

Faculty of Engineering & Technology M.J.P. Rohilkhand University, Bareilly

REVISED SCHEME OF COURSES FOR B.TECH ELECTRONICS AND COMMUNICATION ENGINEERING

SI.				Teaching	
No.	Course No.	Subject	Credits	Schedule Hrs.	Total
				LTP	
1.	PH-101T	Engineering Physics-I (All Branches)	4	310	4
2.	CY-101T	Engineering Chemistry (EE, EC & EI)	4	310	4
3.	MA-101T	Engineering Mathematics-I (All Branches)	4	310	4
4.	HU-101T	Communicative English (EE, EC & EI)	3	210	3
5.	CS-101T	Computer Fundamentals & Programming (EE, EC & EI)	4	310	4
6.	ME-107 T	Engineering Graphics (CS, CH & ME)	2	120	3
7.	EE-101T	Basic Electrical Engineering (EE, EI & EC)	4	310	4
8.	EI-101T	Basic Electronics Engineering (ME, CS & CH)	4	310	4
9.	CY-103T	Environments Studies (CS, CH & ME)	2	300	3
10.	HU-103T	Fundamentals of Economics (ME, CS & CH)	2	300	3
11.	ME-101T	Manufacturing Techniques (EE, EC & EI)	2	200	2
12.	ME-105T	Basic Mechanical Engineering (CS, CH & ME)	4	310	4
		Total	22		25/25
		Laboratory Courses			
13.	PH-101P	Engineering Physics Lab (CS, CH & ME)	2	003	3
14.	CY-101P	Engineering Chemistry Lab (EE, EI & EC)	2	003	3

B.Tech I year, I Semester

15.	CS-101P	Computer Programming Lab	2	003	3
		(EE, EC & EI)			
16.	EE-101P	Basic Electrical Engg. Lab (EE, EI & EC)	2	003	3
17.	EI-101P	Basic Electronics Engg. Lab (CS, CH & ME)	2	003	3
18.	ME-101P	Workshop Practice Lab (CS, CH & ME)	2	003	3
		Total	6/6		9/9
		G. Total	28/31		34/34

B.Tech I year, II Semester

sı				Teaching	
No.	Course No.	Subject	Credits	Schedule Hrs. LTP	Total
1.	PH-102T	Engineering Physics-II (All Branches)	4	310	4
2.	CY-101T	Engineering Chemistry (CH, CS & ME)	4	310	4
3.	MA-102T	Engineering Mathematics-II (All Branches)	4	310	4
4.	HU-101T	Communicative English (CS, CH & ME)	3	210	3
5.	CS-101T	Computer Fundamentals & Programming (CS, CH & ME)	4	310	4
6.	ME-107 T	Engineering Graphics (EE, EC & EI)	2	120	3
7.	EE-101T	Basic Electrical Engineering (CS, CH & ME)	4	310	4
8.	EI-101T	Basic Electronics Engineering (EE, EC & EI)	4	310	4
9.	CY-103T	Environments Studies (EE, EC & EI)	2	300	3
10.	HU-103T	Fundamentals of Economics (EE, EC & EI)	2	300	3
11.	ME-101T	Manufacturing Techniques (CS, CH & ME)	2	200	2
12.	ME-105T	Basic Mechanical Engineering (EE, EC & EI)	4	310	4
		Total	25		25/25

	Laboratory Courses							
13.	PH-101P	Engineering Physics Lab (EE, EC & EI)	2	003	3			
14.	CY-101P	Engineering Chemistry Lab (CS, CH & ME)	2	003	3			
15.	CS-101P	Computer Programming Lab (CS, CH & ME)	2	003	3			
16.	EE-101P	Basic Electrical Engg. Lab (CS, CH & ME)	2	003	3			
17.	EI-101P	Basic Electronics Engg. Lab (EE, EC & EI)	2	003	3			
18.	ME-101P	Workshop Practice Lab (EE, EC & EI)	2	003	3			
		Total	31		34/34			

III Semester

S.No	Subject code	subjects	Teaching schedule		dule	Credits
			L	Т	Р	
1.	EC-201T	Electronics engineering materials	3	1	0	4
2.	EC-203T	Electromagnetic theory	3	1	0	4
3.	EI-201T	Analog electronics	3	1	0	4
4.	EI-203T	Electronic measurement and	3	1	0	4
		instrumentation				
5.	EE-201T	Network analysis & Synthesis	3	1	0	4
6.	MA-201T	Engineering Mathematics-III	3	1	0	4
7.	EC-201P	Electronic devices lab	0	0	3	2
8.	EC-207P	Product Design lab	0	0	3	2
9.	CS-201P	Computer programming lab-II	0	0	3	2
Total Credits					30	

IV Semester

S.No	Subject code	subjects	Teaching schedule		Credits	
			L	Т	P	
1.	EC-202T	Signal and System	3	1	0	4
2.	EC-204T	Digital Electronic	3	1	0	4
3.	EI-202T	Linear Integrated Circuits	3	1	0	4
4.	ME-212T	Industrial Management	3	1	0	4
5.	CS-204T	Computer Organization	3	1	0	4
6.	EE-202T	Element of Electrical Machines	3	1	0	4
7.	EI-202P	Leaner Integrated Circuit Lab	0	0	3	2
8.	EC-204P	Digital Electronics Lab	0	0	3	2
9.	EE-202P	Electrical Machine Lab	0	0	3	2
				Tot	al	30
		Credits				

V Semester

S.No	Subject	subjects	Teaching schedule		dule	Credits	
	code		L	Т	P		
1.	EC-301T	Analog Communication Systems	3	1	0	4	
2.	EC-303T	Antenna And Wave Propagation	3	1	0	4	
3.	EC-315T	Consumer Electronics	3	1	0	4	
4.	EI-301T	Microprocessor and Their Applications	3	1	0	4	
5.	EE-301T	Control System	3	1	0	4	
6.	EE-303T	Power Electronics	3	1	0	4	
7.	EC-301P	Analog Communication Lab	0	0	3	2	
8.	EI-301P	Microprocessor Lab	0	0	3	2	
9.	EE-303P	Power Electronics Lab	0	0	3	2	
	Total Credits 30						

S.No	Subject	Subjects	Teaching schedule		lule	Credits
	code		L	Т	Р	
1.	EC-302T	Digital Signal Processing	3	1	0	4
2.	EC-304T	Digital Communication System	3	1	0	4
3.	EC-308T	Microelectronics	3	1	0	4
4.	EC-306T	RADAR And Navigational Aids	3	1	0	4
5.	CS-302T	Data Network & Computer Network	3	1	0	4
6.	EI-302T	Microcontroller & Embedded System	3	1	0	4
7.	EC-304P	Digital Communication Lab	0	0	3	2
8.	EI-302P	Microcontroller Lab	0	0	3	2
9.	EE-301P	Control System Lab	0	0	3	2
	Total Credits				30	

VII Semester

S.No	Subject code	subjects	Teaching		5	Credits
			S	chedule	;	
			L	Т	Р	
1.	EC-415T	Mobile communication	3	1	0	4
2.	EC-403T	VLSI design &circuit	3	1	0	4
3.	EC-405T	Microwave engineering	3	1	0	4
4.		Pool elective	3	1	0	4
5.		Open elective	3	1	0	4
6.	EC-407T	Industrial training	0	0	3	2
7.	EC-409T	seminar	0	0	3	2
8.	EC-401P	Digital signal processing Lab	0	0	3	2
9.	EC-415P	Advanced wireless communication lab	0	0	3	2
10.	EC-405P	Project-I	0	0	3	2
Total Credits				30		

Pool elective :

- 1. EC-433 Digital system design
- 2. EC-435T MATLAB Programming and Application
- 3. ME-473T Work Study
- 4. CS-402T Multimedia
- 5. EI-451T PCB Design & Technology

Open elective :

- 1. PH-419T Futuristic material
- 2. MA-491T Operation research
- 3. CY-401T Polymeric Materials and their Applications

VIII Semester

S.No	Subject code	subjects	Teaching schedule		Credits	
			L	Т	P	
1.	EC-436T	Optical Fibre Communication	3	1	0	4
2.	EC-456T	Satellite Communication	3	1	0	4
3.		Pool elective	3	1	0	4
4.		Open elective	3	1	0	4
5.	EC-404 P	Microwave Lab	0	0	3	2
6.	EC-402P	Project -II	0	0	3	10
				Tota	ıl	28
		Credits				

Pool elective

1. Digital Image Processing EC-458T

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- 2. DSP Processor & Architecture EC-462T
- 3. Speech Signal Processing EC-464T

Open elective : 1. A subject from department of humanities is proposed to be floated.

Subject: Analog Electronics	Code: EI-201 T	Credits:4
Branches: EC, EI, CSIT and EE 3 1 0	Sem: III semester	LPT:

Unit 1:- Transistor as an amplifier: Transistor Biasing and thermal stabilization: The operating point, Biasing Circuits, fixed bias, bias stability, self bias or emitter bias, fixing of Q-point using graphically & analytical methods, stabilization against variation in I_{CO} , V_{BE} , β : Bias compensation Diode for I_{CO} , V_{BE} .

Unit 2:- The Transistor at low frequencies: Two port devices and the hybrid model. The h-paratmeter, determination of h-parameter from input and output characteristics. Analysis of a transistor amplifier circuit using h-parameters; the emitter follower (its modelling), miller's theorem and its dual, cascading transistor amplifier (up to 2 stages), simplified hybrid model, high input resistance transistor circuit e.g. Darlington, Emitter follower.

Unit 3:- Field effect transistors: General description on FET, JFET operations, and its characteristic, MOSFET, the FET small signal model, CS and CD amplifiers at high and low frequencies.

Unit 4:- Feedback amplifiers: Classification of amplifiers, feed back concepts, transfer gain with feedback, general characteristics of negative feedback amplifier, input and output resistances for voltage series, current series, current shunt, voltage shunt feedback, analysis of feedback amplifier (voltage series, current series, current shunt, voltage shunt feedback).

Unit 1:- Power amplifier: Class A large signal amplifier, second harmonic distortion, higher order harmonic generation, the transfer audio power amplifier, efficiency, class B, class C, class AB and pushpull amplifier.

REFERENCES

- 1. Integrated Electronics Analog and Digital circuits and systems, J. Millman, Halkias and Prikh, TMD.
- 2. Electronics Devices and Circuit Theory; Robert Boylestad&Nashlasky (PHI).
- 3. Electronics Devices and Circuit: Allen mottershed (TMH).

Subject: Electronic Measurement & Instrumentation

Code: EI-203 T Credits: 4

Branches: EC,EI

Sem: III Sem L P T: 310

Unit 1:- Measurement & measurement system: Methods of measurement, Direct & Indirect types of measurement systems, Mechanical, Electrical: Classification of Instruments, Null type, deflection type; Mode operation: Analog, Digital.

Unit 2:- Characteristics of Instrumentation & measurement System: Static & Dynamic characteristics, Noise, Linearity hysteresis, Threshold, Dead Time & Dead Zone, Loading Effect, Input & Output Impedance.

Unit 3:- Errors in measurements

Unit 4:- Dynamic response of Instruments & measuring Systems: Dynamic response, First order system, second order System

Unit 5:- Bridges: DC Bridge-Wheatstone Bridge, Kelvin Bridge, measurement of low & High Resistance; AC Bridge-General equation of bridge balance, General form of AC Bridge, Maxwell's Bridge. Hay's Bridge, Wein Bridge, Schering Bridge.

