits, Counters and timers, Serial data transmission /reception.
Interrupts--Timer flag interrupt, serial communication interrupt, External interrupt, software generated interrupts.

UNIT3. PROGRAMMING OF 8051:
Instruction format, addressing modes, Data transfer instructions, logical instructions, arithmetic instructions, Jump and Call instructions. Interrupts and interrupt handler subroutines. Development of assembly Language programs

UNIT4. ARCHITECTURE OF PIC:
Block diagram, pin Configuration, Functional descriptions of internal blocks—program memory considerations, register file structure. registers, oscillators and clock.
Other features--I/O Pins, Counters and timers, Watchdog timer, SPI port USART.
Interrupts—Interrupt structure.

UNIT5. APPLICATION DESIGN & HARDWARE INTERFACING WITH 8051 & PIC:
Hardware Interfacing with LED, Seven segment LED, LCD, Switches and stepper motor.

TEXT BOOKS:
1. Design with PIC Micro-controller by John B. Peatman, Pearson.
2. The 8051 microcontroller and embedded system by M.A.Mazidi, PHI

REFERENCE BOOKS:
1. Programming and customizing the 8051 micro-controller- Predko, TMH.
2. Designing Embedded Hardware: John Catsoulis: Shroff Pub and Dist.
3. Programming embedded systems in C and C++: Michael Barr: Shroff Pub and distr.

OPERATIONAL RESEARCH

EIC-406

L	T	P	CR			
4	-	-	4			

CLASS WORK	**:**	**40**
EXAM	**;**	**60**
TOTAL	**:**	**100**

PART-A

Different types of o.r. models, their construction and general methods of solution. Linear Programming problem-Formulation and graphical solution. The standard form of the L.P.model. The simplex method. Thedual of L.P.P. Primal-dual relation ship. Dual simplex method. Sensitivity analysis. Transportation problem, its solution and applications. Theassignment model. Travelling salesman problem.

PART-B

Network minimisation. Shortest route problem. Maximum flow problem. Project of scheduling by PERT, CPM

Critical path calculations. Construction of the time chart and resource leveling, Integer programming-examples, method of and algorithms [cutting plane algorithm only]

Dynamic Programming- Examples of D.P.models. Bellman's Principle of optimality and method of recursive optimization [simple problems only involving upto one constraint]

TEXT BOOKS:

1. Taha H.A Operations Research-An Introduction, PHI
2. **Wanger H.M, Principles of Operation Research, PHI**

SATELLITE COMMUNICATION

ECE-412

L T P CR		
4 - - 4	CLASS WORK :	40
	EXAM :	60
	TOTAL :	100

UNIT1. PRINCIPLES OF SATELLITE COMMUNICATION :

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

UNIT2. COMMUNICATION SATELLITE LINK DESIGN:

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

UNIT3. DIGITAL & ANALOG SATELLITE COMMUNICATION :

Advantages of digital communication, Elements of digital satellite communication systems, Digital baseband signals, Digital modulation techniques, Satellite digital link design, Time Division Multiplexing,Baseband analog signal,FDM techniques.

UNIT4. MULTIPLE ACCESS TECHNIQUES:

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

UNIT5. SATELLITE ORBITS:

Introduction, Synchronous orbit, Orbital parameters, Satellite location with respect to earth, Look angles, Earth coverage & slant range, Eclipse effect, Satellite stabilization. space craft technology-structural, primary power, attitude and orbit control, thermal, propulsion, telemetry, tracking and command, communication and antenna subsystems- launching procedures and launch vehicles

UNIT6. SPECIAL PURPOSE COMMUNICATION SATELLITES :

VSAT(data broadband satellite), MSAT(Mobile Satellite Communication technique), LEOs (Lower earth orbit satellite), Satellite communication with respect to Fiber Optic Communication, LANDSAT, Defense satellite,ATM over satellite, role of satellite in future network.

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UNIT7. LASER SATELLITE COMMUNICATION:

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

TEXT BOOK:

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

REFERENCE BOOK:

1. Satellite Communication: Gagliardi; CBS

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COMPUTER NETWORKS

ECE-410

L T P CR	CLASS WORK :	40
4 - - 4	EXAM :	60
	TOTAL :	100

UNIT 1 INTRODUCTION:
Uses of Computer Networks, Network Hardware and Software, Reference models (OSI & TCP/IP).

UNIT 2 THE PHYSICAL LAYER:
The Theoretical basis for Data communication, Transmission media, Wireless Communication, Communication Satellites, Network topology, switching techniques.

UNIT 3 THE DATA LINK LAYER:
Data Link Layer Design issues, Error Detection & correction, Elementary Data Link layer protocols, Sliding Window Protocols, Protocol Specification & Verification, Example of Data Link Protocols.
THE MEDIUM ACCESS SUBLAYER: Channel Allocation, Multiple access Protocols (ALOHA, CSMA, FDM, TDM).

UNIT4 NETWORK LAYER:
Design issues, routing algorithms, congestion control, and internetworking.

UNIT 5
TRANSPORT LAYER: Design issues, simple transport protocols (TCP, UDP)
SESSION LAYER: Design issues, remote procedure calls.

UNIT 6:
PRESENTATION LAYER: Design issues, 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.

REFERENCE BOOKS;

1. Ahuja V, Design and Analysis of Computer Communication, McGraw Hill.
2. Bee K.C.S, Local Area Networks, NCC Pub.
3. Davies D. W. Barber, Computer Networks and their Protocols, John Wiley.

