

BACHELOR OF ENGINEERING
(SCHEME OF TEACHING AND EXAMINATION)
BOARD OF STUDIES IN ELECTRONICS ENGINEERING
BRANCH :-ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER :-FIFTH

S.N.	Subject Code	Name of Subject	Board	L	T	P	Total Hours Per Week	Maximum Marks Paper/Practical	Mini Marks For Passing	Paper Duration in Hours	Remarks	
01.	5ET-1	Engineering Economics &Industrial Management	ASH	3	1	-	4	Paper 80 } Coll.Ass. 20 } ¹⁰⁰	40	3	Same as:5U-1,5DT-1,5PE-1,5TE-1,5IN-1.	
02.	5ET-2	Linear Electronic Circuits (T+P)	Electronics	4	1	2	7	Paper 80 } Coll.Ass. 20 } ¹⁰⁰ Pract. 25 } Coll.Ass. 25 } ⁵⁰	40 25	3	Same as : 5U-2,5DT-2,5PE-2,5TE-2,5IN-2.	
03.	5ET-3	Signals &System	Electronics	4	1	-	5	Paper 80 } Coll.Ass. 20 } ¹⁰⁰	40	3	Same as : 5U-3.	
04.	5ET-4	Power Electronics (T+P)	Electrical	4	1	2	7	Paper 80 } Coll.Ass. 20 } ¹⁰⁰ Pract. 25 } Coll.Ass. 25 } ⁵⁰	40 25	3	Same as : 5U-4,5TE-4,5IN-4. -	
05.	5ET-5	Microprocessors &Interfacing (T+P)	Electronics	4	1	2	7	Paper 80 } Coll.Ass. 20 } ¹⁰⁰ Pract. 25 } Coll.Ass. 25 } ⁵⁰	40 25	3	Same as : 5U-5,5DT-5,5PE-5,5TE-5. -	
Total Load				19	5	6	30	Total -	650			

BACHELOR OF ENGINEERING
(SCHEME OF TEACHING AND EXAMINATION)
BOARD OF STUDIES IN ELECTRONICS ENGINEERING
BRANCH :-ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER :-SIXTH

S.N.	Subject Code	Name of Subject	Board	L	T	P	Total Hours Per Week	Maximum Marks Paper/Practical	Mini Marks For Passing	Paper Duration in Hours	Remarks
01.	6ET-1	Fields &Radiating	Electronics	4	1	-	5	Paper 80 }	40	3	Same as:6U-1,6DT-1.

Total Load 19 5 9 33 Total - 650

LIST OF ELECTIVE-(Any One of the Above)	SUBJECTS	BOARD	REMARK
	i) Radar Engg.	Electronics.	
	ii) Digital System Design.	Electronics	
	iii) satellite communication	Electronics	Same as: 7DT-4

BACHELOR OF ENGINEERING

(SCHEME OF TEACHING AND EXAMINATION)

BOARD OF STUDIES IN ELECTRONICS ENGINEERING

BRANCH :-ELECTRONICS AND TELECOMMUNICATION ENGINEERING

SEMESTER :-EIGHT

S.N.	Subject Code	Name of Subject	Board	L	T	P	Total Hours Per Week	Maximum Marks Paper/Practical	Mini Marks For Passing	Paper Duration in Hours	Remarks
01.	8ET-1	Electronic System Design. (Th+P)	Electronics	4	1	2	7	Paper 80 } Coll.Ass. 20 } ¹⁰⁰ Pract. 25 } Coll.Ass. 25 } ⁵⁰	40	3	
02.	8ET-2	UHF & Microwave (Th.+P)	Electronics	4	1	2	7	Paper 80 } Coll.Ass. 20 } ¹⁰⁰ Pract. 25 } Coll.Ass. 25 } ⁵⁰	40	3	
03.	8ET-3	Moblie Communication	Electronics	4	1	-	5	Paper 80 } Coll.Ass. 20 } ¹⁰⁰	40	3	
04.	8ET-4	Optical Communication	Electronics	3	1	-	4	Paper 80 } Coll.Ass. 20 } ¹⁰⁰	40	3	
05.	8ET-5	Elective -II	Electronics	3	1	-	4	Paper 80 } Coll.Ass. 20 } ¹⁰⁰	40	3	
06.	8ET-6	Project	Electronics	-	-	6	6	Pract. 75 } Coll.Ass. 75 } ¹⁵⁰	75	2	

Total Load 18 5 10 33 Total - 750

LIST OF ELECTIVE- II (Any One of the Above)	SUBJECTS	BOARD	REMARK
	i) computer Communication network.	Electronics	
	ii) Digital Image processing.	Electronics	
	iii) Fuzzy logic & neural network.	Electronics	

5ET-1 ENGINEERING ECONOMICS AND INDUSTRIAL MANAGEMENT

UNIT-I:

Demand Utility and indifference curves, Approaches to analysis of demand , Elasticity of demand, measures of demand elasticity, factors of production, advertising elasticity, Marginalize.

UNIT-II:

Laws of returns and cost ,price and output determination under competition, monopoly, monopolistic competition, oligopoly, Depreciation and methods for its determination.

UNIT-III:

Function of central and commercial banks inflation, Deflation, stagflation, Direct and Indirect taxes monetary and cycles, new economic policy, Liberalisation, Globalisation, market friendly state. Fiscal government meaning and phase of business.

UNIT-IV:

Definition, nature and scope of management, functions of management planning, organizing, Directing, controlling, communicating.

UNIT-V:

Meaning of marketing Managements, concepts of Marketing, Marketing mix, Administrative and cost plus pricing, channels of distribution, Advertising and sales promotion.