Unit 6:- Potentiometers: DC Basic Circuit, Laboratory type, Standardization of Potentiometers; AC: Drysdale polar potentiometers, Gall-Tinsley AC Potentiometer (Working & Construction both).

Unit 7:- Analog Ammeter & Voltmeter

Unit 8:- Measurement of Power & Wattmeter: Power in DC & AC Circuit, Electrodynamometer Wattmeter, Measurement of Power in 3 Phase circuit, 3 Phase Wattmeter, Measurement refractive power.

Unit 9:- CRO: Observation of waveform on CRO, Measurement of Large & frequency (Lissajious figure).

REFERENCE BOOKS

1. Electronic Measurement & Instrumentation Published, DhanpatRai& Sons, By:- A.K. Sawhney.

Subject: Electronics Engineering Materials	Code: EC-201T	Credits: 4
Branches: EC, EI	SEM: III Semester	L P T: 3 1 0

Unit 1:- Atoms & aggregates of atoms: Introduction, nomenclature pertaining to electronic states, the electron configuration of atoms, nature of the chemical bond & classification of solids.

Unit 2:- Dielectric properties of insulators in static fields: Polarization & dielectric constant, the atomic interpretation of the dielectric constant of non-atomic gases, qualitative analysis of the dielectric of non-atoms gases, qualitative & quantitative dielectric constant of poly atomic molecules, the internal fields in solids & liquids, the electric constant of solids, some properties of ferroelectric materials, spontaneous polarization piezoelectricity.

Unit 3:- Behaviour of dielectrics in alternating field: Frequency dependence of the electronic permeability, ionic polarization as a function of frequency, dielectric relaxation, dielectric losses.

Unit 4:- Magnetic properties of materials: Classification of magnetic materials, diamagnetism the origin of permanent magnetic dipoles in matters, paramagnetic spin systems, some properties of ferromagnetic materials, anti-ferromagnetic materials, ferri magnetic materials.

Unit 5:- The conductivity of metals: Relaxation time, collision time & mean free path, electron scattering & resistivity of metals, the heat developed in a current carrying conductor, the thermal conductivity of metals, superconductivity.

Unit 6:- The mechanism of conduction in semiconductor: Classifying materials as semiconductors, the chemical bond in Si &Ge and its consequences, the density of carriers in intrinsic semiconductors, the energy gap, conductivity, hall effect & carrier density.

REFERENCES

1. Electrical Engineering Materials, A.J. Dekker

Subject: Electromagnetic Theory	Code: EC-203T	Credits: 4
Branches: EC, EI	SEM: III Semester	LPT:310

Unit 1:- Elements of Vector Calculus: Co-ordinate system, differential volume, surface 7 line elements, gradient, divergence, curl and del-operator.

Unit 2:- Review of static electric field: Coulomb's Law, Electric field-intensity, electric flux and flux density, Gauss's Law, conservation properties of electrostatic field, electric potential, Energy and work in electric field, Current, current density and conductor capacitance & dielectric materials, polarization relative permittivity, multiple dielectric capacitors, energy stored in a capacitor.

Unit 3:- Review of magnetic field: Faraday's law, Lenz's law, bio-savart law, Ampere's law, Magnetic flux density, Vector magnetic potential, stokes theorem, magnetic force, Displacement current, self, internal and mutual inductance.

Unit 4:- Maxwell's Laplace's and Poisson's Equation and Boundary condition: Introduction and its applications.

Unit 5:- Electromagnetic waves: Introduction and solutions for partially-conducting perfect dielectric and good conductor mediums, skin depth, interface conditions ate normal incidence, oblique incidence and Snell's laws, perpendicular and parallel polarization, standing wave, power and the pointing vectors.

Unit 6:- Transmission Lines: Wave equation for ideal transmission line, characteristics impedence, propagation & reflection, VSWR, impedance, transformation, smith chart, parallel and co-axial transmission lines, Impedance Matching, single and double stub matching, impedance measurement, Motion of charged particles in an Electric & Magnetic Field.

REFERENCES

- 1. Electromagnetic; john D. Kraus TMH
- 2. Schaum's outline series on Electromagnetic; Joseph A. Edinister ,TataMcGraw hill inc.
- 3. Engineering Electromagnetics; Haytt, Kemmerly.
- 4. Electromagnetic wave and radiating system; John, Balmin
- 5. Engineering Electromagnetics; William Haytt

Subject: Network Analysis& Synthesis Credits: 4

Code: EE-201 T

Branches: EC, EI, EE

SEM: III Semester L P T: 310

Unit 1:- Graph Theory and Network Equation: Introduction, Graph of a Network, Tree, Co-tree; Incidence Matrix, Cut set and Tie-set matrices, Network Equilibrium Equations, Analysis of Network, Duality and Dual Network.

Unit 2:- Fourier Series: Trigonometric and Exponential forms of Non-Sinusoidal functions, Evaluation of Fourier coefficients, Waveform Symmetry, Effective value of a Non-Sinusoidal Wave, Fourier Transform.

Unit 3:- Laplace Transform: Laplace Transform and its applications, Laplace Transformation, basic theorems, Gating function, Laplace Transform of periodic functions, initial value and final value theorems, Solution of network problems.

Unit 4:- Two Port Networks: Open Circuit, Short Circuit parameters, Hybrid and inverse hybrid parameters and interrelation between them, interconnection of two port networks, input output and image impedances.

Unit 5:- Network Function: Network function, Poles and Zeros, necessary conditions for driving points and transfer functions, application of network analysis, Driving network functions, Time domain behaviour from pole zero plot.

Unit 6:- Passive network synthesis: Hurwitz polynomial, positive real functions, LC, RL, R two terminal synthesis.

Unit 7:- Attenuators: Lattice, T-type, π -type, Bridge-T, L-type, Ladder type, balanced type, insertion loss.

Unit 8:- Filters: Filter fundamentals, Constant-k low pairs, Constant-k high pass and constant-k band pass. Band elimination filters m-derived T-section, termination with m-derived half sections, m-derived band pass.

BOOKS

- 1. Network Analysis by D. Roy Chaudhary, New stage publication.
- 2. Network Analysis by Van Valkenberg, PHI.

Subject: Engineering Mathematics-III	<i>Code: MA-201 T</i>	Credits: 4
Branches: EC, EI EE and CSIT	SEM: III Semester	L P T: 3
10		

- Note: A setting of eight questions will be there covering all the units proportionally out of which any five are to be attempted.
- UNIT:1 **Ordinary Differential Equations:** First order equations (linear and non-linear). Linear equations of second and higher orders with constant and variable coefficients. Solution of second order equations by removing first derivative, changing of dependent and independent variables and method of variation of parameters.
- UNIT:2 **Special Functions & Partial Diff. Eqns:** Power Series solutions of second order equations by frobenious method. Legendre polynomials and Berel's functions of first kind and their properties method of separation of variable for heat, wave and Laplace equations: Their solutions and related application.
- UNIT:3 Integral Transforms: Laplace transform, existence theorem, Laplace transform of derivatives and integrals, Laplace transform of special functions. Inverse Laplace transform, convolution theorem. Applications of Laplace transform and its inverse to solve ordinary and partial differential equation. Introduction to Fourier transforms. Fourier series, half range sine and cosine series, related applications.

References

- 1. J.N.Sharma: Differential Equations, Krishna Prakashan Media (P) Ltd., Meerut.
- 2. B.V.Raman: higher Engineering Mathematics, Tata McGraw Hill Co., Ltd., 2008.
- 3. R.K.Jain& S.R.K. Iyenger: Advance Engineering Mathematics, Narosa Publishing House, 2002.
- 4. A.R.Vashistha: Integral Transforms KrishanPrakashan Media (P) Ltd., Meerut.
- 5. G.G.Simmons: Differential Equations, Tata McGraw Hill Co. Ltd., 1981.

Subject: Linear Integrated Circuits

Code: EI-202 T Credits: 4

Branches: EC, EI, and EE

SEM: IV Semester L P T: 310

Unit 1:- Differential Amplifiers: Introduction, Differential amplifier circuit configuration, D.C. and A.C. analysis fo dual-input balanced output, single input-balanced output, dual input unbalanced output, single input-on balanced output, differential amplifier configuration, FET differential Amplifier, an introduction, differential amplifier with swamping resistors, cascaded differential amplifier stages, cascade or CE-CB configuration.

Unit 2:- Operational Amplifiers: Introduction, Block diagram representation of typical Op-Amplifier, level transistor stage of op-amp, transistor current mirrors and active loads, output stage of op-amp, transfer characteristic of output stage, constant current bias, Thermal stability.

Unit 3:- Interpretation of data sheets and characteristics of an op-amp: Interpreting a typical set of data sheets, electrical parameters like, input offset voltage, input offset current, input bias current, CMMR, Slew rate etc. The ideal op-amp, equivalent circuit of an op-amp, ideal voltage transfer curve, open loop op-amp. Configuration.

Unit 4:- An Op-Amp. With negative feedback: Block diagram representation o feedback configuration, voltage series and voltage shunt feedback amplifier, concentrating on voltage gain, input & output resistances, bandwidth with feedback expressions, voltage follower circuits.

Unit 5:- Frequency response of an op-Amp.: Frequency response, compensating networks, high frequency op-amp., equivalent circuit, open loop voltage gain as a function of frequency.

Unit 6:- Applications of Op-Amp. & Linear I.C.'s: Summing amplifier, scaling and averaging amplifier, instrumentation amplifier integrator, differentiator, differential amp. Realization using one and two op-amp.

(i) Active filters; Advantages of active filters over passive filters, First order low pass Butterworth filter design, Second order L.P. Butterworth filter, first and second order H.P. Butterworth filters. Higher order filtered an introduction; band pass and band reject filters. All pass filter design, introduction to oscillators.

Unit 5:- 555 timer, 566 (VCO), P.L.L., - I.C.'s

REFERENCES

- 1. Op-amps & linear integrated ckts by: R.A. Gayakwad-PHI (India).
- 2. Operational amplifiers and linear integrated Ckts by Coughlin, Driscoll-PHI (India).
- 3. Linear integrated ckts by D. Roy Chaudhary, Shail Jain/New age international (P) Ltd, India.

Subject: Signals and Systems	<i>Code: EC-202 T</i>	Credits: 4
Branches: EC, EI	SEM: IV Semester	L P T: 310

- Unit 1:- Fourier analysis of signals, Amplitude, Phase and Power spectrum, Orthogonality of functions, Types of signals, Fourier transform of some useful functions, Singularity functions & its properties, Dirac Delta function & its properties, Sampling function, Laplace transform of some useful functions.
- Unit 2:- Convolution of signals, Graphical & analytical methods of convolution, sampling theorem, Nyquist rate &Nyquist interval, Aliasing, Aperture effect, Recovery from sampled signal, natural sampling, flat top sampling. Time convolution theorem, Frequency convolution theorem.
- **Unit 3:-** Power & Energy signals, Energy & Power spectral densities of signals, Cross correlation, Auto correlation.
- **Unit 4:-** Systems & Filters: Linear system, Time invariant & LTI system, Impulse response, Causal systems, Filter characteristics of linear systems, Low pass filter High pass filters, Band pass filters, Band pass, Band stop filters.
- **Unit 5:-** Random variables and probability theory, PDF, CDF and their properties, Normal and Gaussian distribution.

