VARDHAMAN COLLEGE OF ENGINEERING

(AUTONOMOUS)

Affiliated to JNTUH, Approved by AICTE, Accredited by NAAC and ISO 9001:2008 Certified

Shamshabad - 501 218, Hyderabad, Telangana State, India.

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BACHELOR OF TECHNOLOGY
ELECTRONICS AND COMMUNICATION ENGINEERING

SYLLABI (III Year and IV Year)

B. Tech. - Regular Four Year Degree Program

(For batches admitted from the Academic Year 2013 - 2014)

&

B. Tech. - Lateral Entry Scheme

(For batches admitted from the Academic Year 2014 - 2015)

SYLLABI FOR V SEMESTER

B. Tech. ECE V SEMESTER

OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(Common to ECE & EEE)

Course Code: **A1506**

L	T	P	C
4	-	-	4

UNIT - I

OBJECT ORIENTED THINKING: Need for object oriented programming paradigm, a way of viewing world agents and Communities, messages, methods, responsibilities, Classes and Instances, Class Hierarchies-Inheritance ,Method Binding, Overriding and Exceptions.

JAVA BASICS: History of Java, Java buzzwords, JVM architecture, data types, variables, scope and life time of variables, arrays, operators, control statements, type conversion and casting, simple java program, constructors, methods, string and String Buffer handling functions.

UNIT - II

INHERITANCE AND POLYMORPHISM: Basic concepts, types of inheritance, member access rules, usage of this and super key word, method overloading, method overriding, abstract classes, dynamic method dispatch, usage of final keyword, static import.

PACKAGES AND INTERFACES: Defining package, access protection, importing packages, defining and implementing interface, and variables in interface and extending interfaces.

I / O STREAMS: Concepts of streams, stream classes- byte and character stream, reading console input and writing console output, File: introduction to file, reading and writing to a file.

UNIT - III

EXCEPTION HANDLING: Exception handling fundamentals, exception types, uncaught exceptions, usage of try, catch, throw, throws and finally keywords, built-in exceptions, creating own exception sub classes.

MULTI THREADING: Concepts of thread, thread life cycle, creating threads using thread class and runnable interface, synchronization, thread priorities, inter thread communication.

UNIT - IV

AWT CONTROLS: The AWT class hierarchy, user interface components- labels, button, text components, check box, check box groups, choices, list box, panels - scroll pane, menu, scrollbars. Working with frame windows, color, font and layout managers.

EVENT HANDLING: Events, event sources, event listeners, relationship between event sources and listeners, delegation event model, handling mouse and keyboard events, adapter classes, inner classes.

UNIT - V

SWINGS: Introduction to swings, hierarchy of swing components. Containers, top level containers - JFrame, JWindow, JDialog, light weight containers - JPanel, swing components - JButton, JToggleButton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList, JComboBox, JTable, JTree, JTabbedPanes, JScrollPane.

APPLETS: Life cycle of an applet, inheritance hierarchy for applets, differences between applets and applications, developing applets, simple applet display methods, passing parameters to applets.

TEXT BOOKS:

1. Herbert schildt (2010), *The complete reference*, 7th edition, Tata Mc graw Hill, New Delhi

REFERENCE BOOKS:

1. T. Budd (2009), *An Introduction to Object Oriented Programming*, 3rd edition, Pearson Education, India.
2. J. Nino, F. A. Hosch (2002), *An Introduction to programming and OO design using Java*, John Wiley & sons, New Jersey.
3. Y. Daniel Liang (2010), *I*ntroduction *to Java programming*, 7th edition, Pearson education, India.
4. R. A. Johnson (2009), *An introduction to Java programming and object oriented application development*, 1st edition, Course Technology, India.

B. Tech. ECE V SEMESTER

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

Course Code: **A1414**

L	T	P	C
4	-	-	4

UNIT - I

CHARACTERSTICS OF INSTRUMENTS: performance characteristics of instruments, static and dynamic characteristics, errors in measurement, DC voltmeters- multirange, range extension, solid state and differential voltmeters, AC voltmeters- multi range, range extension, shunt, thermocouple type RF ammeter, ohmmeters series type, and shunt type, multimeter for voltage, current and resistance measurements, dual slope and successive approximation type DVM.

UNIT - II

CATHODE RAY OSCILLOSCOPE (CRO): Introduction to CRT, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line, simple CRO, triggered sweep CRO, dual beam CRO, measurement of frequency.

UNIT - III

OSCILLOSCOPES: Dual trace oscilloscope, sampling oscilloscope, analog storage oscilloscope, digital readout oscilloscope, digital storage oscilloscope, measurement of phase and frequency (lissajous patterns).

AC BRIDGES: Measurement of resistance wheat's stone bridge, kelvin's double bridge, measurement of inductance using maxwell's inductance bridge, anderson's bridge, hay's bridge, measurement of capacitance using schering bridge, , errors and precautions in using bridges, Q-meter.

UNIT - VI

TRANSDUCERS: Introduction, classification, strain gauges, LVDT, piezo electric transducers, OPAMP applications in measurement and transducer circuits, instrumentation amplifier, thermometers, thermocouples, thermistors, sensistors.

UNIT - V

MEASUREMENT OF NON - ELECTRICAL QUANTITIES: Measurement of Strain, displacement, force, pressure, vacuum, torque, vibration and acceleration, pH, sound, velocity, humidity, speed, analog and digital data acquisition systems, pc based data acquisition systems, interfacing and bus standards, programmable logic controllers and their industrial applications.

TEXTBOOKS:

1. K Sawhney (2007), *Electrical and Electronic Measurements and Instrumentation,* 18th edition, Dhapat Rai & Co, New Delhi.
2. A. D. Helfrick, W.D. Cooper (2002), *Modern Electronic Instrumentation and Measurement Techniques*, 5th edition, Prentice Hall of India, New Delhi.

REFERENCE BOOKS:

1. David A. Bell (2003), *Electronic Instrumentation & Measurements,* 2nd edition, Prentice Hall of India, New Delhi.
2. Robert A. Witte (2004), *Electronic Test Instruments, Analog and Digital Measurements,* 2nd edition, Pearson Education, India.

B .Tech. ECE V SEMESTER

INTEGRATED CIRCUITS APPLICATIONS
(Common to ECE & EEE)

Course Code: **A1415**

L	T	P	C
3	1	-	4

UNIT - I

INTEGRATED CIRCUITS AND OPERATIONAL AMPLIFIER: Introduction, Classification of IC's, IC chip size and circuit complexity, basic information of Op-Amp IC741 Op-Amp and its features, the ideal Operational amplifier, Op-Amp internal circuit, Op-Amp characteristics - DC and AC.

UNIT - II

LINEAR APPLICATIONS OF OP-AMP: Inverting and non-inverting amplifiers, adder, subtractor, Instrumentation amplifier, AC amplifier, V to I and I to V converters, Integrator and differentiator.

NON-LINEAR APPLICATIONS OF OP-AMP: Sample and Hold circuit, Log and Antilog amplifier, multiplier and divider, Comparators, Schmitt trigger, Multivibrators, Triangular and Square waveform generators, Oscillators.

UNIT - III

ACTIVE FILTERS: Introduction, Butterworth filters – 1st order, 2nd order low pass and high pass filters, band pass, band reject and allpass filters.

TIMER AND PHASE LOCKED LOOPS: Introduction to IC 555 timer, description of functional diagram, monostable and astable operations and applications, schmitt trigger, PLL - introduction, basic principle, phase detector/comparator, voltage controlled oscillator (IC 566), low pass filter, monolithic PLL and applications of PLL.

UNIT - IV

VOLTAGE REGULATOR: Introduction, Series Op-Amp regulator, IC Voltage Regulators, IC 723 general purpose regulators, Switching Regulator.

D to A AND A to D CONVERTERS: Introduction, basic DAC techniques - weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, A to D converters - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC, DAC and ADC Specifications.

UNIT - V

CMOS LOGIC: CMOS logic levels, MOS transistors, Basic CMOS Inverter, NAND and NOR gates, CMOS AND-OR-INVERT and OR-AND-INVERT gates, implementation of any function using cmos logic.

COMBINATIONAL CIRCUITS USING TTL *74XX* ICS: Study of logic gates using *74XX* ICs, Four-bit parallel adder(IC 7483), Comparator(IC 7485), Decoder(IC 74138, IC 74154), BCD-to-7-segment decoder(IC 7447), Encoder(IC 74147), Multiplexer(IC 74151), Demultiplexer (IC 74154).

SEQUNTIAL CIRCUITS USING TTL *74XX* ICS: Flip Flops (IC 7474, IC 7473), Shift Registers, Universal Shift Register(IC 74194), 4- bit asynchronous binary counter(IC 7493).

TEXT BOOKS:

1. D. Roy Choudhury, Shail B. Jain (2012), *Linear Integrated Circuit*, 4th edition, New Age International Pvt. Ltd., New Delhi, India.
2. Ramakant A. Gayakwad, (2012), *OP-AMP and Linear Integrated Circuits*, 4th edition, Prentice Hall / Pearson Education, New Delhi.
3. Floyd, Jain (2009), *Digital Fundamentals,* 8th edition, Pearson Education, New Delhi.

REFERENCE BOOKS:

1. Sergio Franco (1997), *Design with operational amplifiers and analog integrated circuits*, McGraw Hill, New Delhi.
2. Gray, Meyer (1995), *Analysis and Design of Analog Integrated Circuits*, Wiley International, New Delhi.
3. John F. Wakerly (2007), *Digital Design Principles and practices*, Prentice Hall / Pearson Education, New Delhi.

B .Tech. ECE V SEMESTER

DIGITAL DESIGN THROUGH VERILOG HDL

Course Code: **A1416**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION TO VLSI DESIGN: Introduction, conventional approach to digital design, VLSI design, ASIC design flow, Role of HDL.

INTRODUCTION TO VERILOG: Conventional Data flow, ASIC data flow, Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Functional Verification, System Tasks, Programming Language Interface (PLI), Module, Simulation and Synthesis Tools, Test Benches.

LANGUAGE CONSTRUCTS AND CONVENTIONS: Introduction, Keywords, Identifiers, White Space Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Memory, Operators, System Tasks, Exercises.

UNIT - II

GATE LEVEL MODELING: Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tri-State Gates, Array of Instances of Primitives, Additional Examples, Design of Flip-flops with Gate Primitives, Delays, Strengths and Contention Resolution, Net Types, Design of Basic Circuits, Exercises.

UNIT - III

BEHAVIORAL MODELING: Introduction, Operations and Assignments, Functional Bifurcation, Initial Construct, Always Construct, Examples, Assignments with Delays, Wait construct, Multiple Always Blocks, Designs at Behavioral Level, Blocking and Non blocking Assignments, The case statement, Simulation Flow, if and if-else constructs, assign-de assign construct, repeat construct, for loop, the disable construct, while loop, forever loop, parallel blocks, force-release construct, Event.

UNIT - IV

MODELING AT DATA FLOW LEVEL: Introduction, Continuous Assignment Structures, Delays and Continuous Assignments, Assignment to Vectors, Operators.

SWITCH LEVEL MODELING:. Introduction, Basic Transistor Switches, CMOS Switch, Bi-directional Gates, Time Delays with Switch Primitives, Instantiations with Strengths and Delays, Strength Contention with Tri reg Nets, Exercises.

UNIT - V

SYSTEM TASKS, FUNCTIONS, AND COMPILER DIRECTIVES: Introduction, Parameters, Path Delays, Module Parameters, System Tasks and Functions, File-Based Tasks and Functions, Compiler Directives, Hierarchical Access, General Observations, Exercises.

FUNCTIONS, TASKS, AND USER DEFINED PRIMITIVES: Introduction, Function, Tasks, User- Defined Primitives (UDP), FSM Design (Moore and Mealy Machines).

TEXT BOOKS:

1. T. R. Padmanabhan, B. Bala Tripura Sundari (2004), *Design through Verilog HDL*, Wiley & Sons Education, IEEE Press, USA.
2. J. Bhaskar (2003)*, A Verilog Primier,* 2nd edition*,* BS Publications, India.

REFERENCE BOOKS:

1. Stephen. Brown, Zvonko Vranesic (2005), *Fundamentals of Logic Design with Verilog,* Tata McGraw Hill, India.
2. Charles H. Roth (2004), *Digital Systems Design using VHDL,* Jr. Thomson Publications, India.
3. Michael D. Ciletti (2005), *Advanced Digital Design with Verilog HDL*, Prentice Hall of India, New Delhi.
4. Joseph Cavanagh (2012), *Verilog HDL- Digital Design and Modeling*, CRC press, India.

B .Tech. ECE V SEMESTER

ANALOG COMMUNICATIONS

Course Code: **A1417**

L	T	P	C
3	1	-	4

UNIT - I

AM MODULATION: Introduction to communication system, need for modulation, Amplitude modulation- time domain and frequency domain of AM signals-power relations in AM, generation of AM waves: square law modulator, Switching modulator, Detection of AM waves: Square law detector, Envelope detector.

DSBSC MODULATION: Time domain and frequency domain description, balanced modulator, Ring modulator, Coherent detection of DSBSC modulated waves, Coastas loop.

UNIT - II

SSB MODULATION: SSB modulation frequency domain description, frequency discrimination method for generation of AM SSB modulated wave, time domain description, phase discrimination method for generating SSB, Demodulation of SSB waves.

VESTIGIAL SIDEBAND MODULATION: Frequency description, Generation of VSB modulated wave, Time domain description, Envelope detection of VSB wave plus carrier, Comparison of AM techniques, Applications of different AM systems, Frequency division multiplexing.

UNIT - III

BASIC CONCEPTS OF FREQUENCY MODULATION: Single tone frequency modulation, Spectrum analysis of sinusoidal FM wave, Narrow band FM, Wideband FM, Constant Average Power, Transmission Bandwidth of FM Wave-Comparison of FM&AM.

GENERATION AND DETECTION OF FM WAVES: Generation of FM :direct method- Parametric variation method, Varactor Diode, Reactance Modulator, Indirect Method- Armstrong Method, detection of FM waves: Balanced Frequency Discriminator, Zero crossing Detector, Phase locked loop, Foster Seeley Discriminator, Ratio detector.

UNIT - IV

NOISE: Introduction, Noise in DSBSC, Noise in SSBSC, Noise in AM, Noise in FM, Threshold effect in Angle Modulation System, Pre-emphasis & de-emphasis.

PULSE MODULATION: Analog pulse modulation, Types of Pulse modulation, PAM (Single polarity, double polarity), Generation & demodulation of PWM, Generation and demodulation of PPM.

UNIT - V

TRANSMITTERS: Classification of Transmitters, AM transmitter, Effect of feedback on performance of AM transmitter, FM Transmitter, frequency stability in FM transmitter.

RECEIVERS: Introduction, TRF receiver, Super heterodyne receiver, Receiver characteristics, Local oscillator, Image frequency, , Choice of IF, AGC, Frequency changing and tracking, FM Receiver, Amplitude limiting, Comparison with AM Receiver.

TEXT BOOKS:

1. Simon Haykin (1994), *Communication Systems*, 2nd edition, Wiley Eastern, India.
2. Taub and schilling (2011), *Principles of Communication Systems*, Tata McGraw Hill, India.

REFERENCE BOOKS:

1. Kennedy (2005), Davis, *Electronic Communication Systems*, 4th Edition, Tata McGraw Hill, New Delhi.
2. B. P. Lathi (1998), *Modern Digital and Analog Communication Systems*, 3rd edition, BPB Publication, New Delhi.
3. R. P. Singh, S. D. Sapre (2009), *Communication Systems*, 2nd edition, Tata McGraw Hill, New Delhi.

B .Tech. ECE V SEMESTER

ANTENNAS AND WAVE PROPAGATION

Course Code: **A1418**

L	T	P	C
3	1	-	4

UNIT - I

ANTENNA BASICS: Introduction, Radiation Mechanism – single wire, 2 wires, dipoles, Current Distribution on a thin wire antenna. Basic Antenna Parameters -Patterns, Beam widths, Beam Area, Radiation Intensity, Beam Efficiency, Directivity, Gain and Resolution, Antenna Apertures, Antenna efficiency, Effective Height, Related Problems. Retarded vector potentials, Short Electric Dipole-Field, radiation resistance, Thin linear antenna ,half wave dipole-Field, current pattern, Power Radiated, radiation resistance, Beam widths, Directivity, Effective Area and Effective Height, Radiation Resistance at a point which is not current maximum.

UNIT - II

LOOP ANTENNAS: The Small Loop, Comparison of far fields of small loop and short dipole, Loop antenna general case, far field pattern of circular loop antenna with uniform current, small loop as special case, Radiation resistance of loop, Directivity of circular loop antenna with uniform current.

ANTENNA ARRAYS: Two element arrays, Multiplication of patterns, Linear Array with n -isotropic point sources of equal amplitude and spacing (Broadside, End fire Arrays), EFA with Increased Directivity, Scanning Arrays, N element linear array and directivity, Binomial Arrays- Uniform spacing and Non-uniform Amplitude.

UNIT - III

NON-RESONANT RADIATORS: Long wire antennas, V-antennas, Rhombic Antennas and Design Relations, Travelling wave antenna.

BROADBAND ANTENNAS: The Helical Antennas - Significance, Geometry, helix modes, Practical design considerations for monofilar axial mode helical antenna, linear polarization with monofilar axial mode helical antenna.

UNIT - IV

VHF, UHF AND MICROWAVE ANTENNAS : Dipole array with Parasitic Elements, Folded Dipoles & their characteristics, Yagi-Uda Antenna, Reflector Antennas : Flat Sheet and Corner Reflectors, Paraboloidal Reflectors –Beam formation, Types of parabolic reflectors, F/D Ratio, Spill Over, Back Lobes, Aperture Blocking, Feed systems, Off-set Feeds, Cassegrainian Feeds, Horn Antennas – Types, Optimum Horns, Design Characteristics of Pyramidal Horns; Lens Antennas – principle, types of lens antenna, non metallic dielectric lens antenna, primary feed and its uses, E –plane metal plate lens antenna, Antenna Measurements – Patterns measurement-arrangement for radiation pattern, Distance requirements, Directivity and Gain Measurements, Introduction to microstrip antennas.

UNIT - V

WAVE PROPAGATION: Introduction**,** classification, modes of Propagation, Ground Wave Propagation–Characteristics, Parameters, Wave Tilt, Flat and Spherical Earth Considerations. Sky Wave Propagation – Formation of Ionospheric Layers and their Characteristics, Mechanism of Reflection and Refraction, Critical Frequency, Virtual Height, MUF– Calculations, LUHF, Skip Distance, Optimum working Frequency, Ionospheric Abnormalities, Ionospheric Absorption, multi-hop propagation, Space Wave Propagation – LOS, Tropospheric Wave Propagation – Radius of Curvature of path, Effective Earth's Radius, Effect of Earth's Curvature, Field Strength Calculations, Duct Propagation(M-curves).

TEXT BOOKS:

1. John D. Kraus, Ronald J. Marhefka (2003), *Antennas for All Applications,* 3rd edition, Tata McGraw Hill, New Delhi, India.
2. K. D. Prasad, Satya Prakashan (2001), *Antennas and Wave Propagation,* Tech India Publications, New Delhi.