UNIT-VI:

Meaning ,nature and scope of financial management ,Brief outline of profit and loss account, balance sheet, Budgets and their importance, Ratio analysis princinals of costing.

Text/Reference Books :

- 1.Modem Economics by H.L.Ahuja
- 2.Modem Economics Theory by K.K.Dewett
- 3.Monetary Economics by M.L.Seth
- 4.Industrial Management by I.K.Chopde, A.M.Sheikh
- 5.Business Organisation and Management by S.A.Sherlekar
- 6.Managerial Economics by Joel Dean
- 7.Managerial Economics by Pylee

5ET-2 LINEAR ELECTRONIC CIRCUITS

UNIT I:

Basic operational amplifier circuit Differential amplifier stages, current source, biasing, level shifting techniques, common mode and differential mode gains and impedances of a differential stage.

UNIT II:

Overload protection circuits, Frequency response and compensation characteristics of various parameters.

UNIT III:

Simple circuits like inverting, non-inverting buffer amplifiers, summers, integrators and differential amplifier configurations, bridge amplifiers, Instrumentation Amplifier, grounding and shielding problem in Instrumentation amplifier.

UNIT IV:

Precision rectifiers, RMS to DC conversion, constant current and voltage sources, sinusoidal oscillators, with frequency and amplitude stabilization, Elementary idea of active filter. Second order Butter worth chebyshev filter.

UNIT V:

Op-Amp circuits for clipping clamping and comparator circuits with nonlinear components, multiplexers and demultiplexers , bistable, monostable, astable multivibrator Circuits using Op-Amp. Sample / Hold circuits. D/A & A/D conversion circuits Phased Locked loops.

UNIT VI:

Study of Linear ICs like LM741 (Industrial Op- Amp IC), LM555 (Industrial IC), LM566 (VCO), LM565 (PLL) LM339 (Comparator), LM723 (voltage regulator)

Practicals based on above syllabus:

Books :

- 1.Linear Integrated Circuits Manual I, II, III National Semiconductors.
- 2.Linear Application Handbook National Semiconductors
- 3.Dailey :Operational Amplifier (Tata McGraw Hill)
- 4.Wait :Introduction to operational Amplifiers (TMH)
- 5.France :Designing with OP Amps.

5ET-3 SIGNAL & SYSTEMS

UNIT-I:

Analysis of Signals Representation of signals using a set of orthogonal signals, Fourier series representation of periodic signals. Fourier transform of periodic and nonperiodic signals, properties of Fourier Transform, convolution in time & frequency domain. Sampling theory for band limited signals.

UNIT-II:

Probability, random variables and stochastic processes. Review of probability theory, random variables, probability density and distribution function. Random processes, periodic processes, stationary processes. Auto correlation cross correlation applications to signal analysis. Power density and spectral density function.

UNIT-III:

Bandwidth and rate of pulse transmission Inter symbol Interference, PSD of Digital signals, Line coding, RZ, NRZ, Polar, Manchester coding Schemes. Nyquists's first & second Criterion for zero ISI, Pulse shaping, tapped delay line filters and adaptive equalization.

UNIT-IV:

Quantization noise, PCM, A-law & Mu – law. Delta modulation, ADM, Introduction ,ADM, Introduction to ADPCM. Study of noise performance for above systems.

UNIT-V:

Digital Modulation techniques, salient features of ASK, PSK<FSK & DPSK systems M-ary communication systems Matched filter detection.

UNIT-VI:

Information theory, channel capacity of discrete & continuous channels. Error control coding Hamming distance, Linear block codes, CRC, Convolution Codes.

Text Books:

1. Communication Systems: B.P. Lathi.
2. Modern Digital & Analog Communication Systems: B.P.Lathi.
3. Communication systems : A.B.Carlson

Reference Books: Communication

UNIT-I:

Semiconductor devices used in power electronics: Silicon controlled rectifier (SCR), Asymmetrical SCR (ASCR), Reverse, conduction thyristor (RCT), Light activated SCR (LASCR), Field controlled thyristor (FCT), TRIAC, Monolithic Darlington (MD), Insulated Gate Bipolar transistor: (IGBT), power MOSFET, GTO, Triggering devices: UJT PUT, SLAC, GOS, SCS, SUS, and SBU. Device treatment should deal with construction characteristics, ratings, application. Thermal equivalent circuit, Heat sink calculation; protection requirements and methods.

UNIT-II:

Thyristor as power controller: Phase angle control, Extinction angle control, Symmetrical angle control, time ratio control, Pulse width modulation, Burst-Integral cycle Turn on Systems: Requirements: METHODS CIRCUITS, r, re, UJT MSI (Medium Scale Integrated circuits) for single phase line communicated converter single phase converter, single phase inverter, Digital methods, Turn off (commutation) systems Requirements: Methods (Circuits) types A, B, C, D, E, and F.

UNIT-III:

Uncontrolled Rectifiers: Single Phase: Midpoint two Pulse (M-2) bridge two pulse- (B-2 for resistive, inductive and motor loads). 3-phase: midpoint three phase (m-s) midpoint six phase (M-6), Bridge three phase (B-3), Bridge six pulse (B-6) for resistive, inductive and motor load, filter –C input, L input, LC. Analysis of wave form , Fourier.

UNIT IV:

Single phase-/three phase half controlled (one quadrant operation). Single phase, midpoint two pulse, bridge two pulse of resistive, inductive and motor load
Three phase: mid point three phase, mid point six pulse bridge three pulse, bridge six pulse for resistive, inductive, and motor loads.
Full control (Two quadrant operation): Single phase –mid point two pulse, bridge two pulse, for resistive, inductive and motor loads.
Three phase –mid point three pulse, mid point six pulse, bridge six pulse for resistive, inductive and motor loads. Dual converter for quadrant operation: Single-phase bridge, three-phase bridge, circulating, non-circulating.

