III B.Tech II Sem (Semester - VI)

S. No	Category (Course Code)	Subjects	Hours Per week			Credits	Examinations			Category
			L	T	P	C	I	E	T	
1	19EC6T01	MICROPROCESSOR AND MICROCONTROLLERS	3	0	0	3	40	60	100	PC
2	19EC6T02	DIGITAL SIGNAL PROCESSING	3	0	0	3	40	60	100	PC
3	19EC6T03	MICROWAVE ENGINEERING	3	0	0	3	40	60	100	PC
4		**OPEN ELECTIVE II**								
	19OE6T11	1) COMPUTER ARCHITECTURE AND ORGANIZATION	3	0	0	3	40	60	100	OE
	19OE6T12	2) RELIABILITY ENGINEERING								
	19OE6T07	3) OPERATIONS RESEARCH								
5		**PROFESSIONAL ELECTIVE II**								
	19EC6T04	1) RADAR SYSTEMS	3	0	0	3	40	60	100	PC
	19EC6T05	2) DIGITAL TV ENGINEERING								
	19EC6T06	3) DIGITAL SYSTEM DESIGN								
6		**HUMANITIES ELECTIVE I**								
	19HE6T01	1) MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS	3	0	0	3	40	60	100	HS
	19HE6T04	2) LIFE SCIENCES FOR ENGINEERING								
	19HE6T05	**3) FOREIGN LANGUAGE**								
7	19EC6P01	LAB I: MICROPROCESSOR AND MICROCONTROLLERS LAB	0	0	2	1	40	60	100	PC
8	19EC6P02	LAB II: DIGITAL SIGNAL PROCESSING LAB	0	0	2	1	40	60	100	PC
9	19BS6P01	ADVANCED ENGLISH COMMUNICATION SKILLS LAB	0	0	3	1.5	40	60	100	HS
10	19EC6I01	INDUSTRIAL TRAININGS/INTERNSHIPS/ CERTIFICATION COURSES	0	0	1	0.5	50	-	50	PR
Total			**18**	**0**	**8**	**22**	**410**	**540**	**950**	

III Year - II Semester

L	P	T	C
3	0	0	3

MICROPROCESSOR AND MICROCONTROLLERS

Course Objectives:

- To develop an in-depth understanding of the operation of microprocessors.
- To master the assembly language programming using concepts like assembler directives, procedures, macros, software interrupts etc.
- To create an exposure to basic peripherals, its programming and interfacing techniques
- To understand the concept of Interrupts and interfacing details of 8086.
- To impart the basic concepts of serial communication in 8086.
- To develop an in-depth understanding of the operation of microcontroller.
- To understand the features of 8051 Microcontroller, its instruction set and also other controllers.

UNIT –I: 8086 architecture

8086 architecture- functional diagram, Register organization, memory segmentation, programming model, Memory addresses, physical memory organization, Signal descriptions of 8086-common function signals, timing diagrams.

UNIT –II: Programming with 8086 Microprocessor

Instruction formats. Addressing modes, instruction set, assembler directives. Macros, Simple programs involving logical, branch and call instructions.Sorting, evaluating arithmetic expressions, string manipulations.

UNIT –III: Interrupts and Memory Interfacing

Memory interfacing to 8086, Interrupts of 8086, Vector interrupt table, Interrupt service routine, Serial communication standards, serial data transfer schemes, 8251 USART architecture and Interfacing.

UNIT –IV: I/O Interface

8255 PPI, various modes of operation and interfacing to 8086, interfacing of Stepper motor interfacing, D/A &A/D converter, key board, display. Intel 8259 programmable interrupt controller, Intel 8257 DMA controller, Intel 8253 Programmable Timer.

UNIT –V: 8051 Micro controller

Architecture of 8051, Pin description, Special Function Registers (SFRs), Memory Organization, I/O Pins Ports and Circuits, Instruction set, Addressing modes, Assembly language programming.

UNIT –VI: Interfacing8051 Microcontroller

Programming 8051 Timers, Serial Port Programming, Interrupts Programming, LCD & Keyboard Interfacing, ADC, DAC & Sensor Interfacing, External Memory Interface, Stepper Motor and Waveform generation, Comparison of Microprocessor, Microcontroller, PIC and ARM processors

Text Books:

1.Advanced microprocessors and peripherals-A. K ray and K.M.Bhurchandani, TMH, 2nd edition 2006.