REFERENCES BOOKS

- 1. Modern Digital & Analog System by B.P. lathi
- 2. Communication systems by Singh & Spare
- 3. Communication systems by Simon Haykins
- 4. Digital communication systems by Taub& Schilling
- 5. Probability theory and Queuing methods

Subject: Digital Electronics	Code: EC-204 T	Credits: 4
Branches: EC, EI EE and CSIT	SEM: IV Semester	LPT:310

Unit 1:- Basic concept of Boolean algebra: Different rules for arithmetic operation, minimisation of switching functions with theorem and K-Map up to five variables, reduction techniques, prime and essential implicants, concepts of don't care condition, min. and max. Terms SOP, POS variables, entered mapping VEM, plotting & reading theory, QM methods.

Unit 2:- digital logic families: TTL, RTL, DTL, ECL, Totem pole and open collector concept, comparison of logic families.

Unit 3:- Combinational Logic: Design of combinational logic circuit using different chips/gates. Code converter: BCD-gray, excess three, encoders, decoders, multiplexers, de-multiplexers, 7-segment decoder/driver, ROM, PLA, full and half adder/subtractor, parallel adder/subtractor, look ahead carry generator, parity bit checker/generator, implementation of Boolean function with mux and decoder.

Unit 4:- Sequential logic circuit: Concept of memory storage, Latches, Flip Flops, JK, SR, T, D, Master slave, characteristic table truth table, concept of flip flop, conversion techniques, race around condition, Triggering of flip flop, classification of sequential machines, oscillators, analysis of synchronous sequential circuits, design steps for sequential circuits, state diagram, state reduction minimization of the next state decoder, o/p decoder designing.

Unit 5:- Design of single mode and multimode counter: Ripple & ring, Registers, Shift register, Shift register sequences, Ring counter using shift register and memories type of register universal and directional.

REFERENCES

- 1. Digital logic and computer design by MORRIS MANO (PHI)
- 2. Digital principles and applications by MALVING & LEACH, McGraw-Hill Book Co.
- 3. Fundamental of digital electronics by BARITTEE, TMH

- Work study, method study & work measurement including time study, work sampling, production study, PMTS, MTM, importance of time standards, rating &allowance. Work study, incentive schemes, job description, analysis & evaluation.
- Plant maintenance, preventive maintenance, maintenance strategy, value engineering. Ergonomics, safety health &environmental protection, work physiology job stress &fatigue, ergonomics of manual material handling.
- 3. Market research, principle of marketing, customers viewpoint &selective selling, functions & scope of marketing, sales forecasting techniques.
- 4. Performance measures of a Production system, Production, Productivity, Efficiency, Effectiveness, Quality, Flexibility, Agility etc.
- Organization, organization structure, department on functional charts for business & industrial organization centralized &decentralized organizations, manpower planning, requirement & forecasting, recruitment training &placement.

6. Role of IT in Systems - MIS, FMS, Japanese intherenes; JIT, Kanban, Decision, Support Systems.

Text Book:

1. Engineering Management by: Fraidoon Mazda

Reference:

2. Marketing Management by: Philip Kotler

Subject: Computer Organization	Code: CS-204 T	Credits: 4
Branches: EC, EI, CSIT	SEM: IV Semester	L P T: 310

1.Introduction: - Review of digital logic gates, Design of adder and subtractor using gates & K-MAP, functioning of multiplexer, de-multiplexer, flip-flop.

2.Arithmetic for Computer:- Introduction to number system, negative numbers, addition & subtraction, logical operation, constructing and A.L.U., multiplications & division, floating point arithmetic.

3.Processor Design:- Processor organisation, Processor Level, information representation, instruction format, Addressing modes (Implied Mode, Immediate mode, register indirect mode, auto increment or Auto decrement mode, direct addressing mode, indirect addressing mode, relative addressing mode, index addressing mode), instruction types.

4. Control Design: - Control memory address sequencing, micro instruction interpretation, CPU control unit, basic concepts of micro programmed control, micro program sequencer for a control memory, micro instruction formats.

5.Memory Organization:- Classification memories, Memory Hierarchy, Optimization of memory hierarchy, Virtual Memory, Dynamic Address Translation Scheme addressing scheme for main memory, segmented memory system, paged segment memory, memory management policies, High speed memories, characteristics of cache memory, Cache memory organisation, Block replacement policies, interleaved memories, associated memories.

6. System Organization: - Bus arbitration, Programmed I/O (IO addressing, IO instruction), DMA (Types & procedures), interrupts (procedure, interrupt selection, vectored interrupts), Concurrency Control, System management.

REFERENCES

- 1. Computer Architecture and Organization, By John P. Hayes, Me Graw Hill.
- 2. Computer organization and design, by John L. Hennessy 7 David A. Petterson, Morgan Kaufman.
- 3. Computer System Architecture, by M. Morris Mano, PHI

B-TECH. SEMESTER-IV ELEMENTS OF ELECTRICAL MACHINES EE-202T

LΤ	Р	TOTAL
3 1	0	4

UNIT-I:

TRANSFORMER:

Principle & construction of single phase transformer, EMF equation, phasor diagram, equivalent circuit diagram ,SC test, OC test, efficiency.

UNIT-II:

DC MACHINES:

Principle & construction of DC generator, types of windings, types of DC generator, OCC, load characteristics, principle & construction of DC motor, back EMF, torque equation, load characteristics.

UNIT-III:

INDUCTION MOTORS:

Principle and construction of 3-phase induction motor, concept of slip, phasor diagram. Equivalent circuit diagram, T-S characteristics.

UNIT-IV:

SYNCHRONOUS MACHINES:

Principle and construction of synchronous machines, EMF equation, OCC & SCC, synchronous impedence, principle of synchronous motor, V-curve, synchronous condenser.

Text Books:

Electrical Technology by B.L.Theraja

P.S.Bimbhra, "Electrical Machinery", Khanna Publisher

Subject: Linear Integrated Circuit Lab	Code: EI-202P	Credits: 2
Branches: EC, EI and EE	SEM: IV Semester	L P T: 003

List of Experiments

- 1. To perform inverting, non-inverting amplifier and voltage follower using 741 IC.
- 2. To perform integrator and differentiator using 741.
- 3. To determine parameters of 741 IC a) input bias current, b) input off-set current, c) input off-set voltage d) slew rate.
- 4. To perform the comparator circuit using 741 IC.
- 5. To perform the square wave generator circuits using 741 IC.
- 6. To perform the Wein Bridge Oscillator circuit using 741 IC.

Other Subjects

- 1. MA-202 Mathematics III.
- 2. EE-202 Electrical Machines.

Other Laboratories

- 1. EC-202P Digital Electronics Lab (EC, EI, CS, EE)
- 2. EE-202 Electrical Machines Lab

Subject: Analog Communication System	Code: EC-301T	Credits: 4
Branches: EC, EI	SEM: V Semester	LPT:310

Unit 1:- Modulation Process: Definition of amplitude modulation, frequency modulation & phase modulation, DSB-AM, DSB-SC-AM, using linear modulation and non linear modulation.

Unit 2:- Linear Modulation: Collector modulator or plate modulator and base modulator.

Unit 3:- Non linear modulation: Balanced moduling& ring modulator

Unit 4:- Generation of frequency modulation: Indirect method of FM i.e. Armstrong method of frequency modulation direct method of FM: reactance modulator.

Unit 5:- Demodulation/detection process: Demodulation of AM waves, diode detection 1, average detection and 2. Envelop detection, superhetrodyne receiver.

Unit 6:- Demodulation of FM or frequency discriminators: Single tuned discriminators, double tuned discriminators, foster seely discriminators, ratio detectors, and phase locked loop (PLL) demodulator.

Unit 7:- Noise: SNR (signal to noise ratio), noise figure, noise temperature of a cascaded system, S/N in DSB-SC receiver, S/N in SSB-SC receiver, S/N in FM receiver, pre-emphasis and de-emphasis.

Reference Books

1.	Communication systems	-	B.P. Lathi
2.	Communication system	-	Simon Haykin
3.	Principles of communication	-	George Kennedy
4.	Communication system	-	R.P. Singh & S.D. Spare
5.	Principles of communication system	-	Taub Shilling

Subject: Antenna & Wave propagation Code: EC-303T Credits: 4 Branch: EC Sem: V LPT:310

Unit-1: Introduction

Antenna fundamental and definition, Maxwell equation, Electromagnetic spectrum, Radio frequency band.

Unit-2: Theory of Radio wave radiation and reception

Current across closed surface, Boundary condition in electromagnetic field, Electromagnetic wave equation in dielectrics and conductors, Radiation from elementary source, Radiation of dipole of finite length, The influence of the earth and metal bodies on antenna radiation.

Unit-3: Fundamental of Antenna

Basic antenna parameter, patterns, beam area, radiation intensity, beam efficiency, directivity, antenna aperature, effective height, field from oscillating dipole, antennas field zones, polarization.

Unit-3: Types of Antenna devices

Thin linear Antenna, cylindrical antenna, Biconical antenna, Loop antenna, Helical antenna, slot and micro strip antenna, Horn antenna, Reflector antenna, Lens antenna, Wide band antenna, Terahertz antenna, frequency independent antenna, smart antenna, plasma antenna ,embedded antenna

Unit-4: Antenna Measurement

Introduction, Basic concept, Typical sources of errors in antenna measurements, Measurements of different antenna parameters (Input and mutual impedance, Radiation pattern, Gain, Phase front, Polarization).

Unit-5: Radio Wave Propagation

Propagation characteristics of electromagnetic wave, Ground or surface wave propagation, sky wave propagation, space wave propagation, Tropospheric scatter propagation

- 1. Antenna: Fusco (Pearson Education)
- 2. Antenna: J.D. Kraus (TMH)
- 3. Antenna: D-Pozar (PHI)

Subject: Consumer Electronics Branch: EC, EI Code: EC-315T Sem: V Credits: 4 LPT:310

Unit-1: Audio System

Microphones, Tape recorder, Audio compact disc system, High fidelity Audio system, Stereo sound system, loudspeaker, public address system, magnetic sound recording.

Unit-2: Television

Introduction, Radio and TV Transmission & Reception, Block diagram of TV transmitter, Television studies and Equipment, Antenna for TV transmitter, Block diagram of TV receiver, TV camera tube, Persistence of vision, scanning, Synchronization, CCTR-B System, Composite video signal, Bandwidth of TV signal, Audio signal modulation, TV channel, Television Rx antenna, Feeder cable, Balun T/F, Monochrome picture tube, Black & white TV Rx, Colour TV signal, Colour TV Rx, PAL signal, compatibility, CCTV, Cable TV, HDTV.

Unit-3: Video Cassette Recorder

VCR Principle of video recording on magnetic tapes, Block diagram of VCR, VHS, Tape transport mechanism, study of VCD & DVD.

Unit-4: Miscellaneous Devices

Digital watch, Calculators, An electronic guessing game, Cordless Telephone, Mobile telephone, Cellular telephone, Battery telephone, Battery Eliminator, Battery charger, DC supply, DC supply operational amplifier, IC regulator, UPS, Inverter, Decorative Lighting, Microwave oven, LCD tunes with alarm.

Text books:

1. Consumer Electronics: B.R. Gupta

Subject: Microprocessor & their ApplicationsCode: EI-301 T Credits: 4

Branches: EC, EI, EE, ME and CSIT SEM: V Semester L P T: 310

Unit 1:- General features of Microprocessor: Microprocessor architecture and its operation, Memory, Memory Organisation, Memory Mapped I/O mapped I/O Scheme.

Unit 2:- Architecture of 8085 Microprocessor: 8085 Microprocessor pin configuration, Internal architecture and its operation, Control signals, Flag register, Timing control unit, Decoding, Execution of an instructions and memory interfacing. Timing instruction cycle, Opcode Fetch, memory and input output read/write cycle of an instruction set.