UNIT VI:

Choppers: Types A, B, C, D, E multiphase, line filter one, two and four quadrant operation of choppers, Commutation methods: Voltage current, load (treatment should consist of circuits, waveform analysis).
AC regulators: single phase and three phase manual auto, solid state, servo control, uninterrupted power supply, UPS, switch mode power supply (SMPS).

Practicals based on above syllabus:**Text Books:**

1. Power electronics :P.C.Sen
2. Thyristorised power controller: Joshi, Dubey, Doradla, Sinha
3. Thyristor and their application: Rammoorthy
4. GEC Manual.

Reference Books:

1. Power electronics :Cyril W. Landet
2. Power electronics :Kjeld Thorborg

5ET-5 MICROPROCESSOR & INTERFACING

UNIT-I:

VSLI circuit concept, Approach to integrated system Design using Microprocessor, Bus concepts, Address Data & Control, Organization of a computer with MPU. Bits/Bytes/ Words/ Long words- their ranges – accuracy & precision. Memory Organization, Linear/ absolute decoding.

UNIT-II:

Introduction to Intel's 8085 A Architecture- description, software Instructions, Addressing Modes- Timing Diagrams, Assemblers & Disassemblers- (By Hand coding)

UNIT-III:

Flag structure, concept of PSW stacks & subroutines- imple & nested. PUSH, POP instructions & CALL / RETURN instructions, Stack manipulation. Simple programs.

UNIT-IV:

Interrupts- Concept and structure in 8085. Interrupts service routines Advanced instructions
&
Programming of 8085 A.

UNIT-V:

Methods of data transfer – serial, parallel, synchronous asynchronous. IN/OUT instructions Timing diagrams simple hardware interface to 8085 of standard Latches/ Buffers/ Keys/ display devices as I/O ports. Handshaking concepts. Architecture and interface of 8255 & 8253 to 8085. Interfacing of ADC & DAC.

UNIT-VI:

Hardware considerations-bus contention, slow memory interfacing, complete signal description of 8085.multiplexed keyboard/Display interface and assembler Directives General awareness about microcomputer system related products.

Practicals based on above syllabus:

Books :

1. Programming & Interfacing 8085 A, Wietey Eastern :Gaonkar
2. Programming of 8085, McGraw Hill :D.V.Hall

6 ET-1 FIELDS AND RADIATING SYSTEMS

UNIT-I:

Guided waves: Waves between parallel planes, TE, TM, TEM waves and their characteristics, Attenuation in parallel plane guides, wave impedances.

UNIT-II:

Rectangular waveguides: TM, TE waves in rectangular guides and their characteristics, wave velocity, guide wavelength, wave impedances, field configurations.

UNIT-III:

Transmission lines: Transmission line equations and their solution. Transmission line parameters, characteristic impedance, propagation constant, attenuation constant and phase constant, waveform distortion, distortionless transmission lines, loading of transmission lines, reflection coefficient and VSWR. Equivalent circuits of transmission lines, transmission lines at radio frequency, open and short circuited lines, smith chart, stub matching.

UNIT-IV:

Scalar and vector potentials, retarded potentials, field due to a current elements, power radiated and radiation resistance for field due to a dipole, power radiated and radiation resistance, reciprocity theorem applied to antennas gain and aperture of an antenna, radiation intensity, directivity and antenna gain.

UNIT-V:

Two element arrays and their directional characteristics, linear array analysis, broadside and end-fire arrays, pattern multiplication, binomial arrays, Design of broadcast array for a specific pattern.

UNIT-VI:

Basic principles of parabolic reflectors, analysis and power pattern, lens antennas, folded dipole, turnstile and yagi antenna, log-periodic antennas, horn antennas, traveling wave antennas, cassegrain antenna.

Books: -

- 1) Electromagnetic waves and radiating systems: Edward C. Jordan & Keith G. Balmain
- 2) Antennas: Krauss.

Reference Book:

Communication Electronics: George Kennedy

6 ET-2 CONTROL SYSTEM ENGINEERING

UNIT-I:

Introduction to need for automation and automatic control, use of feedback , Broad spectrum of system application. Mathematical modeling, Diff.equations, transfer functions, blockdiagram, signal flow graphs, Application to elementary system simplifications, Effect of feedback on parameter variation, disturbance signal, servomechanisms and regulators. Control system components, Electrical. Electromechanical, hydraulic, pneumatic and other components. Their functional analysis and input, output representation.

UNIT-II:

Time response of the system, first order & second order system, (standard input) concept of gain & time constant, steady state error, type of control system, approximate method for higher order system.

UNIT-III:

Root location and its effect on time response, elementary idea of Root Locus, effect of adding pole and zero and proximity of imaginary axis.

UNIT-IV:

Stability of control systems, conditions of stability characteristic equation, Routh Hurwitz criterion, special cases for determining relative stability.

UNIT-V:

Frequency response method of analysing linear system, Nyquist & Bode Plot, stability & accuracy analysis from frequency response, open loop & closed loop frequency response. Nyquist criteria, effect of variation of gain & addition of poles & zeros on response plot, stability margin in frequency response.

UNIT-VI:

State variable method of analysis, characteristic of system, state choice of state representation of vector matrix differential equation, standard form, relation between transfer function and state variable.

Text Books:

1. Control system analysis: Nagrath and Gopal

Reference Book:

1. Linear system analysis : D. Azzo & Honpis, 1975

(Practical based on the above syllabus.)