2. The 8051 Microcontroller & Embedded Systems Using Assembly and C by Kenneth J.Ayala, Dhananjay V.Gadre,CengageLearning, India Edition.

3. Microprocessors and Interfacing – Programming and Hard ware by Douglas V Hall, SSSP Rao, Tata McGraw Hill Education Private Limited, 3rd Edition.

Reference Books:

1. The Intel Microprocessors-Architecture, Programming, and Interfacing by Barry B.Brey, Pearson, Eighth Edition-2012.

2. Microprocessors and Microcontrollers-Architecture, Programming and System Design by Krishna Kant, \ PHI Learning Private Limited, Second Edition, 2014.

3. Microprocessors and Microcontrollers by N.Senthil Kumar, M.Saravanan and S.Jeevananthan, Oxford University Press, Seventh Impression 2013

Course Outcomes:

At the end of the course, the students should be able to

- Understand and execute programs based on 8086microprocessor.
- Design Memory Interfacingcircuits.
- Design and interface I/Ocircuits.
- Design and implement 8051 microcontroller basedsystems

	L	P	T	C
III Year - II Semester	**3**	**0**	**0**	**3**

DIGITAL SIGNAL PROCESSING

Course Objectives:

The main objectives of this course are to understand

- Analyse the Discrete Time Signals and Systems.
- Importance of FFT algorithm for computation of Discrete Fourier Transform.
- Various implementations of digital filter structures.
- FIR and IIR filter design procedures.
- Need of Multirate Signal Processing
- Architecture and concepts of DSP Processors.

UNIT –I: Introduction

Introduction to Digital Signal Processing: Discrete time signals & sequences, linear shift invariant systems, stability, and causality. Frequency domain representation of discrete time signals and systems.Solution of Linear constant coefficient difference equations using z-transform.

UNIT –II: Discrete Fourier series and Discrete Fourier Transform

Properties of discrete Fourier series, DFS representation of periodic sequences, DTFT. Discrete Fourier transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT, Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT.

UNIT –III: Realization of Digital Filters

System function –stability, block diagram representation of linear constant-coefficient difference equations.Basic structures of IIR systems, Transposed forms, Basic structures of FIR systems, Lattice structures, Lattice-ladder structures.

UNIT –IV: IIR & FIR Digital Filters

Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Design Examples: Analog-Digital transformations Characteristics of FIR Digital Filters, frequency response. Design of FIR Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters.

UNIT –V: Multirate Digital Signal Processing

Introduction, Decimation, Interpolation, Sampling rate conversion, Implementation of sampling rate converters. Applications: Design of Phase shifters, Sub-band Coding of Speech Signals and Trans-multiplexers.

UNIT –VI: Introduction to DSP Processors

Introduction to programmable DSPs: Multiplier and Multiplier Accumulator, Modified bus structures and memory access schemes in P-DSPs, Multiple Access Memory, Multiported memory, VLIW architecture, Pipelining, Special addressing modes, On-Chip Peripherals.

Architecture of TMS320C5X: Introduction, Bus Structure, Central Arithmetic Logic Unit, Auxiliary Register ALU, Index Register, Block Move Address Register, Parallel Logic Unit, Memory mapped registers, program controller, some flags in the status registers, On-chip memory, and On-chip peripherals.

Text Books:

1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G.Manolakis, Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI
3. Digital Signal Processors – Architecture, Programming and Applications, B.Venkataramani, M.Bhaskar, TATA, McGraw Hill, 2002
4. Digital Signal Processing – K Raja Rajeswari, I.K. International Publishing House

Reference Books:

1. Digital Signal Processing: Andreas Antoniou, TATA McGraw Hill, 2006
2. Digital Signal Processing: MH Hayes, Schaum's Outlines, TATA Mc-Graw Hill, 2007.
3. DSP Primer - C. Britton Rorabaugh, Tata McGraw Hill, 2005.
4. Fundamentals of Digital Signal Processing using Matlab – Robert J. Schilling, SandraL. Harris,Thomson, 2007.
5. Digital Signal Processing – Alan V. Oppenheim, Ronald W. Schafer, PHI Ed., 2006
6. Digital Signal Processing – Ramesh babu, Sci Tech publications

Course Outcomes:

At the end of this course the student can able to:

- Apply the difference equations concept in the anayziation of discrete time systems.
- Use the FFT algorithm for solving the DFT of a given signal.
- Design a Digital filter (FIR&IIR) from the given specifications.
- Realize the FIR and IIR structures from the designed digital filter.
- Use the Multirate Processing concepts in various applications (eg: Design of phase shifters, interfacing of digital systems…).
- Apply the signal processing concepts on DSP Processor.