REFERENCE BOOKS:

1. C. A. Balanis (2001), *Antenna Theory,* 2nd Edition, John Wiley & Sons, India.
2. E. C. Jordan, K. G. Balmain (2000), *Electromagnetic Waves and Radiating Systems*, 2nd Edition, PHI.
3. E. V. D. Glazier, H. R. L. Lamont (2001), *Transmission and Propagation –The Services Text Book of Radio*, Standard Publishers Distributors, New Delhi.
4. F. E. Terman (1955), *Electronic and Radio Engineering*, 4th edition, Tata McGraw Hill, New Delhi.
5. John D. Kraus (1988), *Antennas,* 2nd edition, Tata McGraw Hill, New Delhi.

B .Tech. ECE V SEMESTER

INTEGRATED CIRCUITS APPLICATIONS LAB

Course Code: **A1420**

L	T	P	C
-	-	3	2

LIST OF EXPERIMENTS:

PART - A
LINEAR ICS: (Hardware Verification)

1. Measurement of IC741 op-amp parameters.
2. Basic applications of IC741 op-amp.
3. Integrator and differentiator using IC741 op-amp.
4. Precision rectifiers using IC741 op-amp.
5. Adder, Subtractor, Comparator using IC 741 Op-Amp.
6. Active Low Pass & High Pass Butterworth filters (1^{st} & 2^{nd} Order).
7. RC Phase Shift and Wien Bridge Oscillators using IC 741 Op-Amp
8. IC 555 timer in Astable and Monostable operation.
9. Schmitt trigger circuits using IC 741 op-amp & IC 555 timer.
10. Operation of phase locked loop using IC565.
11. Voltage regulator IC 723, three terminal voltage regulators- 7805, 7809, 7912.

PART - B
DIGITAL ICS: (HDL Coding and Simulation using Active HDL 8.1/Xilinx ISE 9.2i)

1. Adder and Subtractor
2. Parity generator.
3. Code converters
4. Comparator
5. Decoders and Encoders.
6. Multiplexers and De-multiplexers.
7. Flip-flops.
8. Counters.
9. Shift Registers.
10. Random Access Memory (RAM).

B .Tech. ECE V SEMESTER

ANALOG COMMUNICATIONS LAB

Course Code: **A1421**

L	T	P	C
-	-	3	2

Note: Minimum 12 Experiments to be conducted:
All these Experiments are to be simulated first either using Commsim, MATLAB, SCILAB, OCTAVE, LAB VIEW or any other simulation package and then to be realized in hardware.

PART - A

1. Amplitude modulation and demodulation
2. DSB-SC Modulator & Detector
3. SSB-SC Modulator & Detector (Phase Shift Method)
4. Frequency modulation and demodulation
5. Study of Spectrum analyzer and analysis of AM and FM Signals
6. Pre-emphasis and de-emphasis
7. PLL as FM Demodulator

PART - B

1. Time Division Multiplexing & De-multiplexing
2. Frequency Division Multiplexing & De-multiplexing
3. Pulse Amplitude Modulation & Demodulation
4. Pulse Width Modulation & Demodulation
5. Pulse Position Modulation & Demodulation
6. Frequency synthesizer
7. AGC Characteristics

SYLLABI FOR VI SEMESTER

B .Tech. ECE VI SEMESTER

COMPUTER NETWORKS

Course Code: **A1515**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION: Network applications, network hardware, network software, reference models: OSI, TCP/IP, Internet, Connection oriented network - X.25, frame relay.

THE PHYSICAL LAYER: Theoretical basis for communication, guided transmission media, wireless transmission, the public switched telephone networks, mobile telephone system.

UNIT - II

THE DATA LINK LAYER: Design issues, error detection and correction, elementary data link protocols, sliding window protocols, example data link protocols - HDLC, the data link layer in the internet.

THE MEDIUM ACCESS SUBLAYER: Channel allocations problem, multiple access protocols, Ethernet, Data Link Layer switching, Wirelwss LAN, Broadband Wireless, Bluetooth

UNIT - III

THE NETWORK LAYER: Network layer design issues, routing algorithms, Congestion control algorithms, Internetworking, the network layer in the internet (IPv4 and IPv6), Quality of Service.

UNIT – IV

THE TRANSPORT LAYER: Transport service, elements of transport protocol, Simple Transport Protocol, Internet transport layer protocols: UDP and TCP.

UNIT - V

THE APPLICATION LAYER: Domain name system, electronic mail, World Wide Web: architectural overview, dynamic web document and http.

APPLICATION LAYER PROTOCOLS: Simple Network Management Protocol, File Transfer Protocol, Simple Mail Transfer Protocol, Telnet.

TEXT BOOKS:

1. A. S. Tanenbaum (2003), *Computer Networks*, 4th edition, Pearson Education/ PHI, New Delhi, India.

REFERENCE BOOKS:

1. Behrouz A. Forouzan (2006), *Data communication and Networking*, 4th Edition, McGraw Hill, India.
2. Kurose, Ross (2010), *Computer Networking: A top down approach,* Pearson Education, India.

B .Tech. ECE VI SEMESTER

MICROPROCESSORS AND INTERFACING
(Common to ECE & EEE)

Course Code: **A1423**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION: Architecture of 8086 microprocessor, Register organization, 8086 flag register and its functions, addressing modes of 8086, Pin diagram of 8086, Minimum mode system operation, Timing diagram.

UNIT - II

8086 FAMILY ASSEMBLY LANGUAGE PROGRAMMING: 8086 Instruction Set, Simple programs, Assembly language programs involving logical, branch and call instructions, sorting, evaluation of arithmetic expressions, string manipulation, assembler directives, procedures and macros.

UNIT - III

8086 MEMORY AND DIGITAL INTERFACING: 8086 addressing and address decoding, Interfacing RAM, ROM, EPROM to 8086, 8255 programmable Peripheral Interface, various modes of operation and interfacing to 8086, Interfacing keyboard, Interfacing to Alphanumeric Displays, seven segment LED displays, stepper motor, D/A and A/D converter interfacing.

UNIT - IV

INTERRUPTS AND PROGRAMMABLE INTERRUPT CONTROLLERS: 8086 Interrupts and Interrupt Responses introduction to DOS and BIOS interrupts. 8259A Priority Interrupt Controller, Software Interrupt Applications.

The 8086 Maximum Mode, Direct Memory Access (DMA) Data Transfer, Interfacing and Refreshing Dynamic RAMs, 8254 Software-Programmable Timer/Counter.

UNIT - V

SERIAL DATA TRANSFER SCHEMES: Asynchronous and synchronous data transfer schemes, 8251 USART architecture and interfacing, RS - 232C Serial data standard, RS - 423A and RS - 422A, sample program of serial data transfer.

ADVANCED MICROPROCESSORS: Introduction to 80286, salient features of 80386, real and protected mode segmentation and paging.

TEXT BOOKS:

1. Douglas V. Hall (2007), *Microprocessors Interface*, 2nd edition, Tata McGraw Hill, New Delhi.

REFERENCE BOOKS:

1. Walter A. Triebel, Avtar Singh (2003), *The 8088 and 8086 Microprocessors* 4th edition, Prentice Hall of India, New Delhi.
2. Mazidi (2000), *The 8051 Microcontroller and Embedded System*, Prentice Hall of India, New Delhi.
3. Deshmukh (2004), *Microcontrollers*, Tata McGraw Hill Edition, New Delhi.

B .Tech. ECE VI SEMESTER

DIGITAL COMMUNICATIONS

Course Code: **A1424**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION: Introduction, elements of a digital communication systems, PCM, quantization noise and SNR, robust quantization, DPCM, DM, ADM, comparison of PCM and DM systems, noise in PCM systems, noise in DM systems.

UNIT - II

DIGITAL CARRIER MODULATION SCHEMES: Optimum receiver for binary digital modulation schemes, binary ASK signaling schemes, binary PSK signaling schemes, binary FSK signaling schemes, probability of error for ASK, FSK and PSK, comparison of digital modulation schemes-bandwidth requirements, power requirements, error probability (coherent & non-coherent), DPSK, QPSK, matched filter receiver, pulse shaping by digital methods, ISI, eye pattern.

UNIT - III

INFORMATION THEORY: Introduction, measure of information, discrete memory less channels, mutual information, channel capacity, Additive White Gaussian Noise channel.

SOURCE CODING: Shannon's theorem, Shannon - fano coding, Huffman coding, efficiency calculations, capacity of Gaussian channel, bandwidth-S/N trade off.

UNIT - IV

LINEAR BLOCK CODES: Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes, single error correcting Hamming codes, Binary cyclic codes, Algebraic structure of cyclic codes, encoding using (n-k) bit shift register, syndrome calculation, error detection and error correction.

UNIT - V

CONVOLUTIONAL CODES: Encoding of convolutional codes, time domain approach, transform domain approach. Graphical approach: code tree, trellis and state diagram, maximum likelihood decoding of convolutional codes, sequential decoding of convolutional codes.

TEXT BOOKS:

1. K. Sam Shanmugam (2006), *Digital and Analog Communication Systems*, John Wiley & Sons, New Delhi.
2. Simon Haykin(1988), *Digital Communications*, John Wiley & Sons, New Delhi.

REFERENCE BOOKS:

1. Hwei P. HSU (2006), Schaums outlines of Analog and Digital Communications, 2nd edition, Tata McGraw Hill Publishing Company Limited, New Delhi.
2. John G. Proakis (2001)*, Digital Communications,* 4th edition, Tata McGraw Hill Publishing Company Limited, New Delhi.
3. Herbert Taub, Donald L. Schilling (1986), *Principles of Communication Systems*, 2nd edition, Tata McGraw Hill Publishing Company Limited, New Delhi.
4. Amitabha Bhattacharya(2006), *Digital Communication*, Tata McGraw Hill Publishing Company Limited, New Delhi.
5. Theodore S. Rappaport(2009), *Wireless Communications: Principles and Practice*, 2nd édition, Pearson Education, India.

B .Tech. ECE VI SEMESTER

DIGITAL SIGNAL PROCESSING

Course Code: **A1425**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION TO DIGITAL SIGNAL PROCESSING: Discrete time signals & systems, linear shift invariant systems, stability and causality, Discrete time systems described by difference equations, Frequency domain representation of discrete time signals and systems.

UNIT - II

FOURIER SERIES AND FOURIER TRANSFORMS: Discrete Fourier series representation of periodic sequences, Properties of discrete Fourier series, Discrete Fourier transforms: frequency domain sampling, , linear convolution of sequences using DFT, Computation of DFT, Relationship of DFT to other transforms, Properties of DFT, Fast Fourier transforms (FFT) - Radix-2 FFT algorithm, Radix-4 FFT algorithms, Inverse FFT.

UNIT - III

Z-TRANSFORMS: Review of Z-transforms, Properties of Z-transform, Rational Z-transforms, Inversion of Z- transforms, stability and causality.

REALIZATION OF DIGITAL FILTERS: Structures for FIR systems: Direct form structure, Cascade form structures, Structures for IIR systems: Direct form structures, Signal flow graphs and transposed structures, cascade form structures, Parallel form structures.

UNIT - IV

DESIGN OF FIR DIGITAL FILTERS: Symmetric and antisymmeric FIR filters, Design of linear phase FIR Digital Filters using Windows, Design of linear phase FIR Digital Filters by Frequency Sampling method.

DESIGN OF IIR DIGITAL FILTERS: IIR filter design by Approximation of Derivatives, IIR filter design by impulse invariance, IIR filter design by bilinear transformation, Characteristics of commonly used analog filters (Butter worth and Chebyshev), Frequency transformations, comparison of IIR & FIR filters.

UNIT - V

MULTIRATE DIGITAL SIGNAL PROCESSING: Decimation by a factor D, interpolation by a factor I, sampling rate conversion by a rational factor I/D, Filter Design & Implementation for sampling rate conversion, Multi stage Implementation of sampling rate conversion.

TEXT BOOKS:

1. John G. Proakis, Dimitris G. Manolakis (2007), *Digital Signal Processing, Principles, Algorithms, and Applications*, Pearson Education / PHI, India.
2. A. V. Oppenheim, R. W. Schaffer (2009), *Discrete Time Signal Processing*, Prentice Hall of India, New Delhi.

REFERENCE BOOKS:

1. Andreas Antoniou (2006), *Digital Signal Processing*, Tata McGraw Hill, New Delhi.
2. M. H. Hayes (2007)*, Schaums Outlines of Digital Signal Processing,* Tata McGraw Hill, India.
3. C. Britton Rorabaugh (2005), *Digital Signal Processing Primer,* Tata McGraw Hill, New Delhi.
4. Robert J. Schilling, Sandra L. Harris (2007)*, Fundamentals of Digital Signal Processing using Matlab,* Thomson Publications, India.
5. Alan V. Oppenheim, Ronald W. Schafer (2006), *Digital Signal Processing,* Prentice Hall of India, New Delhi.

B .Tech. ECE VI SEMESTER

MICROWAVE ENGINEERING

Course Code: **A1426**

L	T	P	C
4	-	-	4

UNIT - I

MICROWAVE TRANSMISSION LINES: Introduction, microwave spectrum and bands, applications of microwaves. rectangular waveguides –solution of wave equations in rectangular coordinates, TE/TM mode analysis, expressions for fields, characteristic equation and cut-off frequencies, filter characteristics, dominant and degenerate modes, sketches of TE and TM mode fields in the cross-section, mode characteristics -phase and group velocities, wavelengths and impedance relations related problems rectangular guide- power transmission and power losses Impossibility of TEM mode, microstrip lines– introduction, Z_O relations, effective dielectric constant, losses, Q factor ,cavity resonators– introduction, rectangular cavities, dominant modes and resonant frequencies, Q factor and coupling coefficients, related Problems.

UNIT - II

WAVEGUIDE COMPONENTS AND APPLICATIONS: Coupling mechanisms – probe, loop, aperture types, waveguide discontinuities – waveguide windows, tuning screws and posts, matched loads, waveguide attenuators – resistive card, rotary vane types; waveguide phase shifters – dielectric, rotary vane types, waveguide multiport junctions – E plane and H plane tees, magic tee, hybrid ring, directional couplers – 2 hole, bethe hole types, related problems ferrites– composition and characteristics, faraday rotation, ferrite components – gyrator, isolator, circulator, scattering matrix– significance, formulation and properties, S matrix calculations for – 2 port junction, e plane and h plane tees, magic tee, directional coupler, circulator and isolator, related problems.

UNIT - III

MICROWAVE TUBES: Limitations and losses of conventional tubes at microwave frequencies, microwave tubes – O type and M type classifications, O-type tubes: 2 cavity klystrons – structure, reentrant cavities, velocity modulation process and applegate diagram, bunching process and small signal theory – expressions for o/p power and efficiency. reflex klystrons – structure, applegate diagram and principle of working, mathematical theory of bunching, power output, efficiency, oscillating modes and o/p characteristics, effect of repeller voltage on power o/p, related problems, HELIX TWTS: Significance, types and characteristics of slow wave structures, structure of TWT and amplification process (qualitative treatment), suppression of oscillations, gain considerations.

UNIT - IV

M-TYPE TUBES: Introduction, cross-field effects, magnetrons – different types, 8-cavity cylindrical travelling wave magnetron – Hull Cut-off and Hartree Conditions, modes of resonance and PI-mode operation, separation of Pi-mode, o/p characteristics.

MICROWAVE SOLID STATE DEVICES: Introduction, Classification, Applications. TEDs - Introduction, Gunn Diode - Principle, RWH Theory, Characteristics, Basic Modes of Operation, Gunn Oscillation Modes. LSA mode Avalanche Transit Time Devices.

UNIT - V

MICROWAVE MEASUREMENTS: Description of Microwave Bench – Different Blocks and their Features, Precautions; Microwave Power Measurement - Bolometers, Measurement of Attenuation, Frequency standing wave measurements –measurement of low and High VSWR, Cavity Q. Impedance Measurements.

TEXT BOOKS:

1. Samuel Y. Liao (1994), *Microwave Devices and Circuits*, 3rd edition, Prentice Hall of India, New Delhi.
2. Herbert J. Reich, J. G. Skalnik, P. F. Ordung, H. L. Krauss (2004)*, Microwave Principles,* CBS Publishers, New Delhi, India.
3. M. Kulkarni (1998), *Micro Wave and Radar Engineering,* Umesh Publications, New Delhi.

REFERENCE BOOKS:

1. R. E. Collin (2002), *Foundations for Microwave Engineering,* 2nd edition, IEEE Press, John Wiley, India.
2. M. L. Sisodia, G. S. Raghuvanshi (1995), *Microwave Circuits and Passive Devices,* Wiley Eastern Ltd., New Age International Publishers Ltd.
3. Peter A. Rizzi (1999), *Microwave Engineering Passive Circuits*, Prentice Hall of India, New Delhi.
4. F. E. Terman (1955), *Electronic and Radio Engineering*, 4th edition, McGraw Hill, New Delhi.

B. Tech. ECE VI SEMESTER

HUMAN VALUES AND ETHICS
Interdepartmental Elective - I
(Common to ECE, CSE & IT)

Course Code: **A1016**

L	T	P	C
4	-	-	4

UNIT - I

HUMANVALUES: Morals, values and ethics, integrity, work ethic, service learning, civic virtue, respect for others, living peacefully, caring, sharing, honesty, courage, valuing time, co-operation, commitment, empathy, self-confidence, character and spirituality.

UNIT - II

ENGINEERING ETHICS: Senses of 'Engineering Ethics', variety of moral issued, types of inquiry, moral dilemmas, moral autonomy, Kohlberg's theory, Gilligan's theory, consensus and controversy, models of professional roles, theories about right action, self-interest, customs and religion, uses of ethical theories.

UNIT - III

ENGINEERING AS SOCIAL EXPERIMENTATION: Engineering as experimentation, engineers as responsible experimenters, codes of ethics, a balanced outlook on law, the challenger case study.

UNIT - IV

SAFETY, RESPONSIBILITIES AND RIGHTS: Safety and risk, assessment of safety and risk, risk benefit analysis and reducing risk, the Three Mile Island and Chernobyl case studies. Collegiality and loyalty, respect for authority, collective bargaining, confidentiality, conflicts of interest, occupational crime, professional rights, employee rights, Intellectual Property Rights (IPR), discrimination.

UNIT - V

GLOBAL ISSUES: Multinational corporations, environmental ethics, computer ethics, weapons development, engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership-sample code of ethics like ASME, ASCE, IEEE, institution of engineers (India), Indian institute of materials management, institution of electronics and telecommunication engineers (IETE),India, etc.

TEXT BOOKS:

1. Mike Martin, Roland Schinzinger(1996), *Ethics in Engineering*, McGraw-Hill, New York.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S (2004), *Engineering Ethics*, Prentice Hall of India, New Delhi, India.