6ET-3 LINE COMMUNICATION & SWITCHING

UNIT-I :

Telegraphy : Telegraphy codes, Morse code, cable code, 5 unit code, 7.5 unit code, telegraphy speed, baud, morse keys, morse sounder, telegraph relays, operate and release lages. Telegraphy circuits : Simplex , Duplex, diff, duplex, bribe duplex, telegraphy repeater.

UNIT-II :

Teleprinter, teleprinter transmitter- receiver , Baudot multiples, telex, facsimile

UNIT-III :

Telephone transmitter & reciver, side tone, subscriber telephone set, electronic telephone transmission bridge, telephone relays, principle of manual switching system, central battery system, local battery system, junction working , trunk exchange.

UNIT-IV :

Automatic telephone: strowger exchanger, line switches and selectors, ringing and tone circuit, subscriber unselector circuit, Hybrid coil, line balancing network, tow wire and four wire repeaters, trunking diagram cross bar switching system, traffic engg. Traffic unit, grade of service, calculation of swithing and selectors , director, system, busy hour call attempts.

UNIT-V

Electronic swithing system, pcm principles, companding HDBA, coding borscht functional , subscriber line interface circuit (SLIC) Trunk side interface, singnalling cas, ccs, ccitt no.7 signaling , cellular telephone, introduction to ISDN .

UNIT-VI

carrier communication , carrier equipments, attenuator, equalizers filters, long haul carrier telephone system, power line carrier communication.

BOOKS:-

1. principle of telephony: n.m.biswas
2. principle of telegraphy :n.m.biswas
3. principle of carrier communication: n.m.biswas
4. telephony, vol.1 genral principles and manual exchange)
5. telephony voi.2 (automatic exchange system): atkinson
6. telecommunication swithing : viswanathan system and network.
7. introduction to telephony and telegraphy: a.e.h.jolly.
8. digital telephony: j.c.bellany.
9. fundamental of digital swithing :j.c.macdonald.

6ET-4 COMMUNICATION ELECTRONICS

UNIT-I:

Frequency spectrum of electromagnetic waves, their properties, wave propagation etc. Tuned Amplifiers, gain and bandwidth, neutralization, Noise, types, source, noise figure calculation.

UNIT-II :

AM modulators, series plate modulated class 'C' amplifier, efficiency and power calculations, SSB modulation SSB-SC modulations. A.M. Demodulators, square law detector, diode peak detector, envelope detector, detectors for SSB and SSB-SC AM signals, AM using transistors

UNIT-III :

Angle Modulation, Frequency modulation spectrum, Reactance tube and FET modulators Armstrong method, F.M. transmitters, frequency stabilization methods.. FM discriminator Foster Selly, PLL detectors, stereophonic FM.

UNIT-IV:

Pulse modulation, pulse amplitude modulation (PAM), Pulse width Modulation (PWM), Pulse Position Modulation (PPM), Pulse code modulation (PCM), Delta Modulation DM).

UNIT-V:

Radio Receivers and its measurements: TRF receiver, superhetrodyne receiver. Detailed study of block schematic and circuits of mixer, RF-stage, I.F stage detector, Automatic gain control (AGC), FM radio receivers.

Receiver Measurements: Sensitivity, selectivity, image frequency rejection etc. communication Receiver, block schematic and its special features.

UNIT-VI:

Line telephony: Elementary phone System, central switching, simple exchange, two and four wire connections, Time division multiplexing, Analog Time division switching, time slot interchanging (TSI), space array for digital signal, combined space time switching.

Text Books:

1. Communication Electronics: Kennedy, TMH
2. Communication Electronics: Deshpande, TMH

Reference Book:

1. Communication Electronics: Forest Bakeries
2. Radio Communication: Miller
3. Electron Tybe Circuits: Seely
4. Principals of Communication System: Taub and Schilling, PHI

5. Communication Electronics: Roddy and Coolen, PHI
(**Practical based on the above syllabus.**)

6ET-5 COMPUTER ORGANIZATION

UNIT-I

Resister Level Design: General characteristic, description languages, combinational and sequential components, design methods. Processor level design– components, design techniques.

UNIT-II:

Processor design : Processor organisation, information representation, number formats. Instruction set, instruction formats, instruction types, multiplication and division ALU design, floating point arithmetic, IEEE 754 floating point formats.

UNIT-III:

Control design: Instruction sequencing, interpretation, hard wire control design, methods, multiplier and CPU control unit. Micro programmed Control: Basic concept, minimizing microinstruction size, multiplier control unit Micro programmed Computers:CPU control unit. A conventional & unconventional computers.

UNIT-IV:

Memory organisation: Device characteristics, RAM, serial access memories, Virtual memory, concept of Cache memory & associative memories

UNIT V:

System Organisation: Local & long distance communication, Input & output system, Interrupts, DMA, introduction to parallel processing.

UNIT VI:

Concept of parallel processing , pipelining , vector processors, Introduction to RISC architecture, data flow architecture.

Text Books :

1. A.S Tanen Baum, “ Structured computer Organisation.” Third edition, PHI
2. Y. Chu 11 Computer organisation & Microprogramming. Prentice Hall, Englewood Chiffs. N. J

Reference Books

1. M. H. Mano, ” Computer system Architecture ”, Prentice Hall, Engle wood chiffs.N.J
2. C. H. Gear, “ Computer organisation & Programming”, McGraw Hill, N.
3. Computer Architecture and Organisation: J.P Hayes, Second edition, PAI.

6ET-6 ELECTRONIC WORKSHOP PRACTICAL

Fabrication and testing of small electronics circuit, PCB Design and technical report presentation.

Study of Indian standards in Electronic Industry.

Manufacturing, practices in Electronic Industry.

Reference material :-

PCB Design : Boshar TMH Pub.