L	P	T	C
3	0	0	3

III Year - II Semester

MICROWAVE ENGINEERING

Course Objectives:

The student will

- Understand fundamental characteristics of waveguides and microstrip lines through electromagnetic field analysis.
- Understand the basic properties of waveguide components and Ferrite materials composition
- Understand the function, design, and integration of the major microwave components oscillators, poweramplifier.
- Understand a Microwave test bench setup for measurements.

UNIT –I: Microwave Transmission Lines - Rectangular Waveguides

Introduction, Microwave Spectrum and Bands, Advantages and Applications ofMicrowaves. Rectangular Waveguides – TE/TM mode analysis, Expressions for Fields, Characteristic Equation andCut-off Frequencies, Filter Characteristics, Dominant and Degenerate Modes, Mode Characteristics – Phase and Group Velocities, Wavelengths and Impedance Relations;Power TransmissionRectangular Guide, Impossibility of TEM mode, Related Problems.

UNIT –II: Circular Waveguides

Introduction, TE/TM mode analysis,Nature of Fields, Characteristic Equation and Cut-off frequencies, Dominant and Degenerate Modes, Impossibility of TEM mode, Related Problems.Cavity Resonators–Introduction, Rectangular and Cylindrical Cavities, Dominant Modes and Resonant Frequencies.

UNIT –III: Microwave Klystron 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, 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. Related Problems.

UNIT –IV: Helix TWTS

Significance, Types and Characteristics of Slow Wave Structures; Structure of TWT and Suppression of Oscillations, Nature of the four Propagation Constants (Qualitative treatment).

M-type TubesIntroduction, Cross-field effects, Magnetrons – Different Types, 8-Cavity Cylindrical Travelling Wave Magnetron-Modes of Resonance and PI-Mode Operation, Separation of PI-Mode.

UNIT –V: Waveguide Components and Applications

Scattering Matrix– Significance, Formulation and Properties. S-Matrix Calculations for – 2 port Junction, E-plane and H-plane Tees, Magic Tee, Hybrid Ring; Directional Couplers. Ferrite Components– Faraday Rotation, S-Matrix Calculations for Gyrator, Isolator, Circulator, Related Problems.

UNIT –VI: Microwave Solid State Devices

Introduction, Classification, Applications. TEDs – Introduction, Gunn Diode – Principle, RWH Theory, Characteristics, Avalanche Transit Time Devices – Introduction, IMPATT and TRAPATT Diodes – Principle of Operation and Characteristics.

MICROWAVE MEASUREMENTS: Description of Microwave Bench – Different Blocks and their Features, Precautions; Microwave Power Measurement – Bolometer Method. Measurement of Attenuation, Frequency, VSWR, Impedance Measurement.

Text Books:

1. Microwave Devices and Circuits – Samuel Y. Liao, PHI, 3rd Edition,1994.
2. Microwave and Radar Engineering-M.Kulkarni, Umesh Publications, 3rd Edition.

ReferencesBooks:

1. Microwave Principles – Herbert J. Reich, J.G. Skalnik, P.F. Ordung and H.L. Krauss, CBS Publishers and Distributors, New Delhi, 2004
2. Microwave Engineering- Annapurna Das and SisirK.Das, McGraw Hill Education, 3rd Edition.
3. Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2nd Edition, 2002.
4. Microwave Engineering – G S N Raju , I K International
5. Microwave and Radar Engineering – G SasibhushanaRao Pearson

L	P	T	C
3	0	0	3

III Year - II Semester

COMPUTER ARCHITECTURE AND ORGANIZATION

Course Objectives:

- To understand the architecture of a modern computer with its various processing units. Also the Performance measurement of the computer system.
- To understand the memory management system of computer.
- To Understand the various instructions, addressing modes
- To Understand the concept of I/O organization

UNIT –I: Basic Structure of Computers

Functional unit, Basic Operational concepts, Bus structures, System Software, Performance, The history of computer development.Machine Instruction and Programs:Instruction and Instruction Sequencing: Register Transfer Notation, Assembly Language Notation, Basic Instruction Types,

UNIT –II:

Addressing Modes, Basic Input/output Operations, The role of Stacks and Queues in computer programming equation. Component of Instructions: Logic Instructions, shift and Rotate Instructions.