Unit 3:- Programming Techniques of 8085 Microprocessor: How to write and execute a simple program timing and execution of the instructions, Addressing modes, programming techniques, programming technique for looping, counting and indexing, counter programs and timing delay program and timing calculations, stack operation and subroutine programs.

Unit 4:- Interrupts of 8085 Microprocessor: Hardware and software interrupts, interrupts call locations, RIM, SIM, RST 7.5, 6.5 and 5.5.

Unit 5:- Programmable interfaces of 8085 microprocessor: Programmable peripheral interface 8255, programmable interval timer 8253/8254, DMA controller 8257, and interrupt controller 8259.

Unit 6:- Microprocessor Applications: Delay subroutine, seven segment display, water level indicator, microprocessor based traffic control.

Unit 7:- Introduction of 8086 microprocessor: Internal Architecture organisation, Maximum mode and minimum mode, instruction set, initialization instructions, constructing the machine codes for 8086 instruction. Assembler directives, addressing modes, procedure and macros, re-entrant and recursive procedures.

Unit 8:- 8087 Coprocessor, Features and internal organization, RS-232, RS-442, IEEE-488, Features and architecture of 80186, 80286, 80386 & 80486.

REFERENCES BOOKS

- 1. Microprocessor Architecture programming and application with 8085/8080 by Ramesh S. Gaonkar.
- 2. Fundamentals of Microprocessor & Microcontroller by B. Ram.
- 3. Microprocessor and interfacing Programming and Hardware by Douglas V. Hall.
- 4. The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386 80486, Pentium and Pentium pro-processor, Architecture, Programming and interfacing by Berry b. Bery.

Subject: Control systemCode: EE-301TCredits: 4

Branches: EIEC and EE SEM: V Semester L P T: 310

Unit 1:- Introduction:- Basic components of a control system, open loop & closed loop systems.

- Unit 2:- Feedback Control System:- Principle of feedback, Transfer function, block Diagram and its Reduction Techniques, Signal flow graph, Effect of feedback on parameters variations and disturbance signal.
- Unit 3:- Mathematical Modelling of physical System:- Modelling of translation and rotation mechanical systems, electrical systems, transfer function of these systems.
- Unit 4:- Time Response Analysis:- Time response of first & second order systems, steady-state errors, and error constant, Time domain specifications of second order systems. Basic concepts of P, PD, PI, PID controllers.
- Unit 5:- Stability:- basic concepts, BIBO stability, asymptotic stability, Routh-Hurwitz Criterion.
- Unit 6:- Root Locus Techniques:- Basic properties & construction of root loci.
- **Unit 7:- Frequency domain specification:-** Frequency domain specification, Bode plots, Polar plots, Nyquist stability criterion, Gain & Phase Margins, M & N-circles, Nichols chart.
- Unit 8:- Compensator Design:- Basic concepts of lag, lead & lag-lead compensators.

BOOKS

- 1. Control System Engineering by Nagrath&Gopal (New Age)
- 2. Modern Control Engineering by K. Ogata (PHI)
- 3. Automatic Control System by B.C. Kuo, PHI

Subject: Power Electronics	Code: EE-303T	Credits: 4
Branches: EI, EC and EE	SEM: V Semester	L P T: 310

- Unit 1:- Introduction:- Solid State Power Devices, Construction & Characteristics of Power Diode, Fast recovery Diode, Transistor, MOSFET, IGBT, GTO, TRIAC and DIAC, Dynamic characteristics of SCR, Gate Characteristics, Ratings, Mountings, Protection, Series & Parallel Connections, Snubber Circuit.
- **Unit 2:-** Firing Circuit & Commutation Techniques:- R.R-C, UJT & Static Firing Circuits, Commutation Techniques-Line Commutation, Resonance Communication, External Pulse Commutation; Current & Voltage Commutation-Auxiliary & Complementary.
- Unit 3:- AC Regulator:- Single Phase AC Regulator, Synchronous Tap Changer, Multistage Regulators, 3-Phase AC Regulator and speed control of AC Motors using ac regulator.
- Unit 4:- AC to DC Converters:- Single Pulse, Mid-point & Bridge type two-pulse converters, Semi converter, 3-phase mid-point & Bridge converters, Single-phase & 3-phase Dual-converters-circulating & Non-Circulating Current Schemes, PWM Techniques, Speed Control of D.C. Motor using Converters.
- Unit 5:- DC Choppers:- Step-down & Step-up Choppers, Single, Double 7 Four-Quadrant Choppers, Control Strategies, Voltage & Current Commutated Choppers, Multiphase Chopper, Speed Control of DC Motor using Chopper.
- **Unit 6:- Inverters:-** Mid-point & Bridge type 1-inverter, 3-inverter-120⁰ & 180⁰ conduction schemes, Modified McMurray inverter, McMurray Bedford inverter, Morgan inverter, Current Source inverter, CSI vs. PWM techniques, speed control of AC motors using inverters.
- Unit 7:- Cyclo-converters:- 1-&3-Cyclo-converters, mid-point & bridge type cycle-converters, advantage of cyclo-converters.

BOOKS

- 1. Power Electronics Circuits, Devices 7 Application by M. Rashid, PHI
- 2. Power Electronics & Introduction to Drives by A.K. Gupta & L.P. Singh, DhanpatRai.
- 3. Power Electronics by P.S. Sen, TMH

Subject: Digital signal processing	<i>Code: EC-302T</i>	Credits: 4
Branches: EI, EC	SEM: VI Semester	LPT:310

- Unit 1:- Discrete time Signals & Systems:- Discrete-time signals, discrete time systems, analysis of discrete time linear system-invariant systems.
- **Unit 2:-** The Z-transform:- The Z-transform, properties of Z-transform, Inversion of Z-transform, one sided Z-transform.
- **Unit 3:- Discrete Fourier Transform:-** Its properties & applications; Discrete Fourier Transform, properties of Discrete Fourier Transform, linear filtering methods based on DFT.
- **Unit 4:- Efficient computation of the DFT:-** Fast Fourier Transform, FFT algorithms, application of FFT algorithms.
- Unit 5:- Implementation of Discrete-time system:- Structure of the realization of discrete-time systems, structures, of FIR systems, structures of HR systems.
- **Unit 6:- Design of digital Filters:-** General considerations, design of FIR filter, design of HR filters from analog filters.

REFERENCE BOOKS

- 1. Digital signal processing (principles, algorithms and applications) by John G. Proakis&Dimitris G. Manolakis, PHI
- 2. Digital signal processing by Alan V. Oppenheim and Ronal W. Schafer.
- 3. Introduction to Digital System Processing by Roman Kook., McGraw hill international editions.

Subject: Microcontrollers and Embedded Systems

Code: EI-302 T

Credits: 4

Branches: EC, EI,

SEM: VI Semester L P T: 310

Unit 1:- Introduction of Microcontrollers: Introduction, basis architecture, differences between microprocessors and microcontrollers, overview of the 8051 family, 8-bit and 16-bit microcontroller.

Unit 2:- 8051 Microcontroller: Architecture, pin description, input-output port and their functions, Memory organization, Timer/Counters, Serial port, Parallel ports.

Unit 3:- Instruction Sets and Programming of 8051 Microcontrollers: Instruction set, Address modes, Assemblers and Compilers, 8051 assembly language programming, 8051 timer programming, Basic registers of the Timer and programming in different modes, 8051 Counters programming, basic registers of the counters and programming in different modes, serial port programming.

Unit 4:- Real world interfacing of 8051 with: LED, Seven segment display, LCD, push button and Relay, keyboard, ADC and DAC, Stepper motor, Bridge and DC motor.

Unit 5:- Introduction to Advanced Microcontrollers: Introduction and Architecture of PIC, ARM, AVR and AT 89C2051 Microcontroller.

Unit 6:- Embedded Systems: An introduction to embedded system, classification of embedded systems.

Recommended Books

- 1. The 8051 Microcontroller and Embedded System-M.A. Mazidi, Pearson Education.
- 2. Microcontrollers-A.J. Ayala, Penram International Publishing (1) Pvt. Ltd.
- 3. 8051 Microcontroller-I. Scott Mackenzie.
- 4. Microcomputer systems, The 8086/8088 family-Liu & Gibson, prentice Hall of India.
- 5. The 8086/8088 Family-Design, programming and interfacing-John Uffenbeck-Prentice Hall of India.
- 6. Microprocessor Architecture, programming and applications with 8085-R.K. Gaonkar, New Age International Publishers.

Subject: Digital Communication System	Code: EC-304T	Credits: 4
Branches: EC, EI,	SEM: VI Semester	L P T: 310

- **Unit 1:-** Introduction to Digital Communication, Basic Building Blocks, Sampling Process, natural & flat Top samplings, Aperture effect, equalization, PAM, channel BW for PAM signals, signal recovery through holding.
- **Unit 2:-** Quantization of signals, Quantization error, Companding, PCM, and PCM Building blocks, multiplexing PCM Signals, T1 Digital System, Line Coding, Bit rate, DPCM.
- **Unit 3:-** Delta Modulation, Slope overloading, Adaptive delta Modulation, Digital Modulation Techniques, BPSK, ASK, ASK, DPSK, QLSK, Transmitter & Receiver Probability of error of Different Modulation Techniques, Expansion.
- **Unit 4:-** Data Transmission, Different Signals, Integrator Response, Optimum filter and matched filter, transfer functions calculation, Probability of error calculation for matched filter, correlation reception of signals, Noise calculation in PCM & DM Systems.
- Unit 5:- Information Theory, Absolute & conditional Joint entropy schemes rate of information mutual information, Noise free channel, channel with independent input & output channel capacity, Binary symmetric channel, BEC channel, reception of signals, Shannon Hartley Theorem, capacity of Gaussian channel, BW S/N trade off, coding techniques, coding efficiency, Binary, Shannon Fanon, Huffinan coding error control code, Block codes, Linear block code, hamming distance, error correcting code, cyclic code, convolution codes.

REFERENCES

- 1. Communication System, Taub Schilling Pub-Tata McGraw Hill.
- 2. Communication System, Kennedy Pub-Tata McGraw Hill
- 3. Communication System, Singh & Spare Pub-Tata McGraw Hill
- 4. Digital Communication; L.A. Glover Pub-PHI, New Delhi.
- 5. Electronics Communication; Dennis Reddy & John Cooten
- 6. Communication Systems by Simon Haykins.

Subject: Microelectronics Branch: EC Code: EC-308T Sem: VI Credits: 4 LPT:310

UNIT-1:

Introduction to monolithic silicon integrated circuits, Processing technology, Silicon processing, Crystal growth, Vapour phase epitaxy, Chemical vapour deposition, Molecular beam epitaxy.

UNIT-2:

Oxidation, Doping processes: Diffusion & Ion implantation, Isolation techniques: p-n junction isolation & dielectric isolation.

UNIT-3:

Metallization: Vacuum evapouration& Cathode sputtering, Etching Processes: Wet etching & Dry etching or Plazma etching, Reactive plazma etching apparatus.

UNIT-4:

Photolithography: Photo mask fabrication, Photo etching, Photo resist, Electron beam lithography: Resists, electron optics, printing techniques, X-ray lithography: X-ray resist, X-ray sources, Printing techniques, X-ray masks, Synchrotron radiation. Ion beam lithography, Comparison of various lithography's.

UNIT-5:

Fabrication process sequence for Bipolar, NMOS, CMOS.