Elliot: Integrated circuit Fabrication Technology (TMH)

(Practicals as per above syllabus)

Text Books:

1. Power electronics :P.C.Sen
2. Thyristorised power controller: Joshi, Dubey, Doradla, Sinha
3. Thyristor and their application: Rammoorthy
4. GEC Manual.

Reference Books:

1. Power electronics :Cyril W. Landet
2. Power electronics :Kjeld Thorborg
3. Power semiconductor devices and applications by Rasid

(Practical based on the above syllabus.)

7ET-1 TELEVISION ENGINEERING

UNIT-I

Brief introduction to TV transmission and reception. Interlaced scanning . TV picture: resolution, brightness Video Bandwidth, Line and frames frequency, blanking, synchronizing and equalizing pulses, complete composite video signal, VSB transmission and Reception.

UNIT-II

Monochrome TV camera tubes, Image Orthcon, Vidicon and Plumbicon tubes, Monochrome TV transmitterblock diagram, TV transmitting and receiving antenna.

UNIT-III

Monochrome TV Receiver block diagram, Balun, RF tuner, Video IF amplifier, Video detector, Intercarrier sound system, Sound take off circuit, Sound IF and FM detector, Transistorised keyed AGC circuit, Horizontal and Vertical deflection circuits, EHT generator.

UNIT-IV

Essentials of colour TV, compatibility, Three colors theory, chromaticity diagram, colour TV camers, production of luminance and colour-differences signals, colour TV picture tubes : Delta gun P.I.L and Trinitron tubes.

UNIT-V

Colour signal transmission and reception, Frequency interleaving, modulation of colour difference signals, PAL colour TV system, choice of sub-carrier frequency, PAL decoder, PAL colour receiver, comparision of PAL with NTSC and SECAM system.

UNIT-VI

Remote control circuits, MATV, CATV and CCTV system, HDTV and TV via satellite.

PRACTICAL: Minimum 8 experiments based on above syllabus. Practical should include experiments on fault finding and trouble shooting.

BOOKS :-

- 1) Monochrome & Colors TV by R.R.Gulati
- 2) TVEngineeringbyDhake

7ET-2 ADVANCE MICROPROCESSOR AND MICROCONTROLLER

UNIT-I

Introduction to 16 bit microprocessors. 8086/8088 CPU architecture, memory organization, interfacing addressing modes, Instruction set, programming examples, pseudo opcodes, assembler directives. (13)

UNIT-II

Interfacing of peripherals 8255,8253 & 8251. Interfacing of ADC & DAC, stepper motor, serial communication standards RS232, I C Bus.

UNIT-III

Architecture, organization operation & interfacing of 8259, ICWs, OCWS, Cascading 8279-keyboard display mode, sensor matrix mode, command words and programme DTMF Trans receiver (Mittel 8880) Real time clock, DS 1307, EEPROM.

UNIT-IV

8086/88 maximum mode 8087 architecture, 80386 architecture, real and protected mode 8237 DMA controller,organization, control words.

UNIT-V

Introduction to 8051 family architecture, pin diagram, operation, ports, addressing modes, internal & external memory, SFR, flags, organization, counters and timers, serial communication

UNIT-VI

8051 instruction set, interrupts, programming exercises for interfaced with keyboard, LED matrix, time delays, serial communications.

NAME OF BOOKS RECOMMENDED :

1. Programming & Interfacing of 8086/80888, D.V.Hall, TMH.
2. Intel Reference Manuals, Microprocessors & Microcontrollers: Intel
3. Advances Microprocessor & peripherals, A.K.Ray, (TMH)
4. Microcontroller – Peatman, McGraw Hill
5. Microcontroller- Ayala (TMH)
6. Microprocessors 8086/88 Family Prog. Interfacing :Liu, Gibson

PRACTICAL : Practical's based on above syllabus

7ET- 3 DIGITAL SIGNAL PROCESSING

UNIT-1

Discrete time signals & systems : Discrete time signals, Discrete time systems, Linearity, causality,

stability, static/dynamic, Time Invariance/Time variance , classification of discrete time system, Linear

convolution, Circular convolution Cross Correlation, Autocorrelation. Linear constant coefficient

difference equations, sampling theorem & sampling process.Reconstruction of sampling data, convolution.

UNIT -II :

Frequency domain representation of discrete time signals and systems, Fourier transform of discrete time

signals, properties of discrete time Fourier transform.

UNIT-III:

The Z-transform: Definition, properties of the region of convergence for the Z-transform, Z-transform

properties, Inverse Z-transform using contour integration, complex convolution theorem, Parseval's,

unilateral Z-transform, stability interpretation using Jury's array.

UNIT-IV:

Transform analysis of LTI system & structures for discrete-time system : Frequency response of LTI

system, relationship between magnitude & phase, all pass systems, minimum phase system,
Linear system
with generalized linear phase. Block diagram representation & signal flow graph
representation of Linear
constant. Coefficient difference equations, Basic structures for IIR systems, transposed
forms, basic
network structures for FIR systems, lattice structures.

UNIT-V:

Filter design Techniques: Design of discrete time IIR filters from continuous time
filters,frequency
transformations of low pass IIR filters, Design of FIR filters by windowing, FIR filter
design by Kaiser
window method. Frequency sampling method.

UNIT -VI:

Discrete Fourier Transform: Discrete Fourier series, properties of discrete fourier
series,Discrete fourier
transform, properties of DFT, circular convolution using discrete fourier transform.
Decimation in time
FFT algorithm, decimation in frequency FFT, FFT of long sequences using overlap add and
overlap
save method.