Type of Instructions: Arithmetic and Logic Instructions, Branch Instructions, Addressing Modes, Input/output Operations

UNIT –III: Input/ Output Organization

Accessing I/O Devices, Interrupts: Interrupt Hardware, Enabling and Disabling Interrupts, Handling Multiple Devices, Direct Memory Access,

Buses: Synchronous Bus, Asynchronous Bus, Interface Circuits, Standard I/O Interface: Peripheral Component Interconnect (PCI) Bus, Universal Serial Bus (USB)

UNIT –IV:The Memory Systems

Basic memory circuits, Memory System Consideration, Read- Only Memory: ROM, PROM, EPROM, EEPROM, Flash Memory, Cache Memories: Mapping Functions, INTERLEAVING

Secondary Storage: Magnetic Hard Disks, Optical Disks,

UNIT –V: Processing Unit

Fundamental Concepts: Register Transfers, Performing Arithmetic orLogic Operation, Fetching A Word From Memory,Execution of Complete Instruction, Hardwired Control,

Micro programmed Control: Microinstructions, Micro program Sequencing, Wide Branch Addressing Microinstructions with next –Address Field

Text Books:

1. Computer Organization, Carl Hamacher, ZvonksVranesic, SafeaZaky, 5thEdition, McGrawHill,2011.

2. Computer Architecture and Organization, John P. Hayes ,3rdEdition, McGrawHill,2002.

ReferencesBooks:

1. Computer Organization and Architecture – William Stallings SixthEdition,Pearson/PHI

2. Structured Computer Organization – Andrew S. Tanenbaum, 4th EditionPHI/Pearson,2012.

3. Fundamentals or Computer Organization and Design, - SivaraamaDandamudiSpringer Int.Edition,2003.

4. “Computer Organization and Design: The Hardware/Software Interface” by DavidA. Patterson and John L.Hennessy, 1998.

5. J .P. Hayes, "Computer Architecture and Organization",McGraw-Hill,1998.

Course Outcomes:

At the end of this course the student can able to:

- Students can understand the architecture ofmoderncomputer.
- They can analyze the Performance of a computer usingperformanceequation.
- Understanding of differentinstructiontypes.
- Students can calculate the effective address of an operand byaddressingmodes.
- They can understand how computer stores positive and negative numbers.
- Understand the concepts of I/O Organization and Memorysystems.

L	P	T	C
3	0	0	3

III Year - II Semester

RELIABILITY ENGINEERING

Course Objectives:

The main objectives of this course are to understand:

- To understand the basic operation &performance parameters of differential amplifiers.
- To understand & learn the measuring techniques of performance parameters of OP-AMP.
- To learn the linear and non-linear applications of operational amplifiers.
- To understand the analysis & design of different types of active filters using opamps.
- To learn the internal structure, operation and applications of different analog ICs.
- To Acquire skills required for designing and testing integrated circuits.

UNIT –I: Reliability Concepts

Quality and Reliability terms and definition, Quality, customer satisfaction and system effectiveness, Performance- Quality and reliability, system life cycle, consequences of failuresBasic Reliability Concepts, Hazard rate, Moments of Time to Failure, Bath tub curve, conditional reliability

UNIT –II: Probability and life Distributions of Reliability Analysis

Discrete distributions – Binomial and Poisson Distribution, Continuous distributions – Weibull Distribution (Design life, median and mode, Burn-in screening, and Failure modes), Exponential distribution (Failure modes, two-Parameter Exponential distribution), Three parameter Weibull Distribution, Normal Distribution and Lognormal Distribution

UNIT –III: Reliability of Systems

Serial Configuration, Parallel Configuration, Combined Serial Parallel System, System Structure – Minimal cuts, Minimal Paths, Multistate Models, Redundancy.