REFERENCE BOOKS:

1. Charles D. Fleddermann(2004), *Engineering Ethics*, Pearson Education / Prentice Hall, New Jersey.
2. Charles E Harris, Michael S. Protchard, Michael J Rabins(2000), *Engineering Ethics - Concepts and Cases*, Wadsworth Thompson Learning, United States.
3. John R Boatright(2003), *Ethics and the Conduct of Business*, Pearson Education, New Delhi.
4. Edmund G Seebauer and Robert L Barry, (2001), *Fundamentals of Ethics for Scientists and Engineers,* Oxford University Press, New York.

B. Tech. ECE VI SEMESTER

HUMAN RESOURCE MANAGEMENT
Interdepartmental Elective - I
(Common to ECE, CSE & IT)

Course Code: **A1017**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION HUMAN RESOURCE MANAGEMENT: Introduction and significance of HRM, Scope, functions of HRM, changing environment of HRM and Challenges. Human Resource Planning, Objectives, Factors influencing Human Resource planning, HR Planning Process.

UNIT - II

JOB ANALYSIS AND RECRUITMENT: Process and Sources of Recruitment; Selection, process of selection and techniques, Retention of Employees.

UNIT - III

HUMAN RESOURCES DEVELOPMENT: Training Vs Development, Need, Process of training, Methods of training, Training Evaluation, Career planning, Performance Management System, Methods of Appraisal, Common Errors.

UNIT - IV

COMPENSATION MANAGEMENT: Concepts and components of wages, Factors influencing wage fixation, Job evaluation, Methods of payment, Incentives and Fringe benefits.

UNIT - V

MANAGING INDUSTRIAL RELATIONS: Components of Industrial Relation, Trade Unions, functions of Trade Union, Employee Participation, Importance and Schemes, Collective Bargaining, Grievance Redressal, Industrial Dispute Settlement machinery.

TEXT BOOKS:

1. Biswajeet Pattnayak (2009), *Human Resource Management*, Prentice hall of India, New Delhi, India.
2. R. Wayne Mondy and Robert M. Noe (2009), *Human Resource Management*, Pearson, India.

REFERENCE BOOKS:

1. Aswathappa. K. (2007), *Human Resources and Personnel Management*, Tata MC Graw Hill, New Delhi, India.
2. Monappa. A, Saiyadain. M. (1979), *Personnel Management*, Tata Mc Graw Hill, New Delhi, India.
3. C. B. Mamoria (2003), *Personnel Management*, Himalaya Publishing House, India.

B. Tech. ECE VI SEMESTER

ENTERPRENEURSHIP
Interdepartmental Elective – I
(Common to ECE, CSE & IT)

Course Code: **A1018**

L	T	P	C
4	-	-	4

UNIT - I

ENTREPRENEURSHIP: Importance and role of entrepreneurship, Characteristics of entrepreneurship, Qualities of an entrepreneur, Functions of entrepreneur; Theories of entrepreneurship, Stimulants of entrepreneurship and Barriers to entrepreneurship, Ethics and Social Responsibility, Role of entrepreneur in economic development.

UNIT - II

INSTITUTIONAL SUPPORT: Role of Government; Role of IDBI, SIDBI, SIDO, NIESBUD, SISI, DIC, Entrepreneurship Development Institute, MSMEs.

UNIT - III

WOMEN ENTREPRENEURSHIP: Role & Importance, Functions of women entrepreneur, Profile of Indian Women Entrepreneur, Problems of Women Entrepreneurs, Women Entrepreneurship Development in India and in Foreign Countries.

UNIT - IV

PROJECT MANAGEMENT: Concept of project and classification of project identification, project formulation - project report - project design, Project appraisal - profitability appraisal - project planning - social cost benefit analysis - financial analysis and project financing.

UNIT - V

TRAINING: Designing appropriate training programmes to inculcate Entrepreneurial Spirit, significance of entrepreneurial training, Training for New and Existing Entrepreneurs, Feedback and Performance of Trainees.

TEXT BOOKS:

1. Robert Hisrich, Michael P. Peter, Dean A. Shepherd (2010), E*ntrepreneurship*, Tata Mc Graw Hill, New Delhi.

REFERENCE BOOKS:

1. Bholanath Datta (2009), *Entrepreneurship*, Excel publications, India.
2. David H Holt (2010), *Entrepreneurship*, Prentice hall of India, New Delhi, India.

B. Tech. ECE VI SEMESTER

BUSINESS COMMUNICATION
Interdepartmental Elective – I
(Common to ECE, CSE & IT)

Course Code: **A1019**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION TO MANAGERIAL COMMUNICATION: Meaning, Importance and objectives, Principles of Communication, Forms of communication, Communication Process, Barriers To effective communication, Gateways to effective communication.

UNIT - II

NONVERBAL COMMUNICATION: Body Language, Gestures, Postures, Facial Expressions, Dress Code. Listening and Speaking Skills, Probing questions, Observation, Business and Social etiquette.

UNIT - III

MANAGERIAL SPEECHES: Principles of Effective Speech & Presentations. Technical and Non-technical presentations. Speech of introduction, speech of thanks, occasional speech, theme speech, Use of audio visual aids.

UNIT - IV

INTERVIEW TECHNIQUES: Mastering the art of conducting and giving interviews, Placement interviews, discipline/technical interviews, appraisal interviews, exit Interviews. *Group communication*: Importance, Meetings, group discussions, Video conferencing.

UNIT - V

INTRODUCTION TO BUSINESS CORRESPONDENCE: *Business letters*: Enquiries, Circulars, Quotations, Orders, Acknowledgments, Executions, Complaints, Persuading letters, Sales letters, Job application letters, Bio-data, Covering Letter, Interview Letters, Letter of Reference, Memos, minutes, Circulars and Notices. *Reports:* Types of Business Reports - Format, Choice of vocabulary, Coherence, paragraph writing, organization reports by individual, Report by committee.

TEXT BOOKS:

1. Lesikar R. V, Flatley M. E (2005), *For Empowering the Internet Generation*, Tata McGraw Hill Publishing Company Ltd., New Delhi, India.
2. Ludlow. R, Panton. F (1998), *The Essence of Effective Communications*, Prentice Hall of India Pvt. Ltd., New Delhi, India.

REFERENCE BOOKS:

1. Adair .J (2003), *Effective Communication,* Pan Macmillan, London.
2. Pan Mcmillan Thill J. V, Bovee G. L (1993), *Excellence in Business Communication,* Tata McGraw Hill, New York.
3. Bowman J.P, Branchaw P. P (1987), *Business Communications: From Process to Product*, Dryden Press, Chicago.

B. Tech. ECE VI SEMESTER

INTELLECTUAL PROPERTY AND PATENT RIGHTS
Interdepartmental Elective - I
(Common to ECE, CSE & IT)

Course Code: **A1020**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION TO INTELLECTUAL PROPERTY: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT - II

TRADE MARKS: Purpose and function of trademarks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark' trade mark registration processes.

UNIT - III

LAW OF COPY RIGHTS : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right regisffation, notice of copy right' international copy right law.

LAW OF PATENTS: Foundation of patent law, patent searching process' ownership rights and transfer.

UNIT - IV

TRADE SECRETS: Trade secrete law, determination of trade secrete status' liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

UNFAIR COMPETITION: Misappropriation right of publicity, false advertising.

UNIT - V

NEW DEVELOPMENT OF INTELLECTUAL PROPERTY: New developments in trade mark law; copy right law patent law, intellectual property audits'. International overview on intellectual property, international - trade mark law, copy right law, international patent law, and international development trade secrets law.

TEXT BOOKS:

1. Deborah. E. Bouchoux (2009*), Intellectual property*, Cengage learning, India.
2. Deborah. E. Bouchoux (2001), *Protecting your companies intellectual property*, AMACOM, USA.

REFERENCE BOOKS:

1. Prabudda ganguli (2003), *Intellectual property right*, Tata McGraw Hill Publishing company ltd., India.
2. Robert Hisrich, Michael P. Peter, Dean A. Shepherd (2010), *Entrepreneurship*, Tata Mc Graw Hill., India.

B. Tech. ECE VI SEMESTER

PROJECT PLANNING AND MANAGEMENT
Interdepartmental Elective - I
(Common to ECE, CSE & IT)

Course Code: **A1021**

L	T	P	C
4	-	-	4

UNIT - I

PERT AND CPM : Introduction, origin of PERT and CPM, planning, scheduling and controlling, bar charts, milestone charts, weaknesses in bar charts, PERT and CPM networks comparison, event, activity, rules for drawing networks, numbering the events (Fulkerson's law), dummy activities.

UNIT - II

CPM - PERT NETWORK ANALYSIS : Time estimate, expected time, earliest allowable occurrence time, latest allowable occurrence time, slack, project duration, probability of completion, start and finish time estimates, floats, project scheduling, critical and sub-critical path. Updating - process of updating, when to update.

UNIT - III

CPM COST MODEL & RESOURCES ALLOCATIONS, RESOURCE SCHEDULING : Cost analysis, direct and indirect costs, operation time, normal and crash times and costs, optimizing project cost, crash limit, free float limit, optimization. Resource smoothening, resource leveling.

UNIT - IV

MANAGEMENT: Scope of construction management, significance of construction management, concept of scientific management, psychology in management, a historical account of management philosophy, qualities of manager, the roles/functions performed by effective and competent managers, the manager - as a decision maker, as a motivator, as a communication-link, as a conflict resolver, as a well wisher of co-employees and the employer etc.

UNIT - V

ORGANIZATION: Types of organization, merits and demerits of different types of organization, authority, policy, recruitment process and training; development of personnel department; labor problems; labor legislation in India; 'workmen's compensation act of 1923 and minimum wages act of 1948', and subsequent amendments. Safety in construction.

TEXT BOOKS:

1. Punmia, Khandelwal (2006), *Project planning and control with PERT and CPM*, 3rd edition, Laxmi Publications, New Delhi, India.

REFERENCE BOOKS:

1. L. S. Srinath (1975), *PERT and CPM*, 2nd Edition, Afflicted East West Press Pvt. Ltd, New Delhi, India.
2. U. K. Shrivastava (1999), Construction Planning and Management, Galgotia Publications Pvt. Ltd., New Delhi**,** India**.**

B .Tech. ECE VI SEMESTER

MICROPROCESSORS AND INTERFACING LAB
(Common to ECE & EEE)

Course Code: **A1427**

L	T	P	C
-	-	3	2

LIST OF EXPERIMENTS:

I. MICROPROCESSOR 8086:

1. Programs involving data Transfer Instructions
   a. Byte and word transfer in different addressing modes
   b. Block move Without overlapping
   c. Block move With overlapping
   d. Block interchanging

2. Programs involving arithmetic and logical operations like addition and subtraction of multi precision numbers
   a. Addition and Subtraction of Multi precision numbers
   b. Multiplication and division of signed and unsigned Hexadecimal numbers
   c. ASCII adjustment instructions
   d. Code Conversion
   e. Arithmetic program to find square ,cube ,LCM ,GCD and factorial

3. Programs involving bit manipulation instructions like checking
   a. If given data is positive or negative
   b. If given data is odd or even
   c. Logical ones and zeros in a given data
   d. 2 out of 5 code
   e. Bit wise palindrome
   f. Nibble wise palindrome

4. Programs involving Branch / Loop instructions like :
   a. Programs on arrays : addition/subtraction of N nos., finding largest/smallest no., ascending/descending order, etc.
   b. Near and Far Conditional and Unconditional jumps, Calls and Returns

5. Programs on String Manipulations like string transfer, string reversing, searching for a character in a string, palindrome etc.

6. Programs involving on Software Interrupts

7. Programs to use DOS interrupt INT 21H Function calls For:
   a. Reading a Character from Keyboard, Buffer Keyboard input
   b. Display of characters/String on console
   c. Creation of a new file, read/write from a file,
   d. Read system date, set system date, read system time, set system time

II. INTERFACING 8086:

1. Experiments on interfacing 8086 with the following modules through 8255 PPI / 8257 DMA / 8259 PIC
   a. A/D and D/A converters
   b. Matrix keyboard interface
   c. Seven segment display interface
   d. Logical controller interface
   e. Stepper motor interface
   f. Traffic signals by interfacing traffic controller to 8086
   g. Real time Clock using PIT 8253/8254

2. Interfacing a printer to an 8086 Microcomputer kit

B .Tech. ECE VI SEMESTER

DIGITAL SIGNAL PROCESSING LAB

Course Code: **A1428**

L	T	P	C
-	-	3	2

The programs shall be implemented in soft ware (using MATLAB/ Lab view/ C programming/OCTAVE or Equivalent) and hard ware (using TI/Analog devices/Motorola/ Equivalent DSP processors).

PART - A

1. Generation of Various Signals and sequences
2. Operations on signals and Sequences such as addition, Multiplication, scaling, Shifting, folding, computation of energy and average power.
3. Convolution between Signals and sequences
4. Auto Correlation and Cross Correlation between Signals and sequences.
5. Verification of Linearity and Time Invariance properties of a given Continuous/Discrete System
6. Generation of Sinusoidal waveform / signal based on recursive difference equations.
7. To find DFT/IDFT of given DT signal.
8. To find frequency response of a given system given in (Transfer Function/Differential equation form).
9. Implementation of FFT of given sequence.

PART - B

1. Determination of Power Spectrum of a given signal(s).
2. Implementation of LPF, HPF, BPF, BSF FIR filter for a given sequence.
3. Implementation of LPF IIR filter for a given sequence.
4. Generation of Sinusoidal signal through filtering.
5. Implementation of Decimation and Interpolation Process.
6. Implementation of sampling rate I/D converters.
7. Noise removal: Add noise above 3 KHz and then remove, interference suppression using 400 Hz tone.
8. Impulse response of first order and second order systems.

SYLLABI FOR VII SEMESTER

B .Tech. ECE VII SEMESTER

INDUSTRIAL MANAGEMENT AND PSYCHOLOGY

Course Code: **A1015**

L	T	P	C
4	-	-	4

UNIT - I

CONCEPTS OF MANAGEMENT AND ORGANISATION: Functions of management, evolution of management thought, Taylor's scientific management, fayol's principles of management, Hertzberg's Maslow's hierarchy of human needs, systems approach to management.

DESIGNING ORGANISATIONAL STRUCTURES: Basic concepts related to organisation - departmentation and decentralization, types of mechanistic and organic structures of organisation (line organization, line and staff organization, functional organization.

UNIT - II

PLANT LOCATION: Definition, factors affecting the plant location, comparison of rural and urban sites, methods for selection of plant- matrix approach. Plant layout - definition, objectives, types of production, types of plant layout, various data analyzing forms travel chart.

WORK STUDY: Definition, objectives, method study - definition, objectives, steps involved- various types of associated charts, difference between micromotion and memomotion studies. Work measurement- definition, time study, steps involved, equipment, different methods of performance rating, allowances, standard time calculation. Work Sampling - definition, steps involved, standard time calculations, differences with time study.

UNIT - III

INTRODUCTION TO PERT / CPM : Project management, network modeling-probabilistic model, various types of activity times estimation, programme evaluation review techniques, critical path, probability of completing the project, deterministic model, critical path method (CPM), critical path calculation, crashing of simple of networks.

INSPECTION AND QUALITY CONTROL: Types of inspections, statistical quality control, techniques, variables and attributes, assignable and non assignable causes, variable control charts, and R charts, attributes control charts, p charts and c charts. Acceptance sampling plan, single sampling and double sampling plans, OC curves. Introduction to TQM - quality circles, ISO 9000 series procedures.

UNIT - IV

MATERIALS MANAGEMENT: Objectives, inventory functions, types, associated costs, inventory classification techniques-ABC and VED analysis. Inventory control systems, continuous review system, periodical review system. Stores management and stores records. Purchase management, duties of purchase of manager, associated forms.

INTRODUCTION TO HUMAN RESOURCE MANAGEMENT: Functions of HRM, job evaluation, different types of evaluation methods. Job description, merit rating, difference with job evaluation, different methods of merit ratings, wage incentives, different types of wage incentive schemes. Marketing, marketing vs. selling, marketing mix, product life cycle.

UNIT - V

INDUSTRIAL PSYCHOLOGY: Definition and concept, industrial psychology vs. personnel management, aims and objectives of industrial psychology, scope of industrial psychology, individual and group, individual differences in behavior, group dynamics, theory x and y, Hawthorne experiment, morale, motivation, working environmental conditions, industrial fatigue.

TEXT BOOKS:

1. O. P. Khanna (2004), *Industrial Engineering and Management*, Dhanpat Rai, New Delhi.

REFERENCE BOOKS:

1. Stoner, Freeman (2005), *Gilbert, Management*, 6th edition, Pearson Education, New Delhi.
2. Panner Selvam (2004), *Production and Operations Management*, Prentice Hall of India, New Delhi.
3. Ralph M. Barnes (2004), *Motion and Time Studies*, John Wiley and Sons.
4. L. S. Srinath (2000), *PERT / CPM*, affiliate East-West Press, New Delhi.
5. Gary Dessler (2002), *Human Resource Management*, Pearson Education Asia, India.

B .Tech. ECE VII SEMESTER

VLSI DESIGN
(Common to ECE, CSE & IT)

Course Code: **A1429**

L	T	P	C
3	1	-	4

UNIT - I

MOS TRANSISTOR THEORY: Introduction, MOS Device Design Equations–Threshold Voltage-Body Effect, Channel Length Modulation, MOS Models, the Complementary CMOS Inverter-DC characteristics, the differential inverter, the Tristate inverter, Bipolar devices.

UNIT - II

CMOS PROCESSING TECHNOLOGY: Overview-Wafer Processing, Oxidation, Epitaxy, deposition, ion-implantation and diffusion, the silicon gate process, Basic CMOS technology, Latchup – Origin of Latchup, Latchup triggering, Latchup prevention.

UNIT - III

MOS-CIRCUIT DESIGN PROCESSES: MOS Layers, Stick Diagrams-nMOS Design style, CMOS design style, Design Rules and Layout-Lambda based design rules, contact cuts, double metal MOS process rules, CMOS Lambda based design rules, general observations on design rules, 2 µm Double metal Double poly CMOS rules, Layout Diagrams.

CIRCUIT CHARACTERIZATION: Introduction, Resistance Estimation, Capacitance Estimation, Inductance, Switching Characteristics-analytic delay models, Power Dissipation, Scaling of MOS Transistor Dimensions.

UNIT - IV

CMOS CIRCUIT DESIGN AND LOGIC DESIGN: Introduction, CMOS logic gate design, Basic Physical design of simple logic gates, CMOS logic structures-CMOS complementary logic, Pseudo-nMOS logic, Dynamic CMOS logic, Pass transistor Logic, CMOS Domino Logic.

UNIT - V

CMOS TESTING: Need for Testing, Manufacturing Test Principles-fault models, Observability, Controllability, Design Strategies for Test, Chip Level test Techniques.

TEXT BOOKS:

1. Neil H. E. Weste, Kamran Eshraghian (2001), *Principles of CMOS VLSI Design – A System Perspective*, 2nd Edition, Pearson Education Asia, India.
2. Kamran Eshraghian, Dougles A. Pucknell, Sholeh Eshraghian (2005)*, Essentials of VLSI Circuits and Systems*, PHI, New Delhi.