Text Books:

1. Discrete time signal processing 2nd Ed. Alan V. Oppenheim, Ronald W. Schafer & Buch, Pearson.
2. Digital Signal Processing-A Computer based approach. Sanjit K. Mitra

Reference Books:

1. Digital signal Processing Theory and application. Proakis and Manolakis – 3rd edition PHI Ltd.

Digital Signal Processing : **Suggested experiments are as follows**

1. Signal generation, sampling principles.
2. Convolution.
3. LTI system characteristics
4. DTFT & Properties.
5. Z-transform and applications, solution of difference equation.
6. DFT, FFT linear & circular convolution.
7. Design of IIR filter.
8. Design of FIR filter.
- Windows method.

- Kaiser window method.

Note: At least one experiment with C and At least one with MATLAB.

Optional – with DSP kit and Excel.

7ET-4 Digital Communication

UNIT-I:

Digital modulation:- PCM systems, Channel capacity, Delta modulation, Adaptive digital waveform coding schemes, matched filter receiver. Coherent Binary: PSK, FSK, QPSK, MSK,DPSK.

UNIT-II:

Source coding methods: - Review of information theory, Huffman and L-Z encoding algorithm. Rate distortion theory for optimum quantization, scalar and vector quantization.

UNIT-III:

Waveform coding methods, ADPCM, Adaptive sub-band and transform coding, model based speech coding like LP coding , CELP coding. Introduction to Image compression, Review of techniques used in JPEG and MPEG standards.

UNIT- IV:

Advanced modulation methods:-The signal space concept, Gram-Schmitt procedure, Signal space representation of modulated signals, nonlinear modulation methods with memory, Error probability and optimum receivers for AWGN channels.

UNIT-V:

Advanced transmission methods:- Review of channel coding , convolution, encoding and decoding , distance properties, Viterbi algorithm and Fano algorithm. Trellis coded modulation methods.

UNIT-VI:

Spread - Spectrum methods:- Study of PN sequences, direct sequence methods, Frequency hop methods, digital spread spectrum, slow and fast frequency hop, performance analysis, synchronization methods for spread spectrum. Application of spread spectrum, CDMA.

Text Books:

1. Digital communication : John G Prokis (TMG)
2. Digital communication : Simon Haykin(WEP)

Reference Books:

1. Modern Communication systems (Principles and application): Leon W. Couch II (PHI)
2. Digital Communication: Shanmugh

7ET-5(I) RADAR ENGINEERING

UNIT-I :

RADAR Range Equation, CW and FM modulated RADAR.

UNIT-II :

MTI and pulse Doppler RADAR , Tracking RADAR .

UNIT-III :

RADAR TRANSMITTER Magnetron oscillator, Traveling tube amplifier , Klystron amplifier Modulator

UNIT-IV :

RADAR antennas, parabolic reflector, Scanning feed reflector, Lens antennas.

UNIT-V :

RADAR Receivers , Displays and Duplexer, Detection of RADAR , signals in noise

UNIT-VI :

RADAR Clutter, Effects of Weather on RADAR, Detection of targets in precipitation, synthetic, aperture

RADAR , HF over the Horizon RADAR.

BOOKS:

1. Introduction of RADAR System by Skolnik (McGraw Hill)
2. Principles of RADAR by Hertes & Coates (McGraw Hill)
3. Introduction to RADAR system by Kingsley (McGraw Hill)
4. Navigational Aids By Sen & Bhattachary

7ET-5(II) DIGITAL SYSTEM DESIGN

UNIT-1 :

Introduction to VHDL, design unit, data objects, signal drivers, inertial and transport delays, data delay , VHDL data types, concurrent and sequential statements

UNIT-2:

subprograms – functions, procedures, attributes, generic, package, IEEE std, logic library, file I/O , test bench , component declaration, instantiation, configuration

UNIT-3 :

combinational logic circuit design and VHDL implementation of following circuits-fast adder, subtractor, decoder, encoder, multiplexer, ALU, barrel shifter, 4x4 key board encoder, multiplier, divider, hamming code encode and correction circuit.

UNIT-4 :

synchronous sequential circuit design-finite state Machine ,Mealy and Moore, state Assignments, design and VHDL implementation of FSMs, Linear feedback shift register (pseudorandom and CRC).

UNIT-5 :

A synchronous sequential circuit design- primitive flow table ,concept of race, critical race and hazards, design issues like metastability, synchronizers, clock skew and Timing considerations.

UNIT-6 :

Introduction to place & route process, Introduction to ROM, PLA, PAL, Architecture of CPLD (xilinx / Altera)

Textbooks:

- 1) VHDL- 3rd edition – Douglas perry-TMH
- 2) Fundamentals of digital Logic with VHDL design-Stephen Brown,Zvonko Vranesic-TMH.
- 3) Digital Design Principles-Fletcher
- 4) VHDL synthesis-j.Bhaskar
- 5) VHDL primer-j.Bhaska-pearson Education

REFERENCE BOOKS:

1. Digital system Design using VHDL-Chales H. Roth
2. Digital system design-john Wakerley
3. VHDL-Zainalabedin Navabbi
4. VHDL- D.Smith Digital System Design:Practicals based on above syllabus

7ET-5(III) SATELLITE COMMUNICATION**UNIT-1:**

Introduction:- Origin of satellite communication current state of satellite communication.Orbital aspect, equation of orbit, locating Satellite in orbit. orbital elements, orbital perturbation. Space craft subsystem:- Attitude and power system, communication Subsystem.

UNIT-2:

Satellite link design :- system noise temperature and G/T ratio , down link design, domestic

satellite system,

uplink design, design of satellite link for specified.

UNIT-3:

Multiple access techniques:- FDMA, FDM/FM/FDMA, Effects of intermodulation, Companded FDM/FM /FDMA, TDMA, TDMA FRAME Structure and design, TDMA Synchronization and timing code division multiple access on board processing, SCPS system, digital speech interpolation system DAMA.