- 1. V.L.S.I. Technique: S.M.S.-Publisher McGraw Hill.
- 2. V.L.S.I. Design Analog & Digital Technique: Geiger (Publisher McGraw Hill)

SUBJECT: Radar And Navigational AidsCode: EC-306TCredit:4Branch: ECSem: IVLPT:310

Unit 1:- Introduction: Basic Concepts, transmission mode, categories of network.

The OSI model, functions of the layers, interface services, Connections and connectionless oriented services, Services primitives.

Unit 2:- The physical layer: Transmission media, switching, Circuit switching & Packer switching, Message switching.

Unit 3:- Date link layer: Data Link Control:- Line Discipline, Flow Control, Error Control.

Data Link Protocol:- A Synchronous Protocol & Synchronous Protocols.

Unit 4:- Medium Sub Access sub layers: The channel allocation problem, Topologies: asymmetric and symmetric, Multiple Access protocol, IEEE Standard 802 for LAN & MANS. (IEEE 802.3 (Ethernet)), IEEE 802.4 (Token ring), IEEE 802.5 (Token Bus), IEEE 802.6 (DQDB).

Unit 5:- Network layer: Network layer: design issue, Routing, Algorithms (types and characteristics), Shortest path routing, Flooding, Distance vector routing, Link State routing. Congestion control algorithms; General principles of congestion control, congestion prevention policies, traffic shaping.

Unit 6:- Introduction to Routers: Bridges, ATM, ISDN, SNMP, HTTP, FTF, TELNET, POP3, SLIP, Network Simulator (NS-2).

REFERENCES BOOKS

- 1. Data Communication and network by Stalling, PHI.
- 2. Computer networks by A.S. Tannebaum, PHI.
- 3. Data Network by Bertisekar D, Gallegar R. PHI.
- 4. Data communication and networking by Behrouz A Forouzan, TMH

Credits: 2

Branches: EC, EI,

Programming Practices on 8051 etc microcontroller universal kits and

- 1. Interfacing with LED
- 2. Interfacing with Seven Segment Display
- 3. Interfacing with LCD
- 4. Interfacing with Push Button and Relay
- 5. Interfacing with keyboard
- 6. Interfacing with ADC and DAC
- 7. Interfacing with Stepper Motor
- 8. Interfacing with H-Bridge
- 9. Interfacing with CD Motor
- 10. Design of small embedded system projects

VLSI Design & Circuits

EC-403 T

SEM:VII

Credits 4 (Pool Elective)

- UNIT:1 MOS transistor, Depletion MOS Transistor, Enhancement MOS Transistor, basic Inverter device, Sizing Enhancement load verses load inverters, basic NMOS NOR logic circuit, basic NMOS NAND logic circuit, multi input NAND & NOR logic circuit.
- **UNIT: 2** A basic C MOS inverter, CMOS inverter logic levels, inverter device sizing. CMOS NOR logic gate, CMOS NAND logic gate, Multi-input CMOS logic gate, NMOS pass transistor, CMOS, Transmission gate.
- UNIT :3 Ratio logic model, Process characteristics time const, inverter pair delay, super Buffer NMOS NAND & NOR DELAY, Enhancement v/s depletion load, CMOS logic delay, interconnection Characteristics capacitive loading logic fan out delay, distributive drivers, NMOS power dissipation, CMOS power dissipation, Resistive noise coupling, capacitive noise coupling, NMOS noise margin, CMOS noise margin.
- **UNIT :4** Structured gate layout, logic gate arrays, Dynamic MOS storage circuit, simple shift register, other shift register, clock CMOS logic Evaluate, logic Domino CMS.
- UNIT :5 Semiconductor memory, memory organization, ROM design, EPORM, EEPROM, Static RAM, Storage cell, decode and selector circuit, select time delay calculation, optimum precharge voltage concept, dynamic RAM cell, sense amplifier, Stick rules & Diagrams.

References:

- 1. VLSI design & circuits by Geige: Publisher Mc-Graw Hill
- 2. VLSI design & circuit by Shoji.
- 3. VLSI design by Puknell.
- 4. Design technique for analog and digital circuits by L.Geizer, Philip E.allen, NoelR.starder.

Open Elective (SYLLABUS)

Code: HU-449TSubject : Principle of ManagementCredits 4(3-1-0)

UNIT 1: Management as a discipline: Definition, nature, scope, functions, managerial Skills, Management. Thought-Historical Prospective, Social Responsibility, of Business.

- **UNIT2:** Planning: Concept and purpose, planning process, Management, By Objectives (MBO), Decision making.
- **UNIT3:** Organization: Concept and purpose of organisation, types of organisation, bases of Departmentation, concept of Authority and Responsibility, Span of Management, Line and Staff Authority, Functional Authority, Delegation of Authority, Centralization and Decentralization of Authority, Coordination Staffing.
- **UNIT4:** Directing: Leadership Concept, Ingredients, Traits, Styles, Roles Communication Concept. Types, Process Barriers, Making Communication effective, Importance.
- **UNIT5:** Controlling: Concept, Provides, Requirements, for adequate control, controlling and earning, Budgeting control Importance, Management Audit, Management in future.

MA-491T Mathematics (Operation Research) Credits 4(3-1-0)

- **UNIT 1: Introduction:** Definition of O.R. and it's scope, modelling in O.R. General methods for solving O.R. models. The Montocarlo technique, main characterstic of O.R. main phases of O.R. Linear programming problems. Graphical method for solve L.P.P., Two phase Method, Big-M Method, problems of tie.
- **UNIT 2: Assignment Model :**Mathematical formulation of assignment model, Reduction theorem, problems of maximisation&minimisation. Hungarian process, travelling salesman problems.
- **UNIT 3: Transportation Model :**Mathematical formulation of transportation problem. Definition of BFS, IBFS, Optimum solution.Algorithm of N-W rule, Least-cost & VAM and their problem
- **UNIT 4: Sequencing :**Introduction, principle assumtions processing of jobs through two, three & m machine's.
- **UNIT 5: Game Theory :**Characteristic of Games. Basic definitions, minimax criterion and optimal strategy.Equavalence of rectangular Games, Dominance process, Arithmatic method for solving zero-sum-two person Games.Graphical and simplex methods for solving the games.
- UNIT 6: Replacement: Replacement of item that fail completely.

UNIT 7: Inventory :Elementry Inventory Models, Inventory models with price breaks.

List of Pool Elective:

- 1. EI-402 PCB Design & Technology
- 2. EI-456 Aircraft Instrumentation
- 3. EC-458 Digital Image Processing
- 4. EC-460 Microwave Integrated circuit

PH 419T

Futuristic Materials

Semiconductors :

Introduction of semiconductors.intrinsic and extrinsic, II-VI and IIIV semiconductors and its alloys, Advantages and necessity of the tailoring of semiconductor, Semiconductors and it alloys used of LED and other devices, Utility of semiconducting alloys like GaAIAs, GaAIN, GaAIP etc.

Superconductors:

Fundamenal Phenomena associated with sumerconductors. Type I& II superconductors, MeissnerOchenfeld effects, Josephon effects, fundamental of BCS theory. Novel High Temperature Superconductors.Hole superconductors, TIBaCaCuO single and bilayer. Electron superconductors NdCuO etc.Doping effects in superconductors, Organic superconductors, fullerenesl.Application of the superconductors in science, medical and commercial sectors.

Material for Magnetic media:

Material useful for magnetic recording head, magnetic disk, magnetic tape media, Magneto optic recording materials. Holography, data storage materials.

Holography:

Fundamentals of holography, Difference between conventional photography and holography. Techniques to make a hologram. Advantages of holography over other techniques.

Introduction of following with applications :

Fibre optics, Lasers, Ceramics, Dielectric Chactrization of Materials

Books: 1) Superconductivity Today: T.V. Ramakrishnan& C.N.R. Rao Wiley astern Pvt. Ltd, New Delhi, 1992
2) Solid State Physics: Ashcrost/Mervin

List of Pool Elective:

1.	EC-435	Optical Fiber communication
2.	EC-452	PC Interfacing
3.	EC-403	VLSI Design and circuit
4.	EI-435	Antenna Engineering
5.	CS-402	Multimedia
6.	ME-473	Work Study
7.	EI-437	Digital System Engineering
8.	EI-439	Virtual Instrumentation

Subject: Microelectronics Code: EC-308T

Cre

Credits: 4 Branch: EC Sem: VI

UNIT-1:

Introduction to monolithic silicon integrated circuits, Processing technology, Silicon processing, Crystal growth, Vapour phase epitaxy, Chemical vapour deposition, Molecular beam epitaxy.

UNIT-2:

Oxidation, Doping processes: Diffusion & Ion implantation, Isolation techniques: p-n junction isolation & dielectric isolation.

UNIT-3:

Metallization: Vacuum evapouration& Cathode sputtering, Etching Processes: Wet etching & Dry etching or Plazma etching, Reactive plazma etching apparatus.

UNIT-4:

Photolithography: Photo mask fabrication, Photo etching, Photo resist, Electron beam lithography: Resists, electron optics, printing techniques, X-ray lithography: X-ray resist, X-ray sources, Printing techniques, X-ray masks, Synchrotron radiation. Ion beam lithography, Comparison of various lithography's.

UNIT-5:

Fabrication process sequence for Bipolar, NMOS, CMOS.

Text books:

- 1. V.L.S.I. Technique: S.M.S.-Publisher McGraw Hill.
- 2. V.L.S.I. Design Analog & Digital Technique: Geiger (Publisher McGraw Hill)

3. Integrated Electronics: K.R.Botkar (Khanna Publisher)

Subject: RADAR and Navigational Aids Code: EC-316T Credits: 4 Branch: EC Sem: VI

Unit-1: Introduction to RADAR

Basic Radar – The simple form of the Radar Equation-Radar Block Diagram-Radar Frequencies – Applications of Radar – The Origins of Radar The Radar Equation Introduction-Detection of Signals in Noise-Receiver Noise and the Signal-to-Noise Ratio-Probability Density Functions-Probabilities of Detection and False Alarm-Integration of Radar Pulses-Radar Cross Section of Targets-Radar cross Section Fluctuations-Transmitter Power-Pulse Repetition Frequency-Antenna Parameters-System losses – Other Radar Equation Considerations.

Unit-2 MTI and Pulse Doppler Radar

Introduction to Doppler and MTI Radar-Delay –Line Cancelers-Staggered Pulse Repetition Frequencies –Doppler Filter Banks -Digital MTI Processing -Moving Target Detector Limitations to MTI Performance -MTI from a Moving Platform (AMIT) -Pulse Doppler Radar

- Other Doppler Radar Topics-Tracking with Radar –Monopulse Tracking –Conical Scan and Sequential Lobing -Limitations to Tracking Accuracy -Low-Angle Tracking -Tracking in Range - Other Tracking Radar Topics -Comparison of Trackers -Automatic Tracking with SurveillanceRadars(ADT).

Unit-3: Detection of Signals in Noise

Introduction – Matched –Filter Receiver –Detection Criteria – Detectors –-Automatic Detector -Integrators -Constant-False-Alarm Rate Receivers -The Radar operator -Signal Management -Propagation Radar Waves -Atmospheric Refraction -Standard propagation -Nonstandard Propagation -The Radar Antenna -Reflector Antennas -Electronically Steered Phased Array Antennas -Phase Shifters -Frequency-Scan Arrays Radar Transmitters-Introduction –Linear Beam Power Tubes -Solid State RF Power Sources -Magnetron -Crossed Field Amplifiers Other RF Power Sources -Other aspects of Radar Transmitter. Radar Receivers -The Radar Receiver -Receiver noise Figure -Superheterodyne Receiver -Duplexers and Receiver Protectors-Radar Displays.