REFERENCE BOOKS:

1. John .P. Uyemura (2011), *Introduction to VLSI Circuits and Systems,* John Wiley, India.
2. S.M. Sze (2003), *VLSI Technology,* 2nd Edition, Tata McGraw Hill, New Delhi.

B .Tech. ECE VII SEMESTER

EMBEDDED SYSTEMS
(Common to ECE & EEE)

Course Code: **A1430**

L	T	P	C
3	1	-	4

UNIT - I

EMBEDDED COMPUTING: Introduction, complex systems and microprocessor, the embedded system design process, formalisms for system design, design examples.

UNIT - II

THE 8051 ARCHITECTURE: Introduction, 8051 micro controller hardware, input/output ports and circuits, external memory, counter and timers, serial data input/output, interrupts.

BASIC ASSEMBLY LANGUAGE PROGRAMMING CONCEPTS: The assembly language programming process, programming tools and techniques, programming the 8051. Data transfer and logical instructions, arithmetic operations, decimal arithmetic, jump and call instructions.

UNIT - III

INTRODUCTION TO REAL-TIME OPERATING SYSTEMS: Tasks and task states, tasks and data, semaphores, and shared data; message queues, mailboxes and pipes, timer functions, events, memory management, interrupt routines in an RTOS environment.

BASIC DESIGN USING A REAL-TIME OPERATING SYSTEM: Principles, semaphores and queues, hard real-time scheduling considerations, saving memory and power, an example RTOS like uC-OS (open source).

UNIT - IV

EMBEDDED SOFTWARE DEVELOPMENT TOOLS: Host and target machines, linker/locators for embedded software, getting embedded software into the target system

DEBUGGING TECHNIQUES: Testing on host machine, using laboratory tools, an example system.

UNIT - V

INTRODUCTION TO ADVANCED ARCHITECTURES: ARM and SHARC, processor and memory organization and instruction level parallelism; networked embedded systems: bus protocols, I^2C bus and CAN bus; internet-enabled systems, design example-elevator controller.

TEXT BOOKS:

1. Wayne Wolf (2008), *Computers as Components-principles of embedded computer system design*, Elseveir, New Delhi, India.
2. Kenneth J. Ayala (2008), *The 8051 Microcontroller*, 3rd edition, Cengage Learning, India.
3. David E. Simon (1999), *An Embedded Software Primer*, Pearson Education, India.

REFERENCE BOOKS:

1. Jean J. Labrosse (2000), Embedding System Building Blocks, 2nd edition, CMP publishers, USA.
2. Raj Kamal (2004), *Embedded Systems*, Tata McGraw hill, India.
3. Ajay V. Deshmukh (2005), *Micro Controllers*, Tata McGraw hill, India.
4. Frank Vahid, Tony Givargis (2002), *Embedded System Design*, John Wiley, India.

B .Tech. ECE VII SEMESTER

CELLULAR AND MOBILE COMMUNICATIONS

Course Code: **A1431**

L	T	P	C
4	-	-	4

UNIT - I

CELLULAR MOBILE RADIO SYSTEMS: Introduction to Cellular Mobile System, Why Cellular Mobile Telephone Systems, History Of 800mhz Spectrum Allocation, Trunking Efficiency, A Basic Cellular System, Performance Criteria, Uniqueness of Mobile Radio Environment, Operation of Cellular Systems, Marketing Image of Hexagonal Shaped Cells, Planning a Cellular system, Analog cellular Systems.

ELEMENTS OF CELLULAR RADIO SYSTEM DESIGN : General Description of The Problem, Concept of Frequency Channels, Co-Channel Interference Reduction Factor, Desired C/I From a Normal Case in a Omni-directional Antenna System, Handoff Mechanism, Cell Splitting, Consideration of The Components of Cellular System.

UNIT - II

INTERFERENCE: Co-Channel Interference, Exploring Co-Channel Interference areas in a system, Real Time Co-Channel Interference Measurement at mobile radio transceivers, Design of an Omni Directional Antenna System in the worst case, Design of a Directional Antenna System, Lowering the Antenna height, Reduction of Co-channel Interference by means of a notch in the tilted antenna pattern, Umbrella-pattern effect, use of parasitic elements, power control, Diversity Receiver.

NON CO-CHANNEL INTERFERENCE: Subjective test Vs objective test, Adjacent-channel interference, near-end-far-end interference, effect on near-end mobile units, cross talk-A unique characteristics of voice channels, effects on coverage and interference by applying power decrease, antenna height decrease, beam tilting, effects of cell-site components, interference between systems, UHF TV interference, long-distance interference.

UNIT - III

CELL COVERAGE FOR SIGNAL AND TRAFFIC: General Introduction, Obtaining the Mobile Point-to-Point Model (Lee Model), Propagation over Water or Flat Open Area, Foliage Loss, Propagation in Near-in Distance, Long –Distance Propagation, Obtain Path Loss from a Point-to-Point Prediction Model-A General Approach, Form of a Point-to-Point Model.

CELL SITE AND MOBILE ANTENNAS: Sum and Difference Patterns and their Synthesis, Antennas at Cell Site, Omni-directional Antennas, Directional Antennas for Interference Reduction, Unique Situations of Cell-Site Antennas, Mobile Antennas.

UNIT - IV

FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT: Frequency Management, Frequency –Spectrum Utilization, Set-up Channels , Channel Assignments to Cell Sites and Mobile Units, Fixed Channel Assignment, Adjacent Channel Assignment, Channel Sharing and Borrowing, Sectorization, Underlay-Overlay arrangement, Nonfixed Channel Assignment Algorithms.

HANDOFF: Value of Implementing Handoffs, Why handoffs, Types of Handoff, Initiation of a Handoff, Delaying a Handoff, Forced Handoffs, Queuing of Handoffs, Power-Difference Handoffs, Mobile Assisted Handoff(MAHO) and Soft Handoff, Cell-Site Handoff, Intersystem Handoff, Introduction to Dropped Call Rate, Formula of Dropped Call Rate.

UNIT - V

DIGITAL CELLULAR NETWORKS: GSM- Architecture, Channels, Multiple-access scheme, Radio resource management, Mobility management, Communication management, Network management, North American TDMA-History, Architecture, CDMA.

TEXT BOOKS:

1. William C. Y. Lee (2006), *Mobile Cellular Telecommunications*, 2nd edition, Tata McGraw Hill, India.
2. Theodore S. Rappaport (2002), *Wireless Communications*, 2nd edition, Pearson education, India.

REFERENCE BOOKS:

1. Gordon L. Stuber (2007), *Principles of Mobile Communication*, 2nd edition, Springer International, India.
2. William C. Y. Lee (2006), *Wireless and Cellular Telecommunications*, 3rd edition, McGraw Hill, New Delhi.

B .Tech. ECE VII SEMESTER

OPERATING SYSTEMS
(Interdepartmental Elective - II)

Course Code: **A1508**

L	T	P	C
4	-	-	4

UNIT - I

OPERATING SYSTEMS OVERVIEW: Introduction, operating system operations, process management, memory management, storage management, protection and security, distributed systems, special purpose systems.

OPERATING SYSTEMS STRUCTURES: Operating system services and systems calls, system programs, operating system structure, operating systems generations.

PROCESS MANAGEMENT: Process concepts, process state, process control block, scheduling queues, process scheduling, multithreaded programming, threads in UNIX, comparison of UNIX and windows.

UNIT - II

CONCURRENCY AND SYNCHRONIZATION: Process synchronization, critical section problem, Peterson's solution, synchronization hardware, semaphores, classic problems of synchronization, readers and writers problem, dining philosophers problem, monitors, synchronization examples(Solaris), atomic transactions. Comparison of UNIX and windows.

DEADLOCKS: System model, deadlock characterization, deadlock prevention, detection and avoidance, recovery from deadlock banker's algorithm.

UNIT - III

MEMORY MANAGEMENT: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation, virtual memory, demand paging, page-replacement algorithms, allocation of frames, thrashing, case study - UNIX.

FILE SYSTEM: Concept of a file, access methods, directory structure, file system mounting, file sharing, protection. File system implementation: file system structure, file system implementation, directory implementation, allocation methods, free-space management, efficiency and performance, comparison of UNIX and windows.

UNIT - IV

I/O SYSTEM: Mass storage structure - overview of mass storage structure, disk structure, disk attachment, disk scheduling algorithms, swap space management, stable storage implementation, tertiary storage structure.

I/O: Hardware, application I/O interface, kernel I/O subsystem, transforming I/O requests to hardware operations, streams, performance.

UNIT - V

PROTECTION: Goals of protection, principles of protection, domain of protection access matrix, implementation of access matrix, access control, revocation of access rights.

SECURITY: The security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, fire walling to protect systems.

TEXT BOOKS:

1. Abraham Silberschatz, Peter Baer Galvin, Greg Gagne (2006), *Operating System Principles*, 7th edition, Wiley India Private Limited, New Delhi.

REFERENCE BOOKS:

1. Stallings (2006), *Operating Systems*, Internals and Design Principles, 5th edition, Pearson Education, India.
2. Andrew S. Tanenbaum (2007), *Modern Operating Systems*, 2nd edition, Prentice Hall of India, India.
3. Deitel & Deitel (2008), *Operating systems*, 3rd edition, Pearson Education, India.
4. Dhamdhere (2008), *Operating Systems*, Second Edition, Tata Mc graw Hill, New Delhi.

B .Tech. ECE VII SEMESTER

ADVANCED COMPUTER ARCHITECTURE
Interdepartmental Elective - II
(Common to EC & CSE)

Course Code: **A1528**

L	T	P	C
4	-	-	4

UNIT - I

PARALLEL COMPUTER MODELS: The State of Computing, Computer development milestones, Elements of modem computers, Evolution of computer architecture, System attributes to performance, Multiprocessors and Multicomputers, Shared -Memory Multiprocessors, Distributed -Memory Multicomputers, A Taxonomy of MIMD Computers, Multivector and SIMD computers, Vector Supercomputers, SIMD Supercomputers, Program and Network Properties, Conditions of Parallelism, Data and Resource Dependences, Hardware and Software Parallelism, The Role of Compilers, Program Partitioning and Scheduling, Grain Sizes and Latency, Grain Packing and Scheduling, Program flow Mechanisms, Control Flow Versus Data Flow , Demand-Driven Mechanisms, Comparisons of Flow Mechanisms.

UNIT - II

SYSTEM INTERCONNECT ARCHITECTURE: Network properties and Routing , Static Connection Networks, Dynamic Connection Networks, Processor and Memory Technologies, Advanced Processor Technology, Instruction Pipelines, Processors and Co-processors, Instruction Set Architectures, CISC Scalar Processor (exclude CISC Microprocessor Families), RISC Scalar Processor (exclude Sun Microsystems SPARC Architecture), Superscalar and Vector Processor, Superscalar Processors (exclude IBM RS/6000 Architecture), VLIW Architecture, Shared-Memory, Organizations, Interleaved Memory Organization, Bandwidth and fault Tolerance, Memory Allocation Schemes (exclude swapping in Unix, Demand Paging system and Hybrid Paging system).

UNIT - III

MEMORY HIERARCHY: Hierarchical Memory Technology, Inclusion, Coherence and Locality, Memory Capacity Planning, Cache Memory Organization, Cache Addressing Models.

BUSES AND ARBITRATION: Hierarchical Bus System, Backplane Bus Specification, Bus Arbitration and Control, Arbitration, Transaction and Interrupt, IEEE Futurebus+ Standards.

UNIT - IV

PIPELINING AND SUPERSCALAR TECHNIQUES: Linear Pipeline Processors, Asynchronous and Synchronous Models, Clocking and Timing control, Speed up, Efficiency and Throughput, Nonlinear Pipeline Processors, Reservation and Latency Analysis, Collision-Free Scheduling, Instruction Pipeline Design, Instruction Execution Phases, Mechanism for Instruction, Pipelining ,Dynamic Instruction Scheduling, Branch Handling Techniques, Arithmetic Pipeline Design, Computer Arithmetic Principles, Static Arithmetic Pipeline, Multifunctional Arithmetic Pipeline (exclude IBM360 Floating Point Unit).

UNIT - V

MULTIPROCESSORS AND MULTI-COMPUTERS: Multiprocessor System Interconnects, Hierarchical Bus Systems: Crossbar Switch and Multiport Memory, Multistage and Combing Networks, Cache Coherence and Synchronization Mechanisms, The Cache Coherence Problem, Snoopy Bus Protocol, Directory-based protocols, Hardware Synchronization Mechanisms, Message Passing Mechanisms, Message Routing Schemes, Deadlock and Virtual Channels, Flow Control Strategy.

TEXT BOOKS:

1. Kai Hwang (2000), *Advanced Computer Architecture- Parallelism, Scalability, Programmability*, The McGraw Hill Companies, New Delhi.

REFERENCE BOOKS:

1. David E. Culler, J. P. Singh, Anoop Gupta, Harcourt Asiam, Morgan Kaufmann (1999), *Parallel Computer Architecture,* Elsevier, India.
2. John P. Hayes (1998), *Computer Architecture and Organization*, 3rd edition, The McGraw Hill Companies, New Delhi, India.
3. Rajararnan, C. Siva Ram Murthy (2000), *Parallel Computers - Architecture and Programming*, Prentice Hall of India, New Delhi.

B .Tech. ECE VII SEMESTER

NETWORK SECURITY AND CRYPTOGRAPHY
Interdepartmental Elective - II
(Common to ECE & IT)

Course Code: **A1607**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION: Security trends, The OSI Security Architecture, Security Attacks, Security Services and Security Mechanisms, A model for Network security.

CLASSICAL ENCRYPTION TECHNIQUES: Symmetric Cipher Modes, Substitute Techniques, Transposition Techniques, Rotor Machines, Stenography.

UNIT - II

BLOCK CIPHER AND DATA ENCRYPTION STANDARDS: Block Cipher Principles, Data Encryption Standards, the Strength of DES, Differential and Linear Crypt Analysis, Block Cipher Design Principles.

ADVANCED ENCRYPTION STANDARDS: Evaluation Criteria for AES, the AES Cipher.

MORE ON SYMMETRIC CIPHERS: Multiple Encryption, Triple DES, Block Cipher Modes of Operation, Stream Cipher and RC4.
INTRODUCTION TO NUMBER THEORY: Prime Numbers, Fermat's and Euler's Theorem, Testing for Primality, The Chinese Remainder Theorem, Discrete logarithms,

UNIT - III

PUBLIC KEY CRYPTOGRAPHY AND RSA: Principles Public key crypto Systems the RSA algorithm, Key Management, Diffie Hellman Key Exchange, Elliptic Curve Arithmetic, Elliptic Curve Cryptography.

MESSAGE AUTHENTICATION AND HASH FUNCTIONS: Authentication Requirement, Authentication Function, Message Authentication Code, Hash Function, Security of Hash Function and MACs.

HASH AND MAC ALGORITHM: Secure Hash Algorithm, Whirlpool, HMAC, CMAC.

DIGITAL SIGNATURE: Digital Signature, Authentication Protocol, Digital Signature Standard.

UNIT - IV

AUTHENTICATION APPLICATION: Kerberos, X.509 Authentication Service, Public Key Infrastructure.

EMAIL SECURITY: Pretty Good Privacy (PGP) and S/MIME.

IP SECURITY: Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management.

UNIT - V

WEB SECURITY: Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Electronic Transaction (SET), Intruders, Viruses and related threats.

FIREWALL: Firewall Design principles, Trusted Systems.

TEXT BOOKS:

1. William Stallings (2006), *Cryptography and Network Security: Principles and Practice*, 4th edition, Pearson Education, India.
2. William Stallings (2000), *Network Security Essentials (Applications and Standards)*, Pearson Education, India.

REFERENCE BOOKS:

1. Charlie Kaufman (2002), *Network Security: Private Communication in a Public World*, 2nd edition, Prentice Hall of India, New Delhi.
2. Atul Kahate (2008), *Cryptography and Network Security,* 2nd edition, Tata Mc Grawhill, India.
3. Robert Bragg, Mark Rhodes (2004), *Network Security: The complete reference,* Tata Mc Grawhill, India.

B .Tech. ECE VII SEMESTER

ENERGY MANAGEMENT
Interdepartmental Elective - II
(Common to ECE & EEE)

Course Code: **A1228**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION: Principles of Energy Management, Managerial Organization, Functional Areas for Manufacturing Industry. Process Industry, Commerce Government. Role of Energy Manager in each of the organization. Initiating, Organizing and Managing Energy Management Programs.

UNIT - II

ENERGY AUDIT: Definition and Concepts, Types of Energy Audits, Basic Energy Concepts. Resources for Plant Energy Studies , Data Gathering, Analytical Techniques. Energy Conservation: Technologies for Energy Conservation, Design for Conservation of Energy materials ,energy flow networks , critical assessment of energy usage. Formulation of objectives and constraints, synthesis of alternative options and technical analysis of options, process integration.

UNIT - III

ECONOMIC ANALYSIS: Scope, Characterization of an Investment Project. Types of Depreciation, Time Value of money , budget considerations, Risk Analysis.

UNIT - IV

METHODS OF EVALUATION OF PROJECTS: Payback, Annualized Costs , Investor's Rate of return. Present worth, Internal Rate of Return, Pros and Cons of the common methods of analysis , replacement analysis. Energy Consultant: Need of Energy Consultant , Consultant Selection Criteria.

UNIT - V

ALTERNATIVE ENERGY SOURCES: Solar Energy : Types of devices for Solar Energy Collection. Thermal Storage System ,Control Systems. Wind Energy: Availability, Wind Devices , Wind Characteristics , Performance of Turbines and systems.

TEXT BOOKS:

1. W. R. Murphy, G. McKay (2008), *Energy Management,* 1st edition*,* B.S. Publications, New Delhi.

REFERENCE BOOKS:

1. B. Smith (2007), *Energy Management Principles*, 1st edition, Pergamon Press, Inc., England.

B .Tech. ECE VII SEMESTER

OPERATIONS RESEARCH
Interdepartmental Elective - II
(Common to ECE, CSE, IT & ME)

Course Code: **A1331**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION TO OPERATIONS RESEARCH: Basics definition, scope, objectives, phases, models and limitations of Operations Research. Linear Programming Problem, Formulation and Graphical solution of Linear Programming Problem. Simplex Method, Artificial variables Techniques, big -M method, two -phase simplex method, degeneracy and unbound solutions.

UNIT - II

TRANSPORTATION PROBLEM: Formulation, solution, unbalanced Transportation problem. Finding basic feasible solutions, North-West corner rule, least cost method and Vogel's approximation method. Optimality test - MODI method.

ASSIGNMENT MODEL: Formulation, Hungarian method for optimal solution, solving unbalanced problem, Traveling salesman problem as assignment problem.

UNIT - III

SEQUENCING MODELS: Solution of Sequencing Problem, Processing n Jobs through two machines, Processing n Jobs through three machines, Processing two Jobs through m machines, Processing n Jobs through m Machines.

QUEUING THEORY: Introduction, Single Channel, Poisson arrivals, exponential service times with infinite population and finite population models.

UNIT - IV

REPLACEMENT MODELS: Replacement of Items that Deteriorate whose maintenance costs increase with time without change in the money value, Replacement of items that fail suddenly, individual replacement policy, group replacement policy.