UNIT-4:

Propagation on satellite:- Earth's path- propagation effects, atmospheric absorption Scintillation effects land and sea multipath ,rain and ice effects, rain drop distribution Calculation of attenuation rain effects on Antenna noise temperature Eliminating propagation effects:- Attenuation, site diversity, Depolarisati

UNIT-5:

Encoding and forward error correction; Error detection and correction, channel capacity, Error detecting code, linear block codes, error correction with linear block codes, performance of block error correction codes, convolution codes, cyclic code, BCH and codes ,error detection on satellite links.

UNIT-6:

Earth station technology - earth station design, antennas tracking, LAN, HPA, RF, Multiplexing factors affecting orbit utilization, tracking, equipment for earth station.

BOOKS:-

- 1) Satellite communication by T.Pratt.
- 2) Satellite communication by D.C.Agrawal
- 3) Satellite communication by Dennis Roddy
- 4) Satellite communication by T.T.Hai

SET-1 ELECTRONIC CIRCUIT DESIGN

UNIT I:

Design of Power supply system: Unregulated D.C. power supply system with rectifiers and filters. Design of emitter follower regulator, series regulators, overload protection circuits for regulators.

Design of SMPS: Step up and step down.

UNIT II:

Design of class A small signal amplifiers: Emitter follower, Darlington pair amplifiers with and without Bootstrapping , Two stage direct coupled amplifier. Design of class A, Class AB, audio power amplifier with drivers.

UNIT III:

Design of sinusoidal oscillators: OPAMP based Wein bridge and Phase Shift oscillators with AGC circuits, Transistor based Hartley, Colpits and Crystal oscillators ,Evaluation of figure of merit for all above oscillator circuits.

UNIT IV:

Design of constant current sources, Design of function generators, Design of tuned amplifiers. Design of Butterworth, Chebyshev filters upto sixth order with VCVS and IGMF configuration.

BOOKS :

1. Regulated Power supply Handbook. Texas Instruments.
2. Electronics : BJT's, FETS and Microcircuits – Anielo.
3. Monograph on Electronic circuit Design : Goyal & Khetan.

PRACTICALS : Practicals based on above syllabus.

Note: 50% practicals should be based on SPICE simulation.

SET-2 UHF AND MICROWAVE**UNIT I:**

Causes of failure of conventional tubes at high frequency, Two cavity klystron amplifier, Reflex klystron oscillator.

UNIT II:

Traveling wave tube, Slow wave structure. Backward wave architecture (Carcinotron) Magnetron, cylindrical magnetron, parallel plate magnetron, voltage tunable magnetron.

UNIT III:

Microwave components: Attenuators, Tees, Directional couplers, Circulators, Isolators, Gyrotors, Phase shifter, Cavity resonator, Transmission line resonator.

UNIT IV :

Scattering matrices, Scattering matrices of transmission lines, microwave junction and tees, directional coupler, circulator.

UNIT V:

Microwave filters: Design of microwave filters by Image parameter method; Insertion loss method. Microwave measurement : Microwave power measurement- Bolometer method and

Calorimeter method, VSWR measurement, Attenuation measurement, Impedance and Q factor measurement.

UNIT VI :

Microwave solid state devices : GaAs oscillator, Parametric amplifier ,PIN diode, Detectordiode, MASER .Strip lines :Microstrip lines, coplanar ,shielded ,parallel striplines.

Text Books

- 1) Microwave device and circuits :Samuel Y.Lio
- 2) Foundations of microwave engineering :R.E. Collins.
- 3) Microwave engineering :R Chatterjee

PRACTICALS : Practicals based on above syllabus

SET-3 MOBILE COMMUNICATION

UNIT- I :

The cellular concept: Evolution of mobile radio communication. Cellular telephone system, frequency reuse, channel assignment and handoff strategies, interference and system capacity, trunking and grade of service, improving capacity in cellular system.

UNIT II :

The mobile radio environment: causes of propagation path loss, causes of fading -longterm and short term, definition of sample average, statistical average, probability density function, cumulative probability distribution, level crossing rate and average duration of fade, delay spread, coherence bandwidth, intersymbol interference.

UNIT III :

Modulation techniques for mobile communication: BPSK, QPSK. Transmission and detection techniques, 4 QPSK transmission and detection techniques. QAM, GMSK.

UNIT IV :

Equalization, diversity and channel coding: fundamentals of equalization, space polarization, frequency and time diversity techniques, space diversity, polarization diversity, frequency and time diversity, fundamentals of channel coding.

UNIT V :

Multiple access techniques: Introduction to multiple access, FDMA, TDMA, Spread spectrum multiple access, frequency hopped multiple access(FHMA), code division multiple access (CDMA), space division multiple access (SDMA).

UNIT VI :

GSM- global system for mobile: services and features, GSM system architecture, GSM radio subsystem, GSM channel types, GSM frame structure, signal processing in GSM, introduction to CDMA digital cellular standard.

TEXT BOOKS:

1. Wireless Communication – Principles and practice by T S. Rappaport. (Prentice Hall PTR, upper saddle river, New Jersey.)
2. Mobile Communications – Design fundamentals by William C. Y. Lee, (John Willey)

REFERNCE BOOKS:

1. Wireless digital communication by Kamilo Feher (PHI)
2. Mobile Cellular Communication by W.C.Y.Lee (Mc Graw Hill)
3. The Mobile Radio Propagation channel by J.D. Parson.

SET-4 OPTICAL COMMUNICATION

UNIT 1:

Principle of optical communication-Attributes and structures of various fibers such as step index, graded index mode and multi mode fibers.Propagation in fibers-Ray mode, Numerical aperture and multipath dispersion in step index and graded index fibers. Material dispersion and frequency response.