Unit-4: Introduction - Four methods of Navigation

Radio Direction Finding - The Loop Antenna -Loop Input Circuits -An Aural Null Direction Finder -The Goniometer -Errors in Direction Finding -Adcock Direction Finders -Direction Finding at Very High Frequencies -Automatic Direction Finders -The Commutated Aerial Direction Finder -Range and Accuracy of Direction Finders Radio Ranges -The LF/MF Four course Radio Range -VHF Omni Directional Range(VOR) -VOR Receiving Equipment Range and Accuracy of VOR -Recent Developments. Hyperbolic Systems of Navigation (Loran and Decca) -Loran-A -Loran-A Equipment -Range and precision of Standard Loran -Loran-C -The Decca Navigation System -Decca Receivers -Range and Accuracy of Decca -The Omega

System.

Unit-5:

DME and TACAN -Distance Measuring Equipment -Operation of DME -TACAN -TACAN Equipment, Aids to Approach and Landing -Instrument Landing System -Ground Controlled Approach System -Microwave Landing System(MLS) Doppler Navigation -The Doppler Effect - Beam Configurations -Doppler Frequency Equations -Track Stabilization -Doppler Spectrum - Components of the Doppler Navigation System -Doppler range Equation -Accuracy of Doppler Navigation Systems. Inertial Navigation -Principles of Operation -Navigation Over the Earth - Components of an Inertial Navigation System -Earth Coordinate Mechanization -Strapped-Down Systems -Accuracy of Inertial Navigation Systems. Satellite Navigation System -The Transit System -Navstar Global Positioning System (GPS)

- 1. Introduction to Radar Systems: Merrill I. Skolnik (TMH)
- 2. Navigation: Nagrajan

Subject: Digital System Design Code: EC-433T Credits: 4 Branch: EC Sem: VII

UNIT-1: Digital Design Fundamentals & Design of Combinational Circuits:

Hardware Aspects Related to ASSERTED and NOT-ASSERTED conditions, The Karnaugh Map, Five and Six Variable Maps, Prime and Essential Implicants, Variable-Entered Mapping, VEM Plotting Theory, VEM Reading theory, Tabulation Method.

UNIT-2: Sequential Machine Fundamentals

The Need for Sequential Circuits, Basic Architectural Distinctions between Combinational and Sequential Circuits, Concept of Memory, The Binary Cell, Fundamental Differences between Sequential Machines, The Flip-Flop, Flip-Flop Conversion from one type to another.

UNIT-3: Traditional Approaches to Sequential Analysis and Design

Introduction, Analysis of Synchronous Sequential Circuits, Approaches to the Design of Synchronous Sequential Finite State Machines, Design Steps for Traditional Synchronous Sequential Circuits, State Reduction, Counters, Shift Register, Shift Register Sequences.

UNIT-4: Asynchronous Finite State Machines

Why Asynchronous Circuits, Scope, Asynchronous Analysis, The Design of Asynchronous Machines.

UNIT-5: Introduction to VHDL

Introduction to Hardware Descriptive Languages, Types of Modeling and Fundamental to VHDL Programming

- 1. An Engineering Approach to Digital Design: William I. Fletcher (PHI)
- 2. Digital Design: Morris Mano (PHI)

Subject: VLSI Design & Circuits Code: EC-403T Credits: 4 Branch: EC Sem: VII

UNIT-1:

MOS transistor, Depletion MOS Transistor, Enhancement MOS Transistor, Basic inverter device, Sizing, Enhancement load verses load inverters, Basic NMOS NOR logic circuit, Basic NMOS NAND logic circuit, Multi input NAND & NOR logic circuit.

UNIT-2:

A basic CMOS inverter, CMOS inverter logic levels, Inverter device sizing. CMOS NOR logic gate, CMOS NAND logic gate, Multi-input CMOS logic gate, NMOS pass transistor, CMOS Transmission gate.

UNIT-3:

Ratio logic model, Process characteristics time constant, Inverter pair delay, Super buffer NMOS NAND and NOR delay, Enhancement v/s depletion load, CMOS logic delay, Interconnection characteristics, Capacitive loading, Logic fan out delay, Distributive drivers, NMOS power dissipation, CMOS power dissipation, Resistive noise coupling, Capacitive noise coupling, NMOS noise margin, CMOS noise margin.

UNIT-4:

Structured gate layout, Logic gate arrays, Dynamic MOS storage circuit, Simple shift register, other shift register, Clock CMOS logic, Evalute logic, Domino CMOS.

UNIT-5:

Semiconductor memory, Memory organization, ROM design, EPROM, EEPROM, Static RAM, Storage cell, Decode and selector circuit, Select time delay calculation, Optimum precharge voltage concept, Dynamic RAM cell, Sense amplifier, Stick rules & diagrams.

- 1 VLSI Design & circuits: Geige (Publisher Mc. Graw Hill)
- 2 VLSI Design & circuits: Shoji
- 3 VLSI Design: Puknill
- 4 Design technique for Analog and Digital circuits: L.Geizer, Philip E.Allen& Noel R.Starder.

Subject: Optical Fiber Communication Code: EC-436T Credits: 4 Branch: EC Sem.: VII UNIT-1:-Introduction:

Historical development, The general system, Advantage of optical fiber communication.

UNIT-2:-Optical fiber waveguides

Total internal reflection, Acceptance angle, Numerical aperture, Skew rays, Modes in planer guides, Phase and group velocity. Cylindrical fiber Modes, Mode coupling, Step index fibers, Graded index fibers.

UNIT-3:-Transmission Characteristics of optical fibers

Attenuation, Intrinsic absorption, Intrinsic & Extrinsic absorption, Linear & non-linear scattering, Rayleigh scattering, Mie scattering, Stimulated Brillouin scattering, Stimulated Raman scattering, Fiber bend loss, Mid infrared and far infrared transmission, Dispersion.

UNIT-4:-Optical fibers and cables

Preparation of optical fibers, Liquid phase (melting) techniques, Vapour phase deposition techniques, Fluoride glass fibers, Optical fiber, Optical fiber cable, Stability of the fiber transmission characteristics.

UNIT-5:-Optical sources

LASER, Basic concepts of LASER, Optical emission from semiconductors, Injection LASER characteristics, LED characteristics, Modulation.

UNIT-6:-Optical detectors

Device types, Optical detection principles, Quantum efficiency, Semiconductor photodiode, Midinfrared photo diodes, Photo transmitter, Photo conductive detectors.

UNIT-7:-Optical fiber systems

Basic system, Modulation formats, Demodulation schemes, Optical transmitter, Optical receiver, Optical power budgeting.

UNIT-8:-Optical Fiber Measurements

Fiber numerical aperture measurements, Reflection and optical return loss, Field measurement, Fiber attenuation measurements.

UNIT-9:-Applications and future developments

Military applications, Computer applications, Local area networks, Public network application, Medical applications.

Text Book:

- 1 Optical fiber communication: John M. Senior (PHI)
- 2 Optical fibers and fiber optic communication systems: Subir Kumar Sarkar (Publisher S.Chand& Company Ltd)
- 3 Optical fiber communication: Keiser (Publisher Mc. Graw Hill)
- 4 Optical communication systems: J. Franz, V.K. Jain (Publisher Narosa publishing house)

Unit-1: Introduction to Microwave

Microwave, Low frequency v/s Microwaves frequency, Microwave signal propagation, Advantages and application of microwave, Interaction b/w electron and fields.

Unit-2: Transmission Media, Transmission line and Waveguides

Transmission line propagation modes, Transmission line parameters, Scattering matrix, Smith chart, Waveguide (Rectangular and circular), Mathematical analysis of propagation modes and cut-off wavelength.

Unit-3: Microwave Components

Coupling probes and loops, Windows, Waveguide junctions, Directional couplers, Isolators and circulators, Waveguide flanges, Rotating joints, Attenuators, Phase shifters, Cavity Resonators, Wave meters, Hybrid ring, slotted line, Strip lines and micro strip lines ,quarter wave transformer, microwave filters

Unit-4: Microwave Tubes

Limitation of gridded tubes at high frequency, Klystron, Megnetron, CFA, TWT, BWO, Gyrotron, Peniotron, Comparison of microwave tubes.

Unit-5: Semiconductor Microwave Devices & Integrated circuits

Parametric amplifier, PIN diode, Tunnel diode, Gun diode, Impact diode, Trapatt diode, Barritt diode, Mitatt diode, MFET's, MMIC's.

Unit-6: Microwave Measurements

Network analysis, Microwave power measurements, Noise measurements, Spectrum analysis, and Frequency counter.

- 1. Microwave Engineering: Lio
- 2. Microwave Engineering: R.E. Collin
- 3. Microwave Engineering: D-Pozar
- 4. Microwave Engineering: Annapurna Das Sisir K Das

Subject: Antenna Engineering	Code: EI-435T	Credits: 4	Branch: EI	Sem : VII
Subject. Antenna Engineering	Cout. E1-4551	Cituits. 7	Diancii, El	

UNIT-1:-Elements of Antenna Theory

Antenna action, Antenna parameters; Gain, Power gain, Directive gain, Antenna resistance and its efficiency, Radiation from a short dipole, half wave dipole. Short monopole, Hertizen dipole, Pointing vector & power flow, Power & field pattern, Antenna aperture.

UNIT-2:-Types of antennas

Folded dipole, Loop &Bicanonical antenna, Rhombic antenna, Turnstile antenna, Helical antenna, Log periodic antenna and Parabolic reflectors.

UNIT-3:-Antenna arrays

Two element array: Broad side array, end fire array. Linear arrays multiplication of patterns, Bionomial array, Chebyshev array and Yagi-Uda array.

UNIT-4:-Antenna measurements

Effective area, Total resistance of Ariel, Effective height & radiation resistance.

- 1. Antennas: J D Kraus
- 2. Antenna & Wave propagation: K. D. Prasad
- 3. Electromagnetic Waves & radiating system: Edward C. Jordan, Keith G. Balmain

UNIT-1: Digital Image Processing Fundamentals & Image Enhancement

Introduction of Digital Image Processing, Origins of Digital Image Processing and its Applications, Fundamental steps in Digital Image Processing, Components of an Image Processing System, Some Basic Relationships Between Pixels, Some Basic Level Transformations, Histogram Processing, Smoothing Spatial Filters, Sharpening Spatial Filters, Filtering in the Frequency Domain, Sharpening Frequency Domain Filters.

UNIT-2: Image Transform

Orthogonal and unitary transforms, Transform frequency, Optimum transform, Properties of unitary transforms, DFT, Dimensional and two Dimensional, Cosine transform, Sine transform, Hadamard transform, Harr transform, Slant transform, KL transforms and their properties.

UNIT-3: Image Restoration and Image Compression

A Model of Image Degradation/Restoration Process, Noise Models, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Fundamental of Image Compression, Image Compression Models, Error-Free Compression, Lossy Compression.

UNIT-4: Image Morphology and Image Segmentation

Introduction of Morphological Image Processing, Dilation and Erosion, Opening and Closing, The Hits-or-Miss Transformation, Some Basic Morphological Algorithms, Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation.

UNIT-5: Image Representation, Description and Recognition

Introduction of Image Representation & Description, Boundary Descriptors, Regional Descriptors, Object Recognition.