INVENTORY MODELS: Inventory costs, Models with deterministic demand model: (a) Demand rate uniform and production rate infinite, (b) Demand rate non-uniform and production rate infinite, (c) Demand rate uniform and production rate finite.

UNIT - V

GAME THEORY: Competitive game, rectangular game, saddle point, minimax (maximin) method of optimal strategies, value of the game. Solution of games with saddle points, dominance principle, Rectangular games without saddle point, mixed strategy for 2 X 2 games.

DYNAMIC PROGRAMMING: Characteristics of dynamic programming, Dynamic programming approach for priority management employment smoothening, Capital budgeting, Stage Coach/Shortest Path, cargo loading and Reliability problems.

TEXT BOOKS:

1. A. M. Natarajan, P. Balasubramani, A. Tamilarasi (2006), *Operations Research*, Pearson Education, India.
2. S. D. Shama (2009), *Operation Research,* Tata McGraw Hill, New Delhi.

REFERENCE BOOKS:

1. J. K. Sharma (2007), *Operations Research – Theory and Applications,* 3rd edition, Macmillan India Ltd, India.
2. R. Panneerselvam (2008), *Operations Research*, 2nd edition, Prentice Hall of India, India.
3. F. S. Hillier, G. J. Lieberman (2007), *Introduction to Operations Research,* 8th edition, Tata McGraw Hill, New Delhi, India.

B .Tech. ECE VII SEMESTER

AVIONICS
Interdepartmental Elective - II
(Common to ECE & AE)

Course Code: **A1725**

L	T	P	C
4	-	-	4

UNIT - I

BASICS: Basic principles of Avionics, Typical avionics sub system in civil/ military aircraft and space vehicles.

FLIGHT DECK AND DISPLAY SYSTEMS: Flight deck display technologies, CRT, LED, LCD, Touch screen, Head up display, Electronic instrumentation systems.

UNIT - II

AUDIO AND COMMUNICATION SYSTEMS: Aircraft audio systems, basic audio transmitter and receiver principles, VHF communication system, UHF communication systems.

UNIT - III

RANGING AND LANDING SYSTEMS: VHF Omnirange, VOR receiver principles, distance maturity equipment, principles of operation, Instrument landing system, localizer and glideslope.

POSITIONG SYSTEM: Global positioning system principles, triangulation, position accuracy, applications in aviation.

UNIT - IV

INERTIAL NAVIGATION SYSTEM: Principle of Operation of INS, navigation over earth, components of inertial Navigation systems, accelerometers, gyros and stabilized platform.

SURVELLIENCE SYSTEM: ATC surveillance systems principles and operation interrogation and replay standards, Collision avoidance system, ground proximity warning system.

UNIT - V

AUTO FLIGHT SYSTEM: Automatic flight control systems fly by wire and fly by light technologies, flight director systems, flight management systems. Integrated Data transfer methodology by use of MILS - STD - 1553/ ARINC - 429.

TEXT BOOKS:

1. N. S. Nagaraja(1996), *Elements of electronic navigation*, 2nd edition, Tata McGraw Hill, New Delhi.
2. Janes W. Wasson, Jeppesen Sandersen(1994), *Avionic systems Operation and maintenance*, Sterling Book House, Mumbai.

REFERENCE BOOKS:

1. Albert Hel frick (2010), *Principle of Avionics*, 6th edition, Avionics Communications Inc, India
2. E. H. J. Pallet (2010), *Aircraft Instrumentation and Integrated systems*, Pearson Education, New Delhi.
3. J. Powell (1998), *Aircraft Radio Systems*, Pitman publishers, London.

B .Tech. ECE VII SEMESTER

TELECOMMUNICATION SWITCHING SYSTEMS

(Professional Elective - I)

Course Code: **A1432**

L	T	P	C
4	-	-	4

UNIT - I

SWITCHING SYSTEMS: Evolution of Telecommunications, simple telephone communication, Basics of a Switching System, Manual Switching System, major Telecommunication Networks.

STROWGER SWITCHING SYSTEMS: Rotary Dial Telephone, Signaling Tones, Strowger Switching Components, Step by Step Switching, Design Parameters, 100 Line Switching systems, 1000 Line Blocking Exchange, 10000 Line Exchange.

CROSSBAR SWITCHING: Principles of Common Control, Touch Tone Dial Telephone, Principles of Crossbar Switching, Crossbar Switch Configurations, Cross point Technology, Crossbar Exchange Organization.

UNIT - II

ELECTRONIC SPACE DIVISION SWITCHING: Stored Program Control, Centralized SPC, Distributed SPC, Software Architecture, Application Software, Enhanced Services, Two-Stage Networks, Three-Stage Networks, *n*-Stage Networks.

TIME DIVISION SWITCHING- Basic Time Division Space Switching, Basic Time Division Time Switching, Time Multiplexed Space Switching, Time Multiplexed Time Switching; Combination Switching-Three Stage Combination Switching, n-stage Combination Switching.

UNIT - III

TELECOMMUNICATIONS TRAFFIC: Introduction, The Unit of Traffic, Congestion, Traffic Measurement, A Mathematical Model, Lost-call Systems –Theory, Traffic Performance, Loss Systems in Tandem, Use of traffic Tables; Queuing Systems -The Second Erlang Distribution, Probability of Delay, Finite Queue Capacity, Some Other Useful Results, Systems with a Single Server, Queues in tandem, Delay Tables, Applications of Delay Formulae.

SWITCHING NETWORKS: Introduction, Single Stage networks, Gradings –Principle, Design of Progressive Gradings, Other forms of grading, Traffic Capacity of Gradings, Applications of Gradings; Link Systems -General, Two Stage Networks, Three Stage Networks, Four Stage Networks, Discussion; Grades of Service of Link Systems.

UNIT - IV

TELEPHONE NETWORKS: Subscriber Loop Systems, Switching Hierarchy and Routing, Transmission Plan, Numbering Plan, Charging Plan.

SIGNALLING: Introduction, Customer Line Signaling, Audio-frequency Junctions and Trunk Circuits, FDM Carrier Systems-Outbound signaling, Inband (VF) Signaling; PCM Signaling, Inter Register Signaling, Common Channel Signaling Principles-General , Signaling Networks, CCITT Signaling System no. 6, CCITT Signaling System no. 7- The High Level data link Control Protocol, Signal Units, The Signaling Information field, Digital Customer Line Signaling.

UNIT - V

PACKET SWITCHING: Introduction, Statistical multiplexing, Local-area and Wide-area Networks– Bus Networks, Ring Networks, Comparison of Bus and Ring Networks, Optical Fiber Networks; Large-scale Networks – General, Datagram's and Virtual Circuits, Routing, Flow Control, Standards, Frame Relay; Broadband Networks-General, The Asynchronous Transfer Mode, ATM Switches.

INTEGRATED SERVICES DIGITAL NETWORK (ISDN): Introduction, Motivation for ISDN, Network and Protocol Architecture, Transmission Channels, User- Network Interfaces, Signaling, Numbering and Addressing, service characterisation, Interworking, ISDN Standards, Broadband ISDN.

TEXT BOOKS:

1. Thiagarajan Viswanathan (2007), *Telecommunication Switching Systems and Networks,* Prentice Hall of India, New Delhi, India.
2. J. E. Flood (2008), *Telecommunications Switching, Traffic and Networks,* Pearson Education, New Delhi.

REFERENCE BOOKS:

1. John. C. Bellamy (2010), Digital *Telephony*, 3rd edition, John Wiley, India.
2. Roger L. Freeman (2010), *Telecommunication System Engineering*, 4th edition, John Wiley & Sons, India.
3. Achyut S. Godbole (2005), *Data Communications & Networks*, Tata McGraw Hill, New Delhi.
4. H. Taub, D. Schilling (2003), *Principles of Communication Systems,* 2nd edition, Tata McGraw Hill, New Delhi.

B .Tech. ECE VII SEMESTER

DIGITAL IMAGE PROCESSING

(Professional Elective - I)

Course Code: **A1433**

L	T	P	C
4	-	-	4

UNIT - I

DIGITAL IMAGE FUNDAMENTALS: Fundamental Steps in Digital Image Processing, Components of an Image Processing System, A Simple Image Formation Model, Image Sampling and Quantization, Relationships Between Pixels, Imaging Geometry.

UNIT - II

IMAGE TRANSFORMS: 2-D Fourier Transform, Properties, FFT, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Haar transform, Slant transform, Hotelling transform.

UNIT - III

IMAGE ENHANCEMENT IN THE SPATIAL DOMAIN: Introduction, Gray Level Transformations, Histogram Processing, Arithmetic and Logic Operations, Basics of Spatial Filtering, Smoothing Spatial Filters, Sharpening Spatial Filters.

IMAGE ENHANCEMENT IN FREQUENCY DOMAIN: Smoothing Frequency-Domain Filters, Sharpening Frequency-Domain Filters, Homomorphic Filtering.

UNIT - IV

IMAGE RESTORATION: Image Degradation/Restoration Process, Noise Models, Restoration in the Presence of Noise Only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering, Constrained Least Squares Filters.

COLOR IMAGE PROCESSING: Pseudo-color Image Processing, Full-color Image Processing.

UNIT - V

IMAGE COMPRESSION: Fundamentals, Image Compression Models, Elements of information Theory, Error Free Compression, Lossy Compression.

IMAGE SEGMENTATION: Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Based Segmentation, Segmentation by Morphological Watersheds

TEXT BOOKS:

1. R. C. Gonzalez, R. E. Woods (2002), *Digital Image processing*, 3rd edition, Addison Wesley/ Pearson education, New Delhi, India.

REFERENCE BOOKS:

1. A. K. Jain (1997), *Fundamentals of Digital Image processing*, Prentice Hall of India, New Delhi.
2. Rafael C. Gonzalez (2004), *Digital Image processing using MATLAB*, Richard E. Woods and Steven Low price Edition, Pearson Education Asia, India.
3. William K. Pratt, (2004), *Digital Image Processing*, 3rd edition, John Wiley & Sons, New Delhi, India.
4. Arthur R. Weeks, Jr. (1996), *Fundamentals of Electronic Image Processing,* SPIE Optical Engineering Press, New Delhi, India.

B .Tech. ECE VII SEMESTER

CPLD AND FPGA ARCHITECTURES AND APPLICATIONS

(Professional Elective - I)

Course Code: **A1434**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION TO PROGRAMMABLE LOGIC ARCHITECTURES: Introduction to PLA, Programmable Sum-of-products Arrays, PAL fuse matrix and, Combinational Outputs, PAL Outputs with programmable polarity, PAL devices with programmable polarity, universal PAL and generic array logic.

FPGA BASED SYSTEMS: Introduction, Basic Concepts, Digital Design and FPGAs, FPGA - Based System Design.

UNIT - II

FPGA FABRICS: Introduction, FPGA architectures, SRAM based FPGAs, permanently programmed FPGAs. Chip input/output, circuit design of FPGA fabrics, architecture of FPGA fabrics.

UNIT - III

COMBINATIONAL LOGIC: The logic design process, combinational network delay, power and energy optimization, arithmetic logic.

SEQUENTIAL MACHINES: Introduction, the sequential machine design process, sequential design styles, rules for clocking, performance analysis.

UNIT - IV

LOGIC IMPLEMENTATION USING FPGAs: Syntax directed translation, logic implementation by macro, logic synthesis, technology independent and dependent logic optimizations, physical design for FPGAs, logic design process revisited.

UNIT - V

FINITE STATE MACHINE: State Transition table, state assignment for FPGAs, hazard and one hot encoding.

CASE STUDIES: Case studies Xilinx XC4000 and ALTERA's FLEX 8000.

TEXT BOOKS:

1. Wayne Wolf (2004), *FPGA Based System Design*, Pearson Education, New Delhi.
2. Robert Dueck (2000), *Digital design With CPLD Applications and VHDL*, Thomson Learning, USA.
3. P. K. Chan, S. Mourad (1994), *Digital Design Using Field Programmable Gate Array*, Prentice Hall of India, India.

REFERENCE BOOKS:

1. S. Trimberger, Edr. (1994), *Field Programmable Gate Array Technology*, Kluwer Academic Publications, New Dehi, India.
2. John F. Wakerly (), *Digital Design*, 3rd Edition, Prentice Hall of India, New Delhi.
3. J. Old Field, R. Dorf (1995), *Field Programmable Gate Arrays*, John Wiley & Sons, New York.
4. S. Brown, R. Francis, J. Rose, Z. Vransic (1992), *Field Programmable Gate Array*, Kluwer Academic Publications, New Dehi, India.

B .Tech. ECE VII SEMESTER

REAL TIME OPERATING SYSTEMS

(Professional Elective - I)

Course Code: **A1435**

L	T	P	C
4	-	-	4

UNIT - I

BASIC REAL-TIME CONCEPTS: Terminology, Real-Time System Design Issues, Example Real-Time Systems, Common Misconceptions, Brief History; Hard Vs Soft Real-Time Systems.

A REFERENCE MODEL OF REAL TIME SYSTEMS: Processors and Resources, Temporal Parameters of Real Time Work Load, Periodic Task Model Precedence Constraints and Data Dependency, Functional Parameters, Resource Parameters of Jobs and Parameters of Resources, Typical Real Time Applications.

UNIT - II

REAL-TIME KERNELS: Pseudo kernels, Interrupt-Driven Systems, Preemptive-Priority Systems, Hybrid Systems, The Task-Control Block Model, Theoretical Foundations of Real-Time Operating Systems.

INTERTASK COMMUNICATION AND SYNCHRONIZATION: Buffering Data, Time-Relative Buffering, Ring Buffers, Mailboxes, Queues, Critical Regions, Semaphores, Other Synchronization Mechanisms, Deadlock, Priority Inversion.

UNIT - III

REAL TIME SCHEDULING: Commonly used Approaches to Real Time Scheduling, Clock Driven Scheduling, Priority Driven Scheduling; Scheduling Aperiodic and Sporadic jobs in priority driven systems.

MEMORY MANAGEMENT: Process Stack Management , Run-Time Ring Buffer, Maximum Stack Size , Multiple-Stack Arrangements ,Memory Management in the Task-Control-Block Model ,Swapping , Overlays , Block or Page Management , Replacement Algorithms , Memory Locking Working Sets ,Real-Time Garbage Collection , Contiguous File Systems ,Building versus Buying Real-Time Operating Systems , Selecting Real-Time Kernels .

UNIT - IV

HADRWARE CONSIDERATIONS TO REAL TIME SYSTEMS: Basic Architecture ,Hardware Interfacing , Central Processing Unit, Memory , Input/output , Enhancing Performance , Other Special Devices , Non Von-Neumann Architectures.

UNIT - V

REAL TIME COMMUNICATION: Model of Real Time communication, Priority based service disciplines for switched networks, Weighted Round Robin Service disciplines, Medium Access-Control protocols of Broadcast networks, internet and Resource Reservation Protocols, Real Time Protocol, Communication in Multicomputer Systems.

CASE STUDIES: Threads ,POSIX Mutexes and Condition ,POSIX Semaphores ,Using Semaphores and Shared Memory ,POSIX Messages ,Real-Time POSIX Signals ,Clocks and Timers ,Asynchronous Input and Output ,
POSIX Memory Locking.

TEXT BOOKS:

1. Liu, Jane W. S. (2009), *Real-Time Systems*, 8th edition, Pearson Education, India.
2. A. Phillip Laplante (2004)*, Real Time Systems Design and Analysis,* 3rd edition, John Wiley and Sons, India.

REFERENCE BOOKS:

1. C. M. Krishna, Kang G. Shin (2010), *Real Time Systems*, Tata McGraw-Hill, New Delhi.
2. K. V. K. K. Prasad (2005), *Embedded / Real Time Systems*, Dreamtech Press, New Delhi.
3. Sri Ram V. Iyer, Pankaj Gupta (2004), *Embedded Real Time Systems Programming*, Tata McGraw-Hill, New Delhi, India.

B .Tech. ECE VII SEMESTER

MOBILE COMPUTING TECHNOLOGIES

(Professional Elective - I)

Course Code: **A1436**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION TO MOBILE COMPUTING ARCHITECTURE: Mobile computing, dialog control, Networks, Middleware and Gateways, Application and Services, developing Mobile computing Applications, Security in Mobile Computing, Architecture for Mobile Computing, Three Tier Architecture, Design considerations for Mobile computing, Mobile Computing through Internet, Making existing Applications Mobile Enabled.

UNIT - II

CELLULAR TECHNOLOGIES (GSM): Bluetooth, Radio frequency Identification, Wireless Broadband, Mobile IP Internet Protocol Version 6(IPv6), Java Card, GSM Architecture, GSM Entities, Call routing in GSM, PLNM Interfaces, GSM addresses and Identifiers, Network aspects in GSM, Authentication and Security.

GPS, GPRS, CDMA And 3G: Mobile computing over SMS, GPRS and packet data Network, GPRS Network Architecture, GPRS Network Operations, Data Services in GPRS, Applications for GPRS, Limitations of GPRS, Spread Spectrum Technology, Is-95, CDMA Versus GSM, Wireless Data, Third Generation Networks, Applications on 3G.

UNIT - III

WIRELESS APPLICATION PROTOCOL (WAP) AND WIRELESS LAN: WAP, MMS Wireless LAN Advantages, IEEE 802.11 Standards, Wireless LAN Architecture, Mobility in wireless LAN.

INTELLIGENT AND INTERNETWORKING: Introduction, Fundamentals of call processing, intelligence in the Networks, SS#7 Signaling, IN Conceptual Model (INCM), softswitch, Programmable Networks, Technologies and Interfaces for IN.

UNIT - IV

CLIENT PROGRAMMING, PLAM OS, SYMBIAN OS, WIN CE ARCHITECTURE: Introduction, Moving beyond the desktop, A Peek Under the Hood: Hardware overview, Mobile phones, PDA, Design Constraints in Applications for Handheld Devices, Palm OS Architecture, Application Development, Multimedia Symbian OS Architecture, Applications for Symbian , Different flavours of Windows CE, Windows CE Architecture.

J2ME: Java in the Handset, The Three-prong approach to JAVA Everywhere, JAVA 2 Micro Edition (J2ME) technology, Programming for CLDC, GUI in MIDP, UI Design Issues, Multimedia Record Management System, Communication in MIDP, Security Considerations in MIDP, Optional Packages.

UNIT - V

VOICE OVER INTERNET PROTOCOL AND CONVERGENCE: Voice over IP- 11.323 Frame work for Voice over IP, Session Initiation Protocol, Comparison between H.323 and SIP, Real time Protocols, Convergence Technologies, Call Routing, Voice over IP Applications, IP multimedia subsystem (IMS), Mobile VoIP.

SECURITY ISSUES IN MOBILE COMPUTING: Introduction, Information Security, Security Techniques and Algorithms, Security Protocols, Public Key Infrastructure, Trust – Security Models, Security frameworks for Mobile Environment.

TEXT BOOKS:

1. Asoke K. Talukder, Roopa R. Yavagal (2009), *Mobile computing: Technology, Applications and Service Creation,* Tata McGraw-Hill, New Delhi.
2. Jochen Schiller (2004), *Mobile Communications*, 2nd edition, Low price edition, Pearson Education, New Delhi.