DIGITAL SIGNAL PROCESSING

E-402

L	T	P	CR
4	-	-	4

CLASS WORK	**:**	**40**
EXAM	**:**	**60**
TOTAL	**:**	**100**

UNIT1. DISCRETE-TIME SIGNALS:

Signal classifications, frequency domain representation, time domain representation, representation of sequences by Fourier transform, properties of Fourier transform, discrete time random signals, energy and power theorems.

UNIT2. DISCRETE-TIME SYSTEMS:

Classification, properties, time invariant system, finite impulse Response (FIR) system, infinite impulse response (IIR) system.

UNIT3. SAMPLING OF TIME SIGNALS:

Sampling theorem, application, frequency domain representation of sampling, reconstruction of band limited signal from its samples. Discrete time processing of continuous time signals, changing the sampling rate using discrete time processing.

UNIT4. Z-TRANSFORM:

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

UNIT5. BASICS OF DIGITAL FILTERS:

Fundamentals of digital filtering, various types of digital filters, design techniques of digital filters : window technique for FIR, bi-linear transformation and backward difference methods for IIR filter design, analysis of finite word length effects in DSP,FIR &IIR Filter structure-direct1,direct2,cascade and parallel, Application of DSP.

UNIT6. MULTIRATE DIGITAL SIGNAL PROCESSING:

Introduction to multirate digital signal processing, sampling rate conversion, filter structures, multistage decimator and interpolators, digital filter banks.

TEXT BOOKS :

1. Digital Signal Processing : Proakis and Manolakis; PHI
2. Digital Signal Processing: Salivahanan, Vallavaraj and Gnanapriya;TMH

REFERENCE BOOKS:

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

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OPTICAL COMMUNICATION SYSTEMS

ECE-408

L	T	P	CR
4	-	-	4

CLASS WORK	**:**	**40**
EXAM	**:**	**60**
TOTAL	**:**	**100**

UNIT1 INTRODUCTION TO OPTICAL COMMUNICATION SYSTEMS:

Electromagnetic Spectrum used for optical communication, Block diagram of optical communication system, Basics of transmission of Light rays, Advantages of optical fibre communication.

UNIT2 OPTICAL FIBERS:

Optical fiber structures & their types, Fiber characteristics: Attenuation, scattering, absorption, fiber band loss, Dispersion, Fiber couplers and connectors.

UNIT3 LED LIGHT SOURCE:

Light Emitting Diode: recombination process, LED characteristics, internal quantum efficiency, external quantum efficiency, LED structures, Lens coupling to Fiber.

UNIT4LASER LIGHT SOURCE:

Basic principles of laser action in semiconductors, optical gain, Lasing threshold, Laser structures and characteristics, Laser to Fiber coupling, Comparison with LED source.

UNIT5AVALANCHE & PIN PHOTO DETECTORS

Principles of Optical Detection, Quantum efficiency, responsivity, general principle of PIN photo detector, impulse & frequency response of PIN photo diodes. Noise in PIN photo diodes, Multiplication process, APD bandwidth, APD Noise.

UNIT6RECENT TRENDS IN OPTICAL COMMUNICATION

Optical Networking, Network Topologies, Optical TDM, Subscriber multiplexing, WDM.

TEXT BOOK:

Optical Fibre Communications: John M Senior:PHI

REFERENCE BOOKS:

1. Optical Communication Systems: John Gowar:PHI
2. Optical Fibre Communications: Gerd Keiser:TMH
3. Optical Fibre Communications: selvarajan ,Kar,Srinivas: TMH
4. Computer Networks: Tanenbaum

DIGITAL SIGNAL PROCESSING LAB

E-416

L T P CR	**CLASS WORK: 30**
- - 2 1	**EXAM: 20**
	TOTAL: 50

LIST OF EXPERIMENTS:
Perform the experiments using MATLAB:

1. To represent basic signals (Unit step, unit impulse, ramp, exponential, sine and cosine).

2. To develop program for discrete convolution.

3. To develop program for discrete correlation.

4. To develop program for amplitude modulation.

5 To understand noise effected signal & get filter signal.

6. To understand stability test.

7. To understand sampling theorem.

8. To design analog filter(low-pass, high pass, band-pass, band-stop).

9. To design digital IIR filters(low-pass, high pass, band-pass, band-stop).

10. To design FIR filters using windows technique.

11. To design a program to compare direct realization values of IIR digital filter

12. To develop a program for computing parallel realization values of IIR digital filter.

13. To develop a program for computing cascade realization values of IIR digital filter

14. To develop a program for computing inverse Z-transform of a rational transfer function.

15 To understand DFT & IDFT.

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

NETWORK PROGRAMMING LAB

EIC-316

L T P CR	**CLASS WORK: 30**
- - 2 1	**EXAM: 20**
	TOTAL: 50

The socket programming can be done on Unix/Linux operating or/and Windows. Socket programming, and the language can be C/VC++ and/or Java

1. Write a program to implement parity check.
2. Write a program to implement hamming code.
3. Write a program to implement two dimensional parity checks.
4. Write a program to determine the type of IP Address.
5. Write a program to implement slotted aloha.
6. Write a program to make an FTP Client.
7. Write a program to implement an adhock network.
8. To make cross and normal cable connection.
9. To implement a socket address.
10. To implement a lan.

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.