- 1. Digital Image Processing: Anil Kr. Jain
- 2. Digital Image Processing: Rafael C.Gonzalez& Richard E. Woods

Subject: Satellite Communication Code: EC-456T Credits: 4 Branch: EC Sem: VIII

UNIT-1: Introduction Origin of Satellite Communication, Brief History of Satellite Communication, Current State of Satellite Communication.

UNIT-2:

Orbital Aspects of Satellite Communication: The equations of the orbit, Describing the orbit, Locating the satellite in the orbit, Locating the satellite with respect to the earth, Orbital elements, Orbit determination. Orbital Perturbations: Effects of earth's oblateness, Effects of sun & moon. Orbital effects in Communication system performance: Doppler Shift, Range variation, Sun transit outage, Eclipse effect.

UNIT-3: Spacecraft

Space craft subsystems, Attitude and orbit control system, Telemetry tracking and command, Power systems, Transponders, Space qualification.

UNIT-4: Satellite link design

Basic transmission theory, System noise temperature and G/T ratio, Design of downlinks, Uplink design.

UNIT-5: Modulation and multiplex techniques for satellite links

Analog television transmission, Digital transmission of voice.

UNIT-6: Earth station technology

Earth station design for low system noise temperature, Large earth station antennas, Basic antenna theory, Antenna noise temperature, Design of small earth station antennas, FDM system, TDM system.

- 1. Satellite Communication: Timothy Pratt & Charles W. Bostian.
- 2. Electronic Communication System; George Kennedy
- 3. Satellite Communication: D.C. Agarwal

Unit-1: Introduction to wireless communication

Evolution of mobile radio communication, examples of wireless comm. Systems, paging systems, cordless telephone systems, comparison of various wireless comm. systems, modern wireless communication systems : second, third and fourth generation wireless networks, WLL, WLAN, Bluetooth, PAN.

Unit-2: Introduction to cellular mobile systems

Spectrum allocation, basic cellular systems ,performance criteria, operation of cellular systems, analog cellular systems, digital cellular systems, frequency reuse, channel assignment , handoff strategies , capacity of cellular systems

Unit-3: Multiple Access Techniques

Introduction to multiple access techniques: FDMA, TDMA, CDMA, Performance of CDMA systems, Comparison of various multiple access techniques, RAKE receiver.

Unit-4: Digital modulation techniques for wireless communication

Performance analysis of BPSK, DPSK, QPSK, M-ary FSK, MSK, QAM, OFDM for Wireless transmission.

Unit-5: Fading

Propagation path loss, free-space propagation model, outdoor and indoor propagation models, multipath fading frequency dispersive, time dispersive and frequency dispersive channels, delay spread and coherence band with

Unit-6: Diversity and basic Combining methods

Diversity and types of Diversity: time Diversity, antenna Diversity, frequency Diversity, Combining methods: selection combiner, maximal ratio combiner, equal gain combiner.

- 1. Wireless Communication: Theodore S Rappaport
- 2. IS-95 CDMA: Vijay K Garg
- 3. Communication Systems: Simon Haykins

Subject: PC Interfacing Code EC-452T Credits: 4 Branch: EC Sem: VIII

UNIT-1:

Introduction to computer, Personal computer, Motherboard, Microprocessor, The memory, Basic I/O interface, Operating system.

UNIT-2:

Communication with external devices, Timing circuits, Parallel I/O ports, Serial I/O ports, Plug in slots, PCI bus.

UNIT-3: Computer interfacing for data acquisition and control, Family of PCs, Operator interface, Computer languages.

UNIT-4:

Signals, Interfacing input signals, Analog signal conditioning, Input signal buffering and amplification, Digital signal conditioning, Electromechanical relay.

UNIT-5:

Output system with continuous actuators, Cabling, Digital to analog converter, Analog to digital converters.

UNIT-6:

Plug-in-cards, Input/output devices, Software from transducer to control room, SCXI.

UNIT-7:

Low cost multi-functional DA and C card, IEEE-4888 GPIB, Standard add-on-cards, Backplane bus, VME bus, VXI bus microcontrollers.

Text books:

1. The Intel microprocessors, architecture, Programming and interfacing: Barry B. Brey

2. Microprocessors and interfacing programming and Hardware: Douglas V.Hall.

3. Hardware and software of personal computers: Sanjay K Bose.

4. Interfacing to the IBM personal computer: Lewis C Eggerbrecht (SAMS Publication)

5. Computer control of processes: M. Chidambaram.

Subject: DSP Processors and Architecture Code: EC-462T Credits: 4 Branch: EC Sem: VIII

Unit-1: Introduction to digital signal processing

Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), linear time-invariant systems, Digital filters, Decimation and interpolation.

Unit-2: Computational accuracy in DSP implementations

Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

Unit-3: Architectures for programmable DSP devices

Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

Unit-4: Execution control and pipelining

Hardware looping, Interrupts, Stacks, Relative Branch support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects, and Pipeline Programming models.

Unit-5: Programmable digital signal processors

Commercial Digital signal-processing Devices, Data Addressing modes of TMS32OC54XX DSPs, Data Addressing modes of TMS32OC54XX Processors, Memory space of TMS32OCS4XX Processors, Program Control, TMS32OCS4XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS32OC54XX processors, Pipeline Operation of TMS32OC54XX Processors.

Unit-6: Implementations of basic DSP algorithms

The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing.

Unit-7: Interfacing memory and I/O peripherals to programmable DSP devices

Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA).

Text books:

1 Digital Signal Processing Avtar Singh and S. Srinivasan, Thomson Publications, 2004.

2 DSP Processor Fundamentals, Architectures & Features Lapsley et al. S. Chand & Co, 2000.

- 3 Digital Signal Processors, Architecture, Programming and Applications B. VenkataRamani and M. Bhaskar, TMH, 2004.
- 4 Digital Signal Processing Jonatham Stein, John Wiley, 2005

Subject: Speech Signal Processing Code: EC-464 T Credits: 4 Branch: EC Sem: VIII

Unit 1: Introduction – Discrete time speech signal processing, the speech communication pathway, analysis based on speech production and perception, applications of speech processing.

Unit 2: Production of speech sounds –Anatomy and physiology of speech production, spectrographic analysis of speech production, categorization of speech sounds, prosody, speech perception, physics of sound ,uniform tube model.

Unit 3:

Code: HU-449 T Branches: EI, EC Subject : Principle of Management Semester :VII Credits 4 LPT:310

UNIT 1: Management as a discipline: Definition, nature, scope, functions, managerial Skills, Management. Thought-Historical Prospective, Social Responsibility, of Business.

- **UNIT2:** Planning: Concept and purpose, planning process, Management, By Objectives (MBO), Decision making.
- **UNIT3:** Organization: Concept and purpose of organisation, types of organisation, bases of Departmentation, concept of Authority and Responsibility, Span of Management, Line and Staff Authority, Functional Authority, Delegation of Authority, Centralization and Decentralization of Authority, Coordination Staffing.
- **UNIT4:** Directing: Leadership Concept, Ingredients, Traits, Styles, Roles Communication Concept. Types, Process Barriers, Making Communication effective, Importance.
- **UNIT5:** Controlling: Concept, Provides, Requirements, for adequate control, controlling and earning, Budgeting control Importance, Management Audit, Management in future.

Subject: Operation Research Branches: EI,EC

Code: MA-491TCSemester :VIIL

Credits: 4 LPT:310

- **UNIT 1: Introduction:** Definition of O.R. and it's scope, modeling in O.R. General methods for solving O.R. models. The Monte-carlo technique, main characteristic of O.R. main phases of O.R. Linear programming problems. Graphical method for solve L.P.P., Two phase Method, Big-M Method, problems of tie.
- **UNIT 2: Assignment Model :**Mathematical formulation of assignment model, Reduction theorem, problems of maximization & minimization. Hungarian process, travelling salesman problems.
- **UNIT 3: Transportation Model :**Mathematical formulation of transportation problem. Definition of BFS, IBFS, Optimum solution. Algorithms of N-W rule, Least-cost & VAM and their problem
- **UNIT 4: Sequencing :**Introduction, principle assumptions processing of jobs through two, three & m machine's.
- **UNIT 5: Game Theory :**Characteristic of Games. Basic definitions, minimax criterion and optimal strategy.Equivalence of rectangular Games, Dominance process, Arithmetic method for solving zero-sum-two person Games.Graphical and simplex methods for solving the games.
- UNIT 6: Replacement: Replacement of item that fail completely.

UNIT 7: Inventory :Elementry Inventory Models, Inventory models with price breaks.

List of Pool Elective:

- 5. EI-402 PCB Design & Technology
- 6. EI-456 Aircraft Instrumentation
- 7. EC-458 Digital Image Processing
- 8. EC-460 Microwave Integrated circuit

Code: EI-456 T Branches: EI, EC

UNIT 1: Requirement and standards:

Location, visibility and grouping of Instruments, Instruments to be installed.Flight and navigational instruments.Power plant instruments.

UNIT 2: Instrument Panels, Displays and Layouts: Director displays, Head up displays.

UNIT 3: Pitot static systems:

Probes Pressure (Position) error, measurement to altitude. Aneroid barom-eter. Air speed indicator vertical speed indicator.

UNIT 4: Primary Flight Instruments (Attitude indication): The gyroscope and its properties. References established by gyroscopes. Gyro horizon.

UNIT 5: Heading Indicating Instruments:

The directional gyroscope.

UNIT 6: Measurement of fuel quantity and fuel flow:

UNIT 7: Integrated instruments and flight director systems.

UNIT 8: Flight data recording.

TEXT BOOK:

Air Craft Instruments by E.H.J. Pallet

References Books:

1) Measurement Systems Application and Design. By:Ernest O Doebelin Publisher-McGraw Hill

2) Air Craft Instruments By C.A. Williams

3) Air Craft Instrument Control Systems by C.A. Williams.

4) Air Craft Electronics and Electricity by Kroes, Bent.

Code: EC-458 T Branches: EI

- **UNIT 1:** Introduction to Digital Image Processing- Image enhancement, Image rep- resentation and modelling, Image Reconstruction, Z-transform and fourier transform, Optical and modulation transfer function, Matrix theory.
- **UNIT 2:** Image sampling and quantization, Two dimensional theory Reconstruction, Nyquist rate, Aliasing, foldrerIneq., Hexagonal sampling, Optimum Sampling, compounder designing, visual quantization.
- **UNIT 3:** Image transforms: orthogonal and UNITary transforms, transform freq., optimum transform, properties of UNITary transforms, DFT, Dimensional and 2 Dimensional, Cosine transform, fine transform Hadamard. Harr, Slant, KL transforms and properties.
- **UNIT 4:** Image enhancement: point operation, Histogram modelling, spatial operation, Multispectral image enhancement, false color and pseudocolor, color image enhancement, **Image filtering:** Inverse and wiever filtering, FIR filters, filtering using image transforms, casual models and recursive filtering.
- **UNIT 5:** Image Reconstruction: Tomographies, Radon transform, Back projection operator, Projection theorem, Image data compression: Pinel coding, predictive techniques, Transform calling theory, Hybrid coding and vector DPCM, Interframe coding.

Reference books: Fundamentals Of DIP By Anil K. Jain. PHI India Ltd

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Futuristic Materials

Credits 4(3-1-0)

Branches: OPEN Semester : VII LPT:310

Semiconductors :

Introduction of semiconductors.intrinsic and extrinsic, II-VI and IIIV semiconductors and its alloys, Advantages and necessity of the tailoring of semiconductor, Semiconductors and it alloys used of LED and other devices, Utility of semiconducting alloys like GaAIAs, GaAIN, GaAIP etc.