REFERENCE BOOKS:

1. Vieri Vaughi, Alexander Damn Jaonvic(2004), *The cdma2000 System for Mobile Communications:* 3G Wireless Evolution, Pearson Education India, New Delhi.
2. Adalestein (2008), *Fundamentals of Mobile and Parvasive Computing*, Tata McGraw-Hill, New Delhi, India.

B .Tech. ECE VII SEMESTER

OPTICAL COMMUNICATIONS

(Professional Elective - I)

Course Code: **A1437**

L	T	P	C
4	-	-	4

UNIT - I

INTRODUCTION: Historical development, the general system, advantages of optical fiber communications.

OPTICAL FIBER WAVE GUIDES: Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fiber - Modes, Mode coupling, Step Index fibers, Graded Index fibers. Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. Graded Index Fiber Structure. Fiber materials.

UNIT - II

SIGNAL DEGRADATION IN OPTICAL FIBERS: Attenuation, Signal Distortion in Fibers, Characteristics of Single-Mode Fibers.

OPTICAL FIBER CONNECTION: Introduction, Fiber alignment and joint loss, Fiber Splicing, Optical fiber Connectors.

UNIT - III

OPTICAL SOURCES: Topics from Semiconductor Physics, Light Emitting Diodes, Laser Diodes, Line Coding, Line Source Linearity, Reliability Considerations.

POWER LAUNCHING AND COUPLING: Source to Fiber Power Launching, Launching Schemes for Coupling Improvement.

UNIT - IV

PHOTODETECTORS: Physical principles of Photodiodes, Photo detector Noise, Detector response time, Avalanche Multiplication Noise, Structure for In GaAs APDs, Temperature Effect on Avalanche gain, Comparison of Photo detectors.

OPTICAL RECEIVER OPERATION: Fundamental receiver operation, Digital receiver performance, Eye Diagrams, Analog receivers.

UNIT - V

OPTICAL FIBER SYSTEMS: Introduction, the Optical Transmitter circuit, the Optical Receiver circuit, System design considerations.

DIGITAL LINKS: Point-to- point links.

ADVANCED MULTIPLEXING STRATEGIES: Optical time division multiplexing, subcarrier multiplexing, orthogonal frequency division multiplexing, wavelength division multiplexing.

TEXT BOOKS:

1. Gerd Keiser (2010)*, Optical Fiber Communications,* 4th edition, McGraw-Hill International Edition.
2. John M. Senior (2005), *Optical Fiber Communications,* 2nd edition, Prentice Hall of India, New Delhi.

RERFERENCE BOOKS:

1. D. K. Mynbaev, S. C. Gupta, Lowell L. Scheiner (2005), *Fiber Optic Communications*, Pearson Education, India.
2. S. C. Gupta (2005), *Optical Fiber Communication and its Applications*, Prentice Hall of India, New Delhi.

B .Tech. ECE VII SEMESTER

DIGITAL COMMUNICATIONS AND MICROWAVE ENGINEERING LAB

Course Code: **A1438**

L	T	P	C
-	-	3	2

PART - A: DIGITAL COMMUNICATIONS LAB (Any 6 Experiments)

1. Pulse code modulation Generation and Detection.
2. Differential pulse code modulation and demodulation.
3. Delta modulation and demodulation.
4. Amplitude shift keying Generation and Detection
5. Frequency shift keying Generation and Detection
6. phase shift keying Generation and Detection
7. study of spectral characteristics of PAM, QAM
8. Differential phase shift keying Generation and Detection
9. Quadrature Phase shift Keying Generation and Detection

PART - B: MICROWAVE ENGINEERING LAB (Any 6 Experiments)

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Directional Coupler Characteristics.
4. VSWR Measurement.
5. Measurement of Wave Guide Parameters.
6. Measurement of Impedance of a given load.
7. Measurement of Scattering Parameters of a Magic Tee.
8. Measurement of Scattering Parameters of a Circulator.
9. Attenuation Measurement.
10. Microwave Frequency Measurement.

Equipment Required For Laboratory.

Digital Communications Lab

1. Trainer Kits.
2. CRO 30MHz
3. Function Generator 0-1 MHz.
4. RF Generators 0-1 MHz
5. Regulated Power Supplies: 0-30 Volts.

Microwave Engineering Lab

1. Microwave Bench Setup with Klystron Power Supply.
2. Microwave Bench Setup with Gunn Power Supply.
3. Micro Ammeter.
4. VSWR Meter.
5. Microwave Components.

B .Tech. ECE VII SEMESTER

VLSI LAB

Course Code: **A1439**

L	T	P	C
-	-	3	2

PART - A

It is expected that every student learn simulation using SPICE and should conduct any six of the following experiments.

1. Introduction to SPICE and its importance in designing of VLSI circuits
2. SPICE simulation of RC circuit and ladder connected RC network
3. SPICE simulation of RL circuit and ladder connected RL network
4. SPICE simulation of RLC circuit and ladder connected RLC network
5. SPICE simulation of Tree and Mesh RLC network
6. SPICE simulation of CS and CD Amplifier
7. SPICE Simulation of basic analog circuits: Inverter and Differential amplifier
8. SPICE simulation of NMOS and PMOS
9. SPICE simulation of CMOS circuit design (DC and transient analysis)
    a. CMOS Inverter
    b. CMOS NOR/NAND gates
10. System Level Design using PLL

PART- B

It is expected that every student learn synthesis on Cadence and should conduct all the following experiments.

1. Introduction to layout Design Rules.
2. Layout, Physical Verification, Placement & Route for Complex Design, Static Timing Analysis, IR drop analysis and crosstalk analysis of the following
    a. Basic logic gates
    b. CMOS Inverter
    c. CMOS NOR/NAND gates
    d. CMOS XOR and MUX gates
    e. CMOS 1-bit full adder
    f. Static/Dynamic logic circuit
    g. Latch
    h. Pass transistor
3. Layout of any combinational circuit (complex CMOS logic gate)-Learning about data paths.

SYLLABI FOR VIII SEMESTER

B .Tech. ECE VIII SEMESTER

SATELLITE AND RADAR COMMUNICATIONS

Course Code: **A1441**

L	T	P	C
3	1	-	4

UNIT - I

ORIGIN OF SATELLITE COMMUNICATIONS: Historical Background, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications, Future Trends of Satellite Communications.

SATELLITE SUBSYSTEMS: Attitude and orbit control system, telemetry, tracking, Command and monitoring, power systems, communication subsystems, Satellite antenna Equipment reliability and Space qualification.

UNIT - II

SATELLITE LINK DESIGN: Basic transmission theory, system noise temperature and G/T ratio, Design of down links, up link design, Design of satellite links for specified C/N, System design example.

MULTIPLE ACCESSES: Frequency division multiple access (FDMA) Inter modulation, Calculation of C/N. Time division Multiple Access (TDMA) Frame structure, Examples. Code Division Multiple access (CDMA).

UNIT - III

EARTH STATION TECHNOLOGY: Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial interface, Primary power test methods.

INTRODUCTION TO RADAR: The Nature of Radar, Maximum unambiguous range, Radar waveforms, Simple form of Radar equation, Radar block diagram & Operation, Radar frequencies and applications, Related Problems.

UNIT - IV

RADAR EQUATION: Prediction of Range performance, Minimum detectable signal, Receiver Noise & SNR, Integration of Radar pulses, PRF & Range Ambiguities, System losses, Related Problems.

CW AND FREQUENCY MODULATED RADAR: Doppler Effect, CW Radar, Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar, FM-CW Radar-Range and Doppler Measurement, FM-CW altimeter.

UNIT - V

MTI AND PULSE DOPPLER RADAR: Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter. Delay Line Cancellers, Filter Characteristics, Blind Speeds, Double Cancellation, MTI Radar Parameters, Limitations to MTI Performance. Non-coherent MTI, MTI versus Pulse Doppler Radar.

TRACKING RADAR: Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar - Amplitude Comparison Monopulse (one- and two- coordinates), Phase Comparison Monopulse.

TEXT BOOKS:

1. Timothy Pratt (2003), *Satellite Communications,* 2nd edition, Wiley Publications, India.
2. Merill I. Skolnik (2007), *Introduction to Radar Systems*, 2nd edition, Tata McGraw-Hill, India.

REFERENCE BOOKS:

1. M. Richharia (2003), *Satellite Communications: Design Principles*, 2nd edition, BS publications, India.
2. Dennis Roddy (2006), *Satellite Communications*, 2nd edition, Tata McGraw-Hill, India.
3. Merill I. Skolnik (2001), *Introduction to Radar Systems*, 3rd edition, Tata McGraw-Hill, India.

B .Tech. ECE VIII SEMESTER

WIRELESS COMMUNICATIONS AND NETWORKS

(Professional Elective - II)

Course Code: **A1442**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION TO WIRELESS COMMUNICATION SYSTEMS: Evolution of mobile radio communications, examples of wireless communication systems-paging systems, cordless telephone systems, cellular telephone systems, comparison of common wireless communication systems, trends in cellular radio and personal communications.

MODERN WIRELESS COMMUNICATION SYSTEMS: Second generation (2G) cellular networks, third generation (3G) wireless networks, wireless local loop (WLL) and LMDS, wireless local area networks (WLANs), Bluetooth and personal area networks (PANs).

UNIT - II

MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION: Introduction, FDMA, TDMA, spread spectrum multiple access, SDMA, packet radio, packet radio protocols, CSMA protocols, reservation protocols, capacity of cellular systems.

INTRODUCTION TO WIRELESS NETWORKING: Introduction to wireless networks, difference between wireless and fixed telephone networks, development of wireless networks, traffic routing in wireless networks-circuit switching, packet switching, x.25 protocol, wireless data services- cellular digital packet data(CDPD), advanced radio data information systems(ARDIS), RAM mobile data(RMD), common channel signaling, ISDN, BISDN and ATM, signaling system no .7(SS7),network services part(NSP) of SS7,The SS7 user part, signaling traffic In SS7 ,SS7 services, performance of SS7.

UNIT - III

MOBILE IP AND WIRELESS APPLICATION PROTOCOL: Mobile IP, operation of mobile IP, discovery, co-located addresses, registration, tunneling, WAP architectural overview, wireless markup language, WML script, wireless application environment, wireless session protocol, wireless transaction protocol, wireless transport layer security, wireless datagram protocol.

WIRELESS LAN TECHNOLOGY: overview**,** infrared LANs, spread spectrum LANs, narrowband microwave LANs.

UNIT - IV

WI-FI AND THE IEEE 802.11 WIRELESS LAN STANDARD: IEEE 802 Architecture, IEEE 802.11 Architecture and Services, 802.11 Medium Access Control, 802.11 Physical Layer, Other IEEE 802.11 Standards, Wi-Fi Protected Access.

BLUETOOTH AND IEEE 802.15: Overview, radio specification, baseband specification, link manager specification, logical link control and adaptation protocol, IEEE 802.15.

UNIT - V

MOBILE DATA NETWORKS: Introduction, data oriented CDPD network, GPRS and higher data rates, short messaging service in GSM, mobile application protocols.

WIRELESS ATM & HIPERLAN: Introduction, Wireless ATM, HIPERLAN, HIPERLAN-2.

TEXT BOOKS:

1. Theodore S. Rappaport (2002), *Wireless Communications - Principles Practice,* 2nd edition, Prentice Hall of India, New Delhi.
2. William Stallings (2009), *Wireless Communications and Networks,* 2nd edition, Pearson Education, India.
3. Kaveh PahLaven, Prashanth Krishna Murthy (2007), *Principles of Wireless Networks - A Unified Approach*, Pearson Education, India.

REFERENCE BOOKS:

1. Dr. Kamilo Feher (2003), *Wireless Digital Communications,* Prentice Hall of India, New Delhi.
2. Jochen Schiller (2009), *Mobile Communications*, 2nd edition, Pearson Education, India.
3. Andreas F. Molisch (2006), *Wireless Communications*, Wiley – India, New Delhi.

B .Tech. ECE VIII SEMESTER

DSP PROCESSORS AND ARCHITECTURES

(Professional Elective - II)

Course Code: **A1443**

L	T	P	C
3	1	-	4

UNIT - I

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, Analysis and Design Tool for DSP Systems: MATLAB, Digital Signal Processing using MATLAB.

UNIT - II

COMPUTATIONAL ACCURACY IN DSP IMPLEMENTATIONS: Introduction, 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.

ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES: Introduction, 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 - III

EXECUTION CONTROL AND PIPELINING: Hardware Looping, Interrupts, Stacks, Relative Branch Support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching Effects, Interrupt Effects, Pipeline Programming Models.

PROGRAMMABLE DIGITAL SIGNAL PROCESSORS: Introduction, Commercial Digital Signal-Processing Devices, Data Addressing Modes of TMS320C54XX DSPs, Data Addressing Modes of TMS320C54XX Processors, Memory Space of TMS320C54XX Processors, Program Control, TMS320C54XX Instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT - IV

IMPLEMENTATIONS OF BASIC DSP ALGORITHMS: Introduction, The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing.

IMPLEMENTATION OF FFT ALGORITHMS: Introduction, an FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and Scaling, Bit-Reversed Index Generation, An 8-Point FFT Implementation on the TMS320C54XX, Computation of the Signal Spectrum.

UNIT - V

INTERFACING MEMORY AND I/O PERIPHERALS TO PROGRAMMABLE DSP DEVICES: Introduction, Memory Space Organization, External Bus Interfacing Signals, Memory Interface, Parallel I/O Interface, Programmed I/O, Interrupts and I/O, Direct Memory Access (DMA), Synchronous Serial Interface, A Multichannel Buffered Serial Port (McBSP), McBSP Programming, A CODEC Interface Circuit, CODEC Programming, A CODEC-DSP Interface Example.

TEXT BOOKS:

1. Avtar Singh, S. Srinivasan (2006), *Digital Signal Processing,* Thomson Publications, India.
2. Phil Lapsley, Jeff Bier, Amit Shoham, Edward A. Lee (2010), *DSP Processor Fundamentals, Architectures & Features*, John Wiley & Sons, India.

REFERENCE BOOKS:

1. B. Venkata Ramani, M. Bhaskar (2004), Digital *Signal Processors, Architecture, Programming and Applications,* Tata McGraw-Hill, New Delhi.
2. Jonatham Stein (2005), *Digital Signal Processing,* John Wiley, India.

B .Tech. ECE VIII SEMESTER

LOW POWER VLSI DESIGN

(Professional Elective - II)

Course Code: **A1444**

L	T	P	C
3	1	-	4

UNIT - I

PHYSICS OF POWER DISSIPATION: Introduction, sources of power dissipation, designing for low power .Physics of power dissipation in MOSFET devices-MIS structure, long channel and sub-micron MOSFET, Gate induced Drain leakage, Power dissipation in CMOS-Shot circuit dissipation, dynamic dissipation, load capacitance. Low power VLSI design limits-Principles of Low power design, hierarchy of limits, fundamental limits, material, device, circuit and system limits.

UNIT - II

POWER ESTIMATION IN CMOS CIRCUITS: Introduction, modeling of signals and probability calculations- signal probability using binary decision diagrams, probabilistic techniques for signal activity estimation- switching activity in combinational circuits, derivation of activity for static CMOS circuits switching activity in sequential circuits and approximation method.

STATISTICAL TECHNIQUES: Combinational and sequential circuits, estimation of glitching ,power- delay models and monte-carlo techniques, sensitivity analysis, power estimation using input vector compaction and domino CMOS circuits.

UNIT - III

SYNTHESIS FOR LOW POWER: Behavioral, logic and circuit level approaches, Algorithm level transforms, power- constrained least squares optimization for adaptive and non-adaptive filters, circuit activity driven architectural transformations, voltage scaling, operation reduction and substitution, pre-computation, logic level and circuit level optimization for low power.

UNIT - IV

DESIGN AND TEST OF LOW - VOLTAGE CMOS CIRCUITS: Introduction, circuit design styles, leakage current in deep sub - micrometer transistors, device design issues, minimizing short channel effect ,low voltage circuit design techniques using reverse V_{gs} ,Steep sub threshold swing and multiple threshold voltages, Testing with elevated intrinsic leakage , multiple supply voltages.

UNIT - V

LOW ENERGY COMPUTING: Energy dissipation in transistor channel, energy recovery circuit design, designs with reversible and partially reversible logic, energy recovery in adiabatic logic and SRAM core, design of Peripheral circuits-address decoder, level shifter and I/O Buffer, supply clock generation.

SOFTWARE DESIGN FOR LOW POWER: Introduction, sources of power dissipation, power estimation and optimization.

TEXT BOOKS:

1. Kaushik Roy, Sharat C. Prasad (2000), *Low-Power CMOS VLSI Circuit Design,* Wiley India, New Delhi.
2. Anantha P. Chandrakasan, Robert W. Brodersen (1998), *Low - Power CMOS Design*, IEEE Press, USA.

REFERENCE BOOKS:

1. Christian Piguet **(**2006), *Low-Power CMOS Circuits: Technology, Logic Design and CAD Tools,* CRC Taylor& Francis, USA.
2. Shin-ichi Minato (1995)**,** *Binary Decision Diagrams and Applications for VLSI CAD*, The Springer Engineering and Computer International Series, USA.

B .Tech. ECE VIII SEMESTER

NANOTECHNOLOGY

Professional Elective - II

(Common to ECE & ME)

Course Code: **A1344**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION TO NANOTECHNOLOGY: Importance of nanoscale, Nanostructure types, electronic, magnetic, optical Properties of Nano materials, top-down and bottom- up approach to nanostructures.

QUANTUM MECHANICAL PHENOMENON IN NANOSTRUCTURES: Quantum confinement of electrons in semiconductor Nano structures, one dimensional confinement (Quantum wires), two dimensional confinements (Quantum Wells), three dimensional confinements (Quantum dots).

UNIT - II

CARBON NANO STRUCTURES: Carbon nano tubes (CNTs), Fullerenes, C60, C80 and C240 Nanostructures, Properties (mechanical, optical and electrical) and applications.

UNIT - III

FABRICATION OF NANO MATERIALS: Physical Methods: Inert gas condensation, Arc discharge, RF plasma, Plasma arc technique, Ion sputtering, Laser ablation, Laser pyrolysis, Molecular beam epitaxy, Chemical vapour deposition method.

NANO SCALE CHARACTERIZATION TECHNIQUES: Scanning probe techniques (AFM, MFM, STM, SEM, TEM), XRD

UNIT - VI

NANO DEVICES AND NANO MEDICINE: Lab on chip for bio-analysis, Core/shell Nano particles in drug delivery systems (site specific and targeted drug delivery), cancer treatment, and bone tissue treatment.

UNIT - V

NANO AND MOLECULAR ELECTRONICS: Resonant-Tunneling structures, single electron tunneling, Single Electron transistors, coulomb blockade, giant magneto resistance, tunneling magneto resistance.

NANOLITHOGRAPHY AND NANO MANIPULATION: E-beam lithography and SEM based nanolithography and nano manipulation, Ion beam lithography, oxidation and metallization, Mask and its application. Deep UV lithography, X-ray based lithography.