UNIT II :

. Electromagnetic wave equation in step index and graded index fibers Modes and Power flow in fibers. Manufacture of fibers and cables, fiber joints, splices and Connector.

UNIT III :

Signal degradation in fibers - Attenuation, material dispersion, waveguide dispersion ,pulse broadening , mode coupling.

UNIT IV:

Optical sources - LED and LASER. Structures and properties. Source launching and coupling.

UNIT V:

Photo detector - Pin and Avalanche Photo-detectors. Structures and Properties. Optical receiver-Operation and performance.

UNIT VI :

Transmission link - Point to point links, WDM , Data buses , star and T-coupler,NRZ, RZ and block codes.
Measurement in optical fibers-Attenuation, dispersion, Refractive index profile and optical

source characteristic measurements.

BOOKS:

1. Optical fiber communication, principles and practice: John M. Senior (PH International Service).
2. Optical fiber communication : B. Keiser (Mc Graw Hill)
3. Optical communication system : J. Gower (Prentice Hall of India)
4. Optical Fiber System : Kao (Tata Mc Graw Hill)

8ET-5(I) COMPUTER COMMUNICATION NETWORK.

UNIT-I Network & Services

Communication Network, Approaches to network Design, types of Network, TwoStage, Three stage Network, Time Division Switching, Time Multiplexed Switching. Time Multiplexed Time Switching.

UNIT-2 LAN Network & Medium Access layer

LAN structure, random access, multiple access protocols, IEEE standard 802 for LAN& MAN. High speed LANS, FDDI, Fast Ethernet. UNIT-3 Application & Layered Architecture OSI reference Model, TCP/IP Architecture, TCP/IP protocol, IP packets, IP addressing , subnet addressing, address resolution & reverse resolution, TCP/IP utilities.

UNIT -4 Physical Layer & Data Link Layer

Transmission media, wireless Transmission, X.25 network, Narrow band & Broadband ISDN, ATM. Data link Layer design, Error detection & correction Elementary data link protocols, sliding window protocols.

UNIT-5 Network Layer & Transport Layer

Network layer design, Routing, congestion, Internetworking Transport layer design issues, Transport services primitives, Internet transport protocol, wireless TCP and UDP.

UNIT-6 Application Layer

Network security; cryptography , secret key, public-key; digital signature, Domain Name system, Electronic Mail system, Multimedia, Real Time Transport protocol.

BOOKS :

- 1) Telecommunication Switching systems & Networks by Vishwanathan
- 2) Communication Networks by Leon- Gracia, Indra Widjaja
- 3) Computer Communication by W. Stanlling.
- 4) Computer Networks Tanenbaum.

8 ET-5(II) FUZZY LOGIC & NEURAL NETWORK.

UNIT I: INTRODUCTION

1. Fuzzy sets, Relations, Approximate reasoning; Representing, set of rules.
2. Fuzzy knowledge based (FKBC) parameters. Introduction rule and data base; inference engine choice of fuzzification and defuzzification processes.

UNIT II : Nonlinear Fuzzy Control

Introduction, Control Problem, FKBC as nonlinear transfer element, Types of FKBC.

UNIT III : Adaptive Fuzzy Control

Introduction, design and performance evaluation ,main approach to design.

UNIT IV : Fundamental concepts of ANN.

Model of artificial Neural Network (ANN), Learning and adaptation learning rules.

Feed forward Networks:

Classification Model, features and decision, regions, Minimum distance classification,perceptron, Delta learning rules for multiperceptron layer, Generalized learning rules,
back propagation Algorithm, back propagation training, learning factors.

UNIT V: Recurrent Networks:

Mathematical foundation of discrete time & gradient type hopefield networks,
Transient Response and relaxation modeling.

UNIT VI: Associative Memories & self organizing Networks.

Basic concepts and performance analysis of recurrent associative memory,
Bidirectional associative memory. Hamming net and MAXNET; Unsupervised learning of clusters, counter propagation network, feature mapping, self organizing feature maps, cluster discovery network (ART 1)

BOOKS:

1. Introduction of Artifical Neural Networks, Jacek Zurada (JPH)
2. Neural Network and Fuzzy Systems, Bart Kosko (PHI)
3. Neural Networks: A comprehensive Foundation, Simon Haykin (Maxwell) Macmillan Canada Inc).
4. An Introduction to Fuzzy Control, D. Driankov, Norsa.
5. Fuzzy sets: Uncertainty & information, Klir and Folger (PHI)
6. Digital Image processing (AWPC) By Gonzalez

SET-5(III) DIGITAL IMAGE PROCEESSING

UNIT-I:

Digital image representation, elements of digital image processing systems. Sampling &

quantization; simple image model, basic relationships between pixels & image geometry.

UNIT-II:

Image transforms – introduction to Fourier transform, DFT , properties of 2-dimensional DFT, FFT, other separable image transforms- DCT , DST, Walsh, Haar, start transforms.

UNIT- III:

Image enhancement- Basic gray level transformations, Histogram processing enhancement using arithmetic/logic operations, spatial filtering, smoothing & sharpening filters, smoothing frequency domain filters, sharpening frequency domain filters.

UNIT-IV:

Image Compression – fundamentals, image compression models, information theory, error-free compression , lossy compression, Image compression standards.

UNIT-V:

Image Segmentation- Detection of discontinuities, Edge linking & boundary detection, thresholding region based segmentation.

UNIT-VI:

Representation & description- Representation, boundary descriptors, Regional Descriptors.

BOOKS:

- 1) Digital Image Processing, R.C Gonzalez, R.E. Woods, Pearson Edition, 2nd edition
- 2) Fundamentals of digital image processing , A.K. Jain (PHI)