Superconductors:

Fundamenal Phenomena associated with sumerconductors. Type I& II superconductors, MeissnerOchenfeld effects, Josephon effects, fundamental of BCS theory. Novel High Temperature Superconductors. Hole superconductors, TIBaCaCuO single and bilayer. Electron superconductors NdCuO etc.Doping effects in superconductors, Organic superconductors, fullerenesl. Application of the superconductors in science, medical and commercial sectors.

Material for Magnetic media:

Material useful for magnetic recording head, magnetic disk, magnetic tape media, Magneto optic recording materials.Holography, data storage materials.

Holography:

Fundamentals of holography, Difference between conventional photography and holography. Techniques to make a hologram. Advantages of holography over other techniques.

Introduction of following with applications :

Fibre optics, Lasers, Ceramics, Dielectric Chactrization of Materials

Books: 1) Superconductivity Today: T.V. Ramakrishnan& C.N.R. Rao Wiley astern Pvt. Ltd, New Delhi, 1992
2) Solid State Physics: Ashcrost/Mervin

EI-452T

P.C. Interfacing *Semester :VII*

Credit: 4 *LPT:310*

Branches: EI

UNIT:1	Introduction to computer personal computer-motherboard, microprocessor, the memory, basic I/O interface, Operating system.
UNIT:2	Communication with external devices, timing circuits, parallel I/O Posrts, plug in slots, PCI bus.
UNIT:3	Computer interfacing for data acquisition and control, family of PCs, operator interface, computer languages.
UNIT:4	Signals interfacing input signals, analog signal conditioning input signal buffering and amplification, digital signal conditioning electro mechanical relay.
UNIT:5	Out put system with continuous actuators, cabling digital to analog converter analog to digital converters.
UNIT:6	Plug-in-cards, Input /Output devices, software from transducer to control room, SCXI.
UNIT:7	Low cost multi-functional DA and C card, IEEE-4888 GPIB, standard add-on-cards, backplane bus, VME bus, VXI bus microcontrollers.

Reference:

- 1. The intel microprocessors architecture, Programming and interfacing by Barry B. Brey.
- 2. Microprocessors and interfacing programming and Hardware by Douglas V. Hall.

Subject: Material Imperfection and Their Application

Code: PH-429T

Credit-4

L P T (3 1 0)

Structure of Crystalline Solids: Fundamental concepts, unit cell, crystallographic directions and planes, Crystal systems, Metallic crystal structures.

- **Imperfections in Solids:** Introduction, Point defects: Vacancies and self-interstitials colour centres, in purities is solids, Linear defects dislocations, Interfacial defects, Bulk or volume defects.
- **Diffusion in Solid:** Diffusion, diffusion Mechanisms: vacancy diffusion, interstitial diffusion, steady state diffusion: Fick's first law, non-steady state diffusion: Fick's second law, Factors that influence diffusion, Applications.
- Amorphous Materials: Definition, types, structure, methods of preparation of amorphous materials, Applications: optical fibers, amorphous semi-conductor, optical memories, solar cells.
- **Plastic deformation & Strengthening Mechanisms:** Plastic deformation, the tensile stress-strain curve, modes of plastic deformation-slip and twinning, the shear strength of perfect and real crystals, the stress to move a dislocation, mechanisms of strengthening in metals by grain size reduction, solid solution strengthening, strain hardening.
- Lasers: Principle, population inversion, Einstein's and B coefficients, types: Ruby laser, he-Ne laser, semi conductor lasers.

Books: Non Crystalline materials:	by Davis & Mott
Amorphous Solids:	by S.R. Elliot
Solid State Physics:	by M.A. Wahab

Subject: Polymeric Materials and Their Applications

L P T (3 1 0)

Code:CY-401T

Credit-4

- 1. **Basic Polymer Chemistry:** Definition, Classification, Types of polymerization.
- Resins and Plastics: Thermoplastic and thermosetting resins, constituents of plastics, fabrication of plastic materials, Important resins, Cellulose derivatives, Polyethylene, Teflon, Polystyrene, Polyvinylacetate, PVC, Nylons, Phenolic resins Phenol-Formaldehyde, Urea and Malamine-Urea and melamine-Formaldehyde resins, Epoxy resins, Polyester, Silicones, Lon exchange resins.

- 3. **Rubbers/Elastomers:** Natural rubber, compounding of rubber, Properties, uses, reclaimed rubber, Synthetic rubber, Buna-S, Nitrile rubbers, Fibre reinforced plastics (FRP).
- 4. **Biopolymers:** Importance and applications of few important biopolymers eg. Proteins, carbohydrates etc.

Subject: Engineering Economics	Code: HU-402T
Credit-4	L P T (3 1 0)

- UNIT:1 Economics Micro and Macro: Definition, Importance and Uses, Interdependence between Micro and Macro Economics.
- UNIT:2 Concept in Economics: Law of Demand, Law of Diminishing Marginal Utility, Law of Equi-marginal Utility, elasticity of Demand, Indifference Curve Analysis-Price effect. Income effect and substitution effect.
- UNIT:3 Theory of Production: Production Function, Laws of Variable proportions, Laws of Returns of to Scale, Cost Function-Meaning of Fixed Cost and Variable Cost, Location of Firms, Wabers theory of Location of the firms.
- UNIT:4 Theory of the Firm: Perfect Competition, Monopoly and monopolistic Competition:-Meaning, Assumptions, Equilibrium of the firm in Short run and Long run period of time.
- UNIT:5 International Trade: Meaning, Nature and Scope of International Trade, Types and Effects of Tariffs and Quotas, Objective and Functions of International Monetary Fund (I.M.F.).

- UNIT:1 Statistics: Definition, Importance, Scope and Limitations of statistics, primary and secondary data. Classification of Meaning objectives and types of classification.Frequency Distribution-Discrete, Grouped and continuous frequency distributions.Fundamentals of frequency distribution.
- UNIT:2 Measures of Central Tendencies: arithmetic mean, Median, Mode, Geometric Mean and Harmonic Mean, Demerits and Uses of all methods.
- UNIT:3 Measures of Dispersion: Mean deviation Method about Mean, Median and Mode, Merits and Demerits of Mean Deviation. Coefficient of M.D. Standard Deviation (S.D.) Method with simple short-cut and step deviation methods.Merits and Demerits of S.D.
 Coefficient of S.D.
- UNIT:4 Correlation: Introduction, Types of Correlation, Karl Pearson's Coefficient of Correlation. Interpretation of 'r'. Probable Error, Uses of Probable Error.
- UNIT:5 Linear Regression Analysis: Introduction, Two method of Linear Regression Analysis: (1) Line of Regression of Y on X and (2) Line of Regression and X on Y. Why two lines of regression Coefficient of Regression. Relation between the coefficient of correlation and Regression.
- UNIT:6 Index Number: Definition, Uses and Types of Index Numbers, Methods of Construction
 Index Numbers-(1) Simple Aggregate Method (2) Weighted Aggregate Method (3)
 Fisher's Ideal Index Numbers (4) const of living Index Numbers (5) Chain Base Index
 Numbers. Base Shifting.Limitations of Index Numbers.

Subject: Foreign Trade

Credit-4

Code: HU-407T L P T (3 1 0)

- UNIT:1 Nature of foreign Trade: Meaning, Nature, Scope and Distinct Features of International Transactions.
- UNIT:2 Theories of International Trade: The Classical Theory:-Absolute Advantage Model of Adam Smith, comparative Advantage Model of David Ricardo, the Neo-classical Analysis:-International trade Equilibrium under Constant cost, Increasing Cost and Decreasing cost conditions.
- UNIT:3 Tariffs and Quota: types and Effect of tariffs and Quotas, Quota vs. Tariff.
- UNIT:4 International Monetary fund (I.M.F.): Nature, Objectives and functions of I.M.F. International Monetary System, since the demise of Bretton Woods System.
- **UNIT:5** International Financial Institutions: World Bank (IBRD, International Financial Corporation (I.F.C.), International Development Association (I.D.A.).
- UNIT:6 India's Trade Policy: Trends of Exports and Imports of India since independence, Composition o India's Foreign Trade.

Subject: fuzzy logics and neural networks

Code: EI-412T

Credits: 04

Branches: all

LPT:310

Unit-I

Neural Networks-1(Introduction & Architecture)Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions,Neural network architecture: single layer and multilayer feed forward networks, recurrent networks.Variouslearning techniques; perception and convergence rule,Auto-associative and hetro-associative memory

Unit-II

Neural Networks-II (Back propogation networks)Architecture: perceptron model, solution, single layer artificial neural network, multilayer perception model;back propogation learning methods, effect of learning rule co-efficient ;back propagation algorithm, factorsaffecting backpropagation training, applications.

Unit-III

Fuzzy Logic-I (Introduction)Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzysets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion.

Unit-IV

Fuzzy Logic –II (Fuzzy Membership, Rules)Membership functions, interference in fuzzy logic, fuzzy if-then rules, Fuzzy implications and Fuzzyalgorithms, Fuzzyfications&Defuzzificataions, Fuzzy Controller, Industrial applications.

Unit-V

Fuzzy Neural Networks:L-R Type fuzzy numbers, fuzzy neutron, fuzzy back propogation (BP), architecture, learning in fuzzy BP, inference by fuzzy BP, applications.

Text Books:

1. Kumar Satish, "Neural Networks" Tata McGraw Hill

2. S. Rajsekaran& G.A. VijayalakshmiPai, "Neural Networks, Fuzzy Logic and Genetic

Algorithm: Synthesis and Applications" Prentice Hall of India.

Reference Books:

3. SimanHaykin,"Neural Netowrks"Prentice Hall of India

4. Timothy J. Ross, "Fuzzy Logic with Engineering Applications" Wiley India

UNIT:1Historical development, the general system, Advantage of optical fiber communication.

UNIT-2:-Optical fiber waveguides

Total internal reflection, Acceptance angle, Numerical aperture, Skew rays, Modes in planer guides, Phase and group velocity. Cylindrical fiber Modes, Mode coupling, Step index fibers, Graded index fibers.

UNIT-3:-Transmission Characteristics of optical fibers

Attenuation, Intrinsic absorption, Intrinsic & Extrinsic absorption, Linear & non-linear scattering, Rayleigh scattering, Mie scattering, Stimulated Brillouin scattering, Stimulated Raman scattering, Fiber bend loss, Mid infrared and far infrared transmission, Dispersion.

UNIT-4:-Optical fibers and cables

Preparation of optical fibers, Liquid phase (melting) techniques, Vapour phase deposition techniques, Fluoride glass fibers, Optical fiber, Optical fiber cable, Stability of the fiber transmission characteristics.

UNIT-5:-Optical sources

LASER, Basic concepts of LASER, Optical emission from semiconductors, Injection LASER characteristics, LED characteristics, Modulation.

UNIT-6:-Optical detectors

Device types, Optical detection principles, Quantum efficiency, Semiconductor photodiode, Midinfrared photo diodes, Photo transmitter, Photo conductive detectors.

UNIT-7:-Optical fiber systems

Basic system, Modulation formats, Demodulation schemes, Optical transmitter, Optical receiver, Optical power budgeting.

UNIT-8:-Optical Fiber Measurements

Fiber numerical aperture measurements, Reflection and optical return loss, Field measurement, Fiber attenuation measurements.

UNIT-9:-Applications and future developments

Military applications, Computer applications, Local area networks, Public network application, Medical applications.