TEXT BOOKS:

1. Charles P. Pode (2010), *Introduction to nanotechnology*, Reprint Edition, Springer, USA.
2. Bharat Bhusan (2010), *Springer Handbook of Nanotechnology,* 3rd edition, Springer, USA.

REFERENCES BOOKS:

1. Phani kumar (2012), *Principles of nanotechnology*, 3rd edition, Scitech publications, Chennai.
2. Challa S. S. Kumar (2007), Nanofabrication towards biomedical application: Techniques, tools, Application and impact, 1st Edition, Wiley- India, New Delhi.
3. Hari Singh Nalwa (2011), Encyclopedia of Nanotechnology, American Scientific Publishers, USA.
4. Michael J. O'Connell (2006), Carbon Nano tubes: Properties and Applications, Taylor & Francis, USA.
5. S. Dutta (2009), Electron Transport in Mesoscopic systems, 8th Print, Cambridge University press, New Delhi.

B .Tech. ECE VIII SEMESTER

SOFTWARE RADIO

(Professional Elective - II)

Course Code: **A1445**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION TO SOFTWARE RADIO CONCEPTS: The Need of Software Radios, What is Software Radio, Characteristics and benefits of software radio, Design Principles of Software Radio, RF Implementation issues, The Purpose of RF Front- End, Dynamic Range.

RADIO FREQUENCY IMPLEMENTATION ISSUES: The Principal Challenge of Receiver Design, RF Receiver Front-End Topologies, Enhanced Flexibility of the RF Chain with software Radios, Importance of the Components to Overall Performance, Transmitter Architectures and Their issues. Noise and distortion in the RF Chain, ADC and DAC distortion.

UNIT - II

MULTI RATE SIGNAL PROCESSING: Introduction, Sample Rate Conversion Principles, Polyphase Filters, Digital Filter Banks, Timing Recovery in Digital Receivers using machine Digital Filters.

DIGITAL GENERATION SIGNALS: Introduction, Comparison of direct Digital Synthesis with analog Signal Synthesis, Approaches to Direct Digital Synthesis, Analysis of Spurious Signals, Spurious Components due to Periodic Jitter – band Pass signals Generation, Performance of Direct digital Synthesis, hybrid DSS PLL Systems- Applications of direct Digital Synthesis.

UNIT - III

ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERSION: Parameters of ideal data converters, parameters of practical data convertors, Analog to Digital and Digital to Analog Conversion Techniques to improve data converter performance, Common ADC and DAC architectures.

SMART ANTENNAS: Vector Channel Modeling, Benefits of smart Antennas, Structures of Beam forming Systems, Smart Antenna, Algorithms. Diversity and space time adaptive signal processing, Algorithms for Transmit STAP, hardware implementation of Smart Antennas, Array Calibration.

UNIT - IV

DIGITAL HARDWARE CHOICES: Introduction, Key Hardware Elements, DSP processors, Field programmable GATE Arrays, trade-Offs in using DSPs, FPGAs and ASICs. Power Management issues: Using Communication of DSP, FPGASs and SASIC.

UNIT - V

OBJECT ORIENTED REPRESENTATION OF RADIOS AND NETWORK RESOURCES: Networks, Object Oriented Programming, Object Brokers, Mobile Applications Environments, Joint Tactical Radio Systems.

CASE STUDIES IN SOFTWARE RADIO DESIGN: Introduction and Historical perspective SPEAK easy- JTRS – JTRs Wireless Information Transfer system, SDR-3000 Digital Transceiver Subsystem, Spectrum Ware, CHARIOT.

TEXT BOOKS:

1. Jeffrey H. Redd (2002), *Software Radio: A modern Approach to Radio Engineering,* Pearson Education Asia, New Delhi, India.
2. Walter Tuttle Bee (2002), *Software Define Radio Fabrication Technologies*, Wiley publications, New Delhi.

REFERENCE BOOKS:

1. Paul Burns (2003), *Software Defined Radio for 3G,* Artech House mobile communications series, Norwood, MA.
2. Markus Dilinger, kambiz Madani, Nancy Alonistioti (2002), *Software Defined Radio: Architectures*, *Systems and Functions*, Wiley - India, New Delhi.
3. Josephal Itola (2000), *Software Radio Architecture: Object Oriented Approaches to Wireless of System Engineering*, John Wiley & sons, India.

B .Tech. ECE VIII SEMESTER

ARTIFICIAL NEURAL NETWORKS AND FUZZY LOGIC

(Professional Elective - II)

Course Code: **A1446**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS: Introduction, Artificial Neural Networks, Historical Development of Neural Networks, Biological Neural Networks, Comparison Between Brain and the Computer, Comparison Between Artificial and Biological Neural Networks, Network Architecture, Setting the Weights, Activation Functions, Learning Methods.

UNIT - II

FUNDAMENTAL MODELS OF ARTIFICIAL NEURAL NETWORKS: Introduction, McCulloch: Pitts Neuron Model, Architecture, Learning Rules, Hebbian Learning Rule, Perceptron Learning Rule, Delta Learning Rule (Widrow-Hoff Rule or Least mean Square (LMS) rule, Competitive Learning Rule, Out Star Learning Rule, Boltzmann Learning, Memory Based Learning.

UNIT - III

FEED FORWARD NETWORKS : Introduction, Single Layer Perceptron Architecture, Algorithm, Application Procedure, Perception Algorithm for Several Output Classes, Perceptron Convergence Theorem, Brief Introduction to Multilayer Perceptron networks, Back Propagation Network (BPN), Generalized Delta Learning Rule, Back Propagation rule, Architecture, Training Algorithm, Selection of Parameters, Learning in Back Propagation, Application Algorithm, Local Minima and Global Minima, Merits and Demerits of Back Propagation Network, Applications, Radial Basis Function Network (RBFN), Architecture, Training Algorithm for an RBFN with Fixed Centers.

UNIT - IV

ADALINE AND MADALINE NETWORKS: Introduction, Adaline Architecture, Algorithm, Applications, Madaline, Architecture, MRI Algorithm.

COUNTER PROPAGATION NETWORKS: Winner Take: all learning, out star learning, Kohonen Self organizing network, Grossberg layer Network, Full Counter Propagation Network (Full CPN), Architecture, Training Phases of Full CPN, Training Algorithm, Application Procedure, Forward Only counter Propagation Network, Architecture, Training Algorithm, Applications, Learning Vector Quantizer (LVQ).

UNIT - V

CLASSICAL AND FUZZY SETS: Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

FUZZY LOGIC SYSTEM COMPONENTS: Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

TEXT BOOKS:

1. S. N. Sivanandam, S. Sumathi, S. N. Deepa (2006), *Introduction to Neural Networks using MATLAB 6.0*, Tata McGraw-Hill, New Delhi.
2. S. Rajasekharan, G. A. Vijayalakshmi Pai(2004), *Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis And Applications*, Prentice Hall of India, New Delhi.

REFERENCE BOOKS:

1. B. Yegnanarayana (2007), Artificial *Neural Networks,* Prentice Hall of India, New Delhi.
2. Bart Kosko(1992), *Neural networks and fuzzy systems: a dynamical systems approach to machine intelligence, Volume 1***,** Prentice Hall of India, New Delhi.

HIGH SPEED NEWORKS
(Professional Elective - III)

Course Code: **A1447**

L	T	P	C
3	1	-	4

UNIT - I

DRIVERS OF THE COMMUNICATION WORLD: Technological drivers, Market drivers.

TRANSFER MODES: Introduction, Circuit Switching, Routing, Virtual Circuit Switching, Comparison of Transfer Modes.

OVERVIEW OF ATM: Introduction, Motivation for ATM, Definition of ATM, Genesis of ATM, Precursor Technologies, Basic Principle of ATM, ATM network architecture and interfaces, BISDN and ATM, Interworking with ATM, applications of ATM networks.

UNIT - II

ATM PROTOCOL REFERENCE MODEL: Introduction, Transmission Convergence (TC) Sub-layer, Physical Medium Dependent (PMD) Sub-layer, Physical Layer Standards for ATM.

ATM LAYER: ATM Cell Header Structure at UNI, ATM Cell Header Structure at NNI, ATM Layer Functions.

ATM ADAPTATION LAYER: Service Classes and ATM Adaptation Layer, ATM Adaptation Layer 1 (AAL1), ATM Adaptation Layer 2 (AAL2), ATM Adaptation Layer 3/4 (AAL3/4), ATM Adaptation Layer 5 (AAL5).

UNIT - III

ATM TRAFFIC AND SERVICE PARAMETERIZATION: ATM Traffic Parameters, ATM Service Parameters, Factors Affecting QoS Parameters, ATM Service Categories, QoS and QoS Classes.

ATM TRAFFIC MANAGEMENT: Introduction, ATM Traffic Contract Management, ATM Traffic Shaping, ATM Traffic Policing- Usage Parameter Control, ATM Priority Control, ATM Flow Control, ATM Congestion Control, Dynamics of TCP Traffic Over the ATM Networks.

ATM SWITCHING: Introduction, Components of a Typical Switch, Performance Measures in Switch Design, Switching Issues, Switching Architectures, Shared- Memory Architecture, Shared- Medium Architecture, Space- Division Architecture, Switching in ATM.

UNIT - IV

ATM ADDRESSING: Introduction, ATM End System Address (ASEA) Format, ATM Group Address, Acquiring ATM Address, ATM Name System (ANS).

ATM SIGNALING: Introduction, ATM Signaling Protocol Stack, Signaling ATM Adaptation Layer (SAAL), UNI Signaling, ATM Point to Point Signaling, ATM Point to Multipoint Signaling.

ATM ROUTING: Introduction, Interim Inter-switch Protocol (IISP), PNNI Protocol, PNNI Routing Hierarchy.

UNIT - V

ATM AND MPLS NETWORKS: Introduction, Overview of Multi-Protocol Label Switching (MPLS), ATM and MPLS.

VOICE OVER ATM: Introduction, Technical Challenges, Carrying Voice over ATM.

ATM AND DSL NETWORKS: Introduction, Overview of Digital Subscriber Line (DSL), ATM and DSL, Voice over DSL (VoDSL).

TEXT BOOKS:

1. Sumit Kasera (2008), *ATM Networks- Concepts and Protocols*, 2nd edition, Tata McGraw-Hill, New Delhi.

REFERENCE BOOKS:

1. Mahbub Hassan, Raj Jain (2005), *High performance TCP/IP Networkin:* concepts, issues, and solutions, Prentice Hall of India, New Delhi.
2. Rainer Handel, Manfired N. Hubber, Stefan Schroder (2002), *ATM Networks*, Pearson Education, New Delhi.
3. William Stallings (2002), *High speed Networks and Internets*, Pearson Education, New Delhi.

B .Tech. ECE VIII SEMESTER

SPEECH SIGNAL PROCESSING

(Professional Elective - III)

Course Code: **A1448**

L	T	P	C
3	1	-	4

UNIT - I

CLASSIFICATION OF SPEECH SOUNDS: Review of signal processing, anatomy and physiology of speech production, spectrographic analysis of speech, categorization of speech sounds, prosody-the melody of speech, speech perception.

ACOUSTICS OF SPEECH PRODUCTION: Introduction, physics of sound basics, the wave equation, uniform tube model-lossless case, effect of energy loss, boundary effects, a complete model, a discrete-time model based on tube concatenation.

UNIT - II

ANALYSIS AND SYNTHESIS OF POLE-ZERO SPEECH MODELS-I: Introduction, time-dependent processing, all-pole modeling of deterministic signals-formulation, error minimization, autocorrelation method, the levinson recursion and its associated properties, lattice filter formulation of the inverse filter, frequency-domain interpretation,linear prediction analysis of stochastic speech sounds formulation, error minimization, autocorrelation method.

UNIT - III

ANALYSIS AND SYNTHESIS OF POLE-ZERO SPEECH MODELS-II: Criterion of goodness time domain frequency domain, synthesis based on all-pole modeling, pole-zero estimation linearization, application to speech, high-pitched speakers- using two analysis windows, decomposition of the glottal flow derivative model, estimation.

UNIT - IV

HOMOMORPHIC SIGNAL PROCESSING: Introduction, homomorphic systems for convolution, complex cepstrum of speech-like sequences, sequences with rational z-transforms, impulse trains convolved with rational z-transform sequences, homomorphic filtering, discrete complex cepstrum, spectral root homomorphic filtering, short-time homomorphic analysis of periodic sequences, frequency-domain perspective, frequency-domain perspective.

UNIT - V

SHORT TIME SPEECH ANALYSIS: Short time speech analysis-complex cepstrum of voiced speech, complex cepstrum of unvoiced speech, analysis/synthesis structures- zero and minimum-phase synthesis, mixed-phase synthesis, spectral root deconvolution contrasting linear prediction and homomorphic filtering-properties, homomorphic prediction.

TEXT BOOKS:

1. Thomas F. Quatieri (2001), *Discrete-Time Speech Signal Processing: Principles and Practice*, 2nd edition, Dev Publishers & Distributors, New Delhi.
2. Ben Gold, Nelson Morgan (2006), *Speech and Audio Signal Processing: Processing and Perception of Speech and Music*, Wiley Publishers, New Delhi, India.

REFERENCE BOOKS:

1. Lawrence R. Rabiner, Ronald W. Schafer (1979), *Introduction to Digital Speech Processing*, Pearson Education, New Delhi, India.
2. Sadaoki Furui (2001), *Digital Speech Processing, Synthesis and Recognition*, 2nd edition, Prentice Hall of India, New Delhi, India.

B .Tech. ECE VIII SEMESTER

DESIGN OF FAULT TOLERANT SYSTEMS

(Professional Elective - III)

Course Code: **A1449**

L	T	P	C
3	1	-	4

UNIT - I

BASIC CONCEPTS OF RELIABILITY: The definition of reliability, reliability and failure rate, relation between reliability and meantime between failures, maintainability and availability, series and parallel systems.

FAULTS IN DIGITAL CIRCUITS: Failures and Faults, modeling of faults, temporary faults.

UNIT - II

TEST GENERARTION: Fault diagnosis of digital systems, test generation of combinational logic circuits, detection of multiple faults in combinational logic circuits, test generation for sequential logic circuits, random testing, transition count testing, signature analysis.

UNIT - III

FAULT TOLERANT DESIGN: The importance of fault tolerance, basic concepts of fault tolerance, static redundancy, dynamic redundancy, hybrid redundancy, self-purging redundancy, sift-out modular redundancy (SMR), 5MR reconfiguration scheme, time redundancy, software redundancy, fail-soft operation.

UNIT - IV

SELF-CHECKING AND FAIL-SAFE LOGIC: Introduction, design of totally self-checking checkers, self-checking sequential machines, partially self-checking circuits, strongly fault-secure circuits, fail-safe design, totally self-checking PLA design.

UNIT - V

DESIGN FOR TESTABILITY: Testability, controllability and observability, design of testable combinational logic circuits, testable design of sequential circuits, scan path technique, level sensitive scan design (LSSD), random access scan technique, built-in-test, design for autonomous self-test.

TEXT BOOKS:

1. Parag K. Lala (1984), *Fault Tolerant & Fault Testable Hardware Design*, Prentice Hall of India, New Delhi, India.
2. Alfred L. Crouch (2008), *Design for Test for Digital IC's and Embedded Core Systems*, Pearson Education, New Delhi, India.

REFERENCE BOOKS:

1. Miron Abramovici, Melvin A. Breuer, Arthur D. Friedman (1994), *Digital Systems Testing and Testable Design*, IEEE Press, New York, USA.
2. Michael L. Bushnell, Vishwani D. Agarwal(2000), *Essentials of Electronic Testing* For Digital, Memory, And Mixed-Signal Vlsi Circuits, Kluwer Academic Publishers, USA.

B .Tech. ECE VIII SEMESTER

BIOMEDICAL INSTRUMENTATION

(Professional Elective - III)

Course Code: **A1450**

L	T	P	C
3	1	-	4

UNIT - I

PHYSIOLOGY: Basic Charge on cell, transmission of action potentials, sources and theories of action potentials, physiology of Cardiac, Nervous and Respiratory Systems, Generalized Medical Instrumentation System, Problems Encountered with measurements from Human beings.

TRANSDUCERS: Different Types of transducers and their selection for biomedical applications, Electrode Theory, Various types of Electrodes, Errors caused by electrodes in measurement of body potential.

UNIT - II

ELECTRO CARDIOGRAPHY: Block Diagram of ECG Machine, Origin of ECG, different types of Lead Systems electrode positions, Noise problems and their elimination.

ELECTRO-ENCEPHALOGRAPHY: Block Diagram of EEG Recording System, Electrode Locations, 10-20 electrode system, Characteristics of Abnormal EEG, Resting Rhythms and sleep stages.

ELECTROMYOGRAPHY: Block Diagram of EMG Machine, simulation, strength duration curves, Electromyography with voluntary muscle action and electrical simulation.

UNIT - III

NEURO-MUSCULAR INSTRUMENTATION: Interpretation of EEG and EMG, Respiratory Instrumentation, Mechanism of respiration, Spirometry, Pnemuotachograph Ventilators.

CARDIAC INSTRUMENTATION: Direct and Indirect measuring techniques of Blood pressure, Blood flow measurement by Electromagnetic, Doppler and Plethysmographic and dilution methods, Einthoven triangle, Pacemaker, Defibrillator and Phonocardiography, Diathermy, Hemodialysis machine.

UNIT - IV

MEDICAL IMAGING: Ultra Sound Imaging, Radiography, MRI, electrical Tomography and applications.

BIO-ELECTRODES: Biopotential Electrodes-External electrodes, Internal Electrodes, Biochemical Electrodes, Mechanical function, Electrical Conduction system of the heart, Cardiac cycle. Relation between electrical and mechanical activities of the heart.

UNIT - V

BIOTELEMETRY: Transmission and Reception aspect of Biomedical Signals via long distances.

ELECTRICAL HAZARDS DURING BIO-ELECTRIC MONITORING: Safety, codes, standards Micro and Macro and their physiological effects, leakage currents and protection by use of isolation transformer, Equipotential grounding and earth free monitoring.

TEXT BOOKS:

1. Leslie Cromwell, F. J. Weibell, E. A. Pfeiffer (2006), *Biomedical Instrumentation and Measurements,* 2nd edition, Prentice Hall of India, New Delhi, India.
2. John G. Webster (2005), *Medical Instrumentation - Application and Design,* 3rd edition, John Wiley & Sons, New Delhi, India.

REFERENCE BOOKS:

1. L. A. Geoddes, L. E. Baker (2002), *Principles of Applied Biomedical Instrumentation*, John Wiley & Sons, New Delhi, India.
2. R. S. Khandpur (2003), *Hand-book of Biomedical Instrumentation*, 2nd edition, Tata McGraw-Hill, New Delhi.
3. Mackay, Stuart R. (2001), *Biomedical Telemetry*, John Wiley & Sons, New Delhi, India.
4. Willis J. Tompkins, Editor (2001), *Biomedical Digital Signal Processing*, Prentice Hall of India, New Delhi, India.
5. Dr. M. Arumugam (1994), *Biomedical Instrumentation*, 2nd edition, Anuradha Publications, India.

B .Tech. ECE VIII SEMESTER

RF CIRCUIT DESIGN

(Professional Elective - III)

Course Code: **A1451**

L	T	P	C
3	1	-	4

UNIT - I

INTRODUCTION: Importance of radio frequency design, dimensions and units, frequency spectrum, RF behavior of passive components, chip components and circuit board considerations.

TRANSMISSION LINE ANALYSIS: Why Transmission line theory, Examples of Transmission lines, Equivalent Circuit representation, Terminated Lossless Transmission line, Special termination conditions, Sourced and loaded transmission line.

UNIT - II

THE SMITH CHART: From reflection coefficient to load impedance, impedance transformation, admittance transformation, parallel and series connections.

SINGLE AND MULTIPORT NETWORKS: Basic definitions, interconnecting networks, scattering parameters.

UNIT - III

AN OVERVIEW OF RF FILTER DESIGN: Basic resonator and filter configurations, filter implementation, coupled filters.

ACTIVE RF COMPONENT MODELING: Diode models, transistor models, scattering parameter device characterization.

UNIT - IV

MATCHING AND BIASING NETWORKS: Impedance matching using discrete components, amplifier classes of operation and biasing networks.

UNIT V

RF TRANSISTOR AMPLIFIER DESIGN: Characteristics of amplifiers, amplifier power relations, stability considerations, constant gain, noise figure circles, constant vswr circles.

OSCILLATORS AND MIXERS: Basic oscillator models, high frequency oscillator configuration, basic characteristics of mixers.

TEXT BOOKS:

1. Reinhold Ludwig, Pavel Bretchko (2000), *RF Circuit Design: Theory and applications*, Prentice Hall of India, New Delhi, India.

REFERENCE BOOKS:

1. Matthew M. Radmanesh(2001), *Radio Frequency and Microwave Electronics,* Prentice Hall of India, New Delhi, India.
2. Chris Bowick, Cheryl Ajluni, John Blyler (2008), *RF Circuit Design,* 2nd edition, Elsevier Inc, USA.
3. Devendra K. Misra (2004), *Radio Frequency and Microwave communication circuits: Analysis and Design*, 2nd edition, John Wiley & Sons, India.

B .Tech. ECE VIII SEMESTER

OPTICAL NETWORKS

(Professional Elective - III)

Course Code: **A1452**

L	T	P	C
3	1	-	4

UNIT - I

CLIENT LAYERS OF THE OPTICAL NETWORKS: SONET/SDH -multiplexing, frame structure, physical layer, infrastructure, ATM – functions, adaptation layers, QoS, flow control, Signaling and Routing, IP -routing and forwarding, QoS, MPLS, storage area networks - ESCON, fiber channel, HIPPI and Gigabit Ethernet.

UNIT - II

WDM NETWORK ELEMENTS: Optical Line terminals and amplifiers, Add/Drop Multiplexers- OADM Architecture and reconfigurable OADMS, Optical cross connects, all-optical OXC configurations.

WDM NETWORK DESIGN: Cost tradeoffs in network design, LTD and RWA problems, dimensioning wavelength routing networks, statistical and maximum load dimensioning models.

UNIT - III

NETWORK CONTROL AND MANAGEMENT: Network management functions, optical layer services and interfacing, layers within optical layer, multivendor interoperability, performance and fault management, configuration management and optical safety.

NETWORK SURVIVABILITY: Basic concepts, protection in SONET/SDH links and rings, protection in IP networks, optical Layer protection service classes, protection schemes and Interworking between layers.

UNIT - IV

ACCESS NETWORKS: Network architecture, enhanced HFC, FTTC- PON evolution.

UNIT - V

PHOTONIC PACKET SWITCHING: OTDM, synchronization, header processing, buffering, burst switching and test beds.

DEPLOYMENT CONSIDERATIONS: SONET/SDH core network, architectural choices for next generation transport networks, designing the transmission layer using SDM, TDM and WDM, unidirectional and bidirectional WDM systems, long haul and metro networks.

TEXT BOOKS:

1. Rajiv Ramaswami, Kumar N. Sivarajan (2004), *Optical Networks a practical perspective*, 2nd edition, Morgan Kaufmann Publishers.
2. C. Siva Rama Murthy, Mohan Guruswamy (2003), *WDM Optical Networks: Concepts, Design and Algorithms,* 2nd edition, Pearson Education, India.

REFERENCE BOOKS:

1. Uyless Black (2009), *Optical Networks: third Generation Transport Systems*, 2nd edition, Pearson Education, New Delhi, India.
2. John M. Senior (2000), *Optical Fiber Communications: Principles and Practice,* 2nd edition, Pearson Education, New Delhi, India.
3. Harold Kolimbris (2004), *Fiber Optics Communications*, 2nd edition, Pearson Education, New Delhi, India.
4. Timothy S. Ramteke (2004), *Networks*, 2nd edition, Pearson Education, New Delhi, India.

B .Tech. ECE VIII SEMESTER

EMBEDDED SYSTEMS LAB

Course Code: **A1454**

L	T	P	C
-	-	6	2

Note: Minimum 12 Experiments to be conducted.

PART - A:
ASSEMBLY LANGUAGE PROGRAMS (Any 6 Experiments).

1. Programming using Arithmetic, logical and bit manipulations instructions of 8051.
2. Develop and execute the program to interface Keyboard to the 8051 microcontroller.
3. Develop and execute the program to interface DAC to the 8051 Microcontroller.
4. Develop and execute the program to interface stepper motor to the 8051 Microcontroller.
5. Develop and execute the program for controlling Traffic Light using 8051 Microcontroller
6. Program to verify Timer/Counter in 8051 Microcontroller.
7. Interrupt programming in 8051 Microcontroller.
8. To develop and execute the program for UART operation in 8051.

PART - B:
EMBEDDED C PROGRAMS (Any 6 Experiments).

1. Interface Seven Segment Display with 8051 Microcontroller.
2. Interface LEDs with 8051 Microcontroller.
3. Develop a program to perform Encryption and Decryption
4. Interface LCD with 8051 Microcontroller.
5. Develop a program to read data from Sensor and to display data.
6. Serial Communication between Microcontrollers to PC vice versa
7. Interfacing Switches with 8051 Microcontroller.
8. Interface ADC with 8051 Microcontroller.

EQUIPMENT REQUIRED FOR LABORATORY:

1. 89C51 Software Development Kit (SDK)
2. PC (Latest Configuration)
3. Eclipse Software
4. PHILIPS ISP Software
5. 8051 kits
6. Interfacing cards

B. Tech. ECE VIII SEMESTER

TECHNICAL SEMINAR

Course Code: **A1455**

L	T	P	C
-	-	6	2

1. OBJECTIVE:

Seminar is an important component of learning in an Engineering College, where the student gets acquainted with preparing a report & presentation on a topic.

2. **PERIODICITY / FREQUENCY OF EVALUATION: Twice**

3. PARAMETERS OF EVALUATION:

1. The seminar shall have two components, one chosen by the student from the course-work without repetition and approved by the faculty supervisor. The other component is suggested by the supervisor and can be a reproduction of the concept in any standard research paper or an extension of concept from earlier course work.
2. The two components of the seminar are distributed between two halves of the semester and are evaluated for 50 marks each. The average of the two components shall be taken as the final score.
3. The students shall be required to submit the rough drafts of the seminar outputs within one week of the commencement of the class work.
4. Supervisor shall make suggestions for modification in the rough draft. The final draft shall be presented by the student within a week thereafter.
5. Presentation schedules will be prepared by different Departments in line with the academic calendar.

The Seminars shall be evaluated in two stages as follows:

A. Rough draft

In this stage, the student should collect information from various sources on the topic and collate them in a systematic manner. He/ She may take the help of the concerned supervisor.

The report should be typed in “MS-Word” file with “calibri” font, with font size of 16 for main heading, 14 for sub-headings and 11 for the body text. The contents should also be arranged in Power Point Presentation with relevant diagrams, pictures and illustrations. It should normally contain 18 to 25 slides, consisting of the followings:

1.	Topic, name of the student & guide	1 Slide
2.	List of contents	1 Slide
3.	Introduction	1 - 2 Slides
4.	Descriptions of the topic (point-wise)	7 - 10 Slides
5.	Images, circuits etc.	6 - 8 Slides
6.	Conclusion	1 - 2 Slides
7.	References/Bibliography	1 Slide

The soft copy of the rough draft of the seminar presentation in MS Power Point format along with the draft Report should be submitted to the concerned supervisor, with a copy to the concerned HOD within 30 days of the commencement of class work.

The evaluation of the Rough draft shall generally be based upon the following.

1.	Punctuality in submission of rough draft and discussion	2 Marks
2.	Resources from which the seminar have been based	2 Marks
3.	Report	3 Marks
4.	Lay out, and content of Presentation	3 Marks
5.	Depth of the students knowledge in the subject	5 Marks
Total		15 Marks

After evaluation of the first draft the supervisor shall suggest further reading, additional work and fine tuning, to improve the quality of the seminar work.

Within 7 days of the submission of the rough draft, the students are to submit the final draft incorporating the suggestions made by the supervisor.

B. Presentation:

After finalization of the final draft, the students shall be allotted dates for presentation (in the designated seminar classes) and they shall then present it in presence students, supervisor, faculties of the department and at least one faculty from some department / other department.

The student shall submit 3 copies of the Report neatly bound along with 2 soft copies of the PPT in DVD medium. The students shall also distribute the title and abstract of the seminar in hard copy to the audience. The final presentation has to be delivered with 18-25 slides.

The evaluation of the Presentation shall generally be based upon the following.

1.	Contents	10 Marks
2.	Delivery	10 Marks
3.	Relevance and interest the topic creates	5 Marks
4.	Ability to involve the spectators	5 Marks
5.	Question answer session	5 Marks
Total		35 Marks

4. WHO WILL EVALUATE?

The presentation of the seminar topics shall be made before an internal evaluation committee comprising the Head of the Department or his/her nominee, seminar supervisor and a senior faculty of the department / other department.

B. Tech. ECE VIII SEMESTER

COMPREHENSIVE VIVA

Course Code: **A1456**

L	T	P	C
-	-	-	2

1. OBJECTIVE:

- To enable the examiners to assess the candidate's knowledge in his or her particular field of learning.
- To test the student's awareness of the latest developments and relate them to the knowledge acquired during the classroom teaching.

2. PARAMETERS OF EVALUATION:

Subject Knowledge	Current Awareness	Career Orientation	Communication Skills	Total
20	10	10	10	50

3. WHO WILL EVALUATE?

The comprehensive Viva will be conducted by a committee comprising Head of the Department or his/her nominee, two senior faculty of the respective department and an external examiner from outside the college. The comprehensive viva shall be evaluated for 50 marks at the end of VIII semester. A minimum of 40% of maximum marks shall be obtained to earn the corresponding credits.

4. **PERIODICITY / FREQUENCY OF EVALUATION: Once**

5. PEDAGOGY:

- The viva will be held on a face to face basis.
- The students will be expected to answer the questions related to latest developments and all courses taken till date.
- Viva voce will be conducted within week before the beginning of midterm examinations. However, in exceptional circumstances it can be scheduled immediately after the end of midterm examinations.
- Students will have to make themselves available on the date of the viva voce.

B. Tech. ECE VIII SEMESTER

MINI PROJECT / PROJECT WORK

Course Code: **A1457/ A1440**

L	T	P	C
-	-	12	8

1. OBJECTIVE:

The main objective of the Project Work is for the students to learn and experience all the major phases and processes involved in solving "real life engineering problems".

2. EXPECTED OUTCOME:

The major outcome of the B. Tech project must be well-trained students. More specifically students must have acquired:

- System integration skills
- Documentation skills
- Project management skills
- Problem solving skills

3. PROJECT SELECTION:

Projects are suggested by the faculty, with or without collaboration with an industry. All faculty are to suggest projects. Students are also encouraged to give project proposals after identifying a faculty who would be willing to supervisor the work. A Project brief is to be given by the faculty to the group defining the project comprehensively.

All B. Tech major projects are to be done in the Institute. For industry specified projects, students will be permitted to spend 1-2 weeks in the industry on recommendation by the supervisor. The number of students per batch should be between 2 and 4. If more number of students is really needed, the project may be split into functional modules and given to subgroups.

4. WHO WILL EVALUATE?

The end semester examination shall be based on the report submitted and a viva-voce exam for 150 marks by committee comprising of the Head of the Department, project supervisor and an external examiner.

5. EVALUATION:

The basic purpose is to assess the student competencies with regard to his project work. More specifically to assess the student's individual contribution to the project, to establish the level of understanding of basic theoretical knowledge relevant to the project and to ensure that the student has good understanding and appreciation of design and development decisions taken in the course of the project. It is desirable that all faculty members are present for the evaluations as this is a platform to get to know the student projects and to motivate the students to do good projects. The faculty should adopt a clear and consistent pattern of asking questions from general to specific aspects of the project. The presentation and evaluation is open to other students of the department.

The project work shall be evaluated for 200 marks out of which 50 marks for internal evaluation and 150 marks for end-semester evaluation. The evaluation shall be done on the following basis

Semester VII	**Semester VIII**
Preliminary Evaluation - 10 marks	Design Evaluation II - 25 marks
Design Evaluation I - 15 marks	Final Evaluation – 150 marks

6. GUIDELINES FOR THE PREPARATION OF B. TECH PROJECT REPORTS

1.1. Project reports should be typed neatly only on one side of the paper with 1.5 or double line spacing on a A4 size bond paper (210 x 297 mm). The margins should be: Left - 1.25", Right - 1", Top and Bottom - 0.75".

1.2. The total number of reports to be prepared are:

- One copy to the department
- One copy to the concerned guide(s)
- One copy to the candidate.

1.3. Before taking the final printout, the approval of the concerned guide(s) is mandatory and suggested corrections, if any, must be incorporated.

1.4. For making copies dry tone Xerox is suggested.

1.5. Every copy of the report must contain

- Inner title page (White)
- Outer title page with a plastic cover

- Certificate in the format enclosed both from the college and the organization where the project is carried out.
- An abstract (synopsis) not exceeding 100 words, indicating salient features of the work.

6.6. The organization of the report should be as follows:

1.	Inner title page	Usually numbered in roman
2.	Abstract or Synopsis	
3.	Acknowledgments	
4.	Table of Contents	
5.	List of table & figures (optional)	

6.7 Chapters (to be numbered) containing Introduction, which usually specifies the scope of work and its importance and relation to previous work and the present developments, Main body of the report divided appropriately into chapters, sections and subsections.

- The chapters, sections and subsections may be numbered in the decimal form for e.g. Chapter 2, sections as 2.1, 2.2 etc., and subsections as 2.2.3, 2.5.1 etc.
- The report should be typed in "MS-Word" file with "calibri" font. The chapter must be left or right justified (font size 16). Followed by the title of chapter centered (font size 18), section/subsection numbers along with their headings must be left justified with section number and its heading in font size 16 and subsection and its heading in font size 14. The body or the text of the report should have font size 11.
- The figures and tables must be numbered chapter wise for e.g.: Fig. 2.1 Block diagram of a serial binary adder, Table 3.1 Primitive flow table, etc.
- The last chapter should contain the summary of the work carried, contributions if any, their utility along with the scope for further work.

6.8. Reference OR Bibliography: The references should be **numbered serially** in the order of their occurrence in the text and their numbers should be indicated within square brackets for e.g. [3]. The section on references should list them in serial order in the following format.

1. For textbooks - A.V. Oppenheim and R.W. Schafer, Digital Signal Processing, Englewood, N.J., Prentice Hall, 3 Edition, 1975.
2. For papers - Devid, Insulation design to combat pollution problem, Proc of IEEE, PAS, Vol 71, Aug 1981, pp 1901-1907.

6.9. Only SI units are to be used in the report. Important equations must be numbered in decimal form for e.g. **V = IZ** ..... **(3.2)**

6.10. All equation numbers should be right justified.

6.11. The project report should be brief and include descriptions of work carried out by others only to the minimum extent necessary. Verbatim reproduction of material available elsewhere should be strictly avoided. Where short excerpts from published work are desired to be included, they should be within quotation marks appropriately referenced.

6.12. Proper attention is to be paid not only to the technical contents but also to the organization of the report and clarity of the expression. Due care should be taken to avoid spelling and typing errors. The student should note that report-write-up forms the important component in the overall evaluation of the project

6.13. Hardware projects must include: the component layout, complete circuit with the component list containing the name of the component, numbers used, etc. and the main component data sheets as Appendix. At the time of report submissions, the students must hand over a copy of these details to the project coordinator and see that they are entered in proper registers maintained in the department.

6.14. Software projects must include a virus free disc, containing the software developed by them along with the read me file. Read me file should contain the details of the variables used, salient features of the software and procedure of using them: compiling procedure, details of the computer hardware/software requirements to run the same, etc. If the developed software uses any public domain software downloaded from some site, then the address of the site along with the module name etc. must be included on a separate sheet. It must be properly acknowledged in the acknowledgments.

6.15. Sponsored Projects must also satisfy the above requirements along with statement of accounts, bills for the same dully attested by the concerned guides to process further, They must also produce NOC from the concerned guide before taking the internal viva examination.

6.16. The reports submitted to the department/guide(s) must be hard bounded, with a plastic covering.

6.17. Separator sheets, used if any, between chapters, should be of thin paper

VARDHAMAN COLLEGE OF ENGINEERING

(Autonomous)

Shamshabad – 501 218, Hyderabad, Andhra Pradesh, India

Department of ……..

CERTIFICATE

Certified that the project work entitled …….. carried out by Mr./Ms. ……., Roll Number ……, a bonafide student of ……in partial fulfillment for the award of **Bachelor of Technology** in …… of the Jawaharlal Nehru Technological University, Hyderabad during the year …….. It is certified that all corrections / suggestions indicated for Internal Assessment have been incorporated in the Report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the said Degree.

Name & Signature of the Guide **Name Signature of the HOD** **Signature of the Principal**

External Viva

Name of the examiners Signature with date

1.

2.

Certificate issued at the Organization where the project was carried out

(On a separate sheet, If applicable)

NAME OF THE INDUSTRY / ORGANIZATION, Address with pin code

CERTIFICATE

Certified that the project work entitled …….. carried out by Mr./Ms . ……., Roll Number……., a bonafide student of ……in partial fulfillment for the award of **Bachelor of Technology** in …… of the Jawaharlal Nehru Technological University, Hyderabad during the year …….. It is certified that, he/she has completed the project satisfactorily

Name & Signature of the Guide **Name & Signature of the Head of Organization**

7. **DISTRIBUTION OF MARKS FOR B.TECH DISSERTATION EVALUATION**

S No.	Particulars	Max. Marks
1	Relevance of the subject in the present context	**10**
2	Literature Survey	**10**
3	Problem formulation	**20**
4	Experimental observation / theoretical modeling	**10**
5	Results – Presentation & Discussion	**20**
6	Conclusions and scope for future work	**10**
7	Overall presentation of the Thesis / Oral presentation	**40**
8	Project Report Writing	**30**
Total Marks		**150**