UNIT –IV: Physical Reliability Models

Covariate Models, Static Models and Dynamic models, Physics of Failure models

UNIT –V: Data analysis and Reliability Estimations

Introduction, definitions, point and interval estimation and its properties, Goodness of Fit tests, Moment estimation, Minimum Likelihood Estimator and Least square estimates.

UNIT –V: Design of Six Sigma

What and Why Six Sigma, Six Sigma Implementation, Optimization problems and Design of six sigma

Text Books:

1. Charles. E. Ebeling, Reliability and Maintainability Engineering, Tata McGrawHill, Tenth reprint, 2008

VNA Naikan, Reliability Engineering and Life Testing, PHI Publisher, 2014.

ReferencesBooks:

1. Elsayed A. Elsayed Reliability Engineering, Second Edition John Wiley & Sons Publications,2012.

2. Kailash C. Kapur and Michael Pecht, Reliability Engineering John Wiley & Sons, Inc., Hoboken, 2014.

Course Outcomes:

- Design circuits using operational amplifiers for various applications.
- Analyze and design amplifiers and active filters using Op-amp.
- Diagnose and trouble-shoot linear electronic circuits.
- Understand the gain-bandwidth concept and frequency response of the amplifier configurations.
- Understand thoroughly the operational amplifiers with linear integrated circuits.

L	P	T	C
3	0	0	3

III Year - II Semester

OPERATIONS RESEARCH

Course Objectives:

To learn the importance of

- Operations Research in the design, planning, scheduling, manufacturing and business applications.
- To use the various techniques of Operations Research in solving such problems.

UNIT –I: Linear programming problem

Development – definition– characteristics and phases – types of operation research models – applications. Linear programming problem formulation – graphical solution – simplex method – artificialvariables techniques -two–phase method, big-M method – duality principle.

UNIT –II: Transportation & Assignment Problem

Formulation – optimal solution, unbalanced transportation problem –degeneracy, Assignment problem – formulation –Hungarian's algorithm, optimal solution - variants of assignment problem- travelingsalesman problem.

UNIT –III: Replacement

Introduction – replacement of items that deteriorate with time – when money value is notcounted and counted – replacement of items that fail completely, group replacement.

UNIT –IV: Theory of Games

Introduction – mini. max (max. mini) – criterion and optimal strategy – solution ofgames with saddle points – rectangular games without saddle points – 2 x 2 games – dominance principle – m x 2& 2 x n games -graphical method.

UNIT –V: Sequencing – Introduction – flow –shop sequencing – n jobs through two machines – n jobs through threemachines – job shop sequencing – two jobs through 'm' machines.

UNIT –VI: Waiting Lines

Introduction – single channel – poison arrivals – exponential service times – with infinite population and finite population models– multichannel – poison arrivals – exponential service times with infinite population single channel poison arrivals.

Text Books:

1. Operations Research-An Introduction/Hamdy A Taha/Pearson publishers
2. Operations Research –Theory & publications / S.D.Sharma-Kedarnath/McMillan publishers India Ltd

References:

1. Introduction to O.R/Hiller & Libermann/TMH
2. Operations Research /A.M.Natarajan,P.Balasubramani,A. Tamilarasi/Pearson Education.
3. Operations Research: Methods & Problems / Maurice Saseini, Arhur Yaspan & LawrenceFriedman/Wiley
4. Operations Research / R.Pannerselvam/ PHI Publications.
5. Operations Research / Wagner/ PHI Publications.
6. Operation Research /J.K.Sharma/MacMilan Publ.

Course Outcomes:

After completion of the course, the students will be able to:

- Modal and solve the LP problems.
- Solve the transportationand assignment problems.
- Make right decisions in operations management using replacement theory.
- Make right decisions in operations management using game theory.
- Make use sequence models.
- Formulate a real time situation in a mathematical model using queuing theory.

L	P	T	C
3	0	0	3

III Year - II Semester

RADAR SYSTEMS

Course Objectives:

The student will be introduced to

- The Basic Principle of radar and radar range equation.
- Different types of radars; CW, FM-CW, MTI and pulse Doppler radars.
- Understand the different tracking techniques for radar.
- Understand the characteristics of a matched filter receiver and its performance.
- Understand the different types of displays, duplexers and antennas used in radar systems.

UNIT –I: Basics of Radar

Introduction, Maximum Unambiguous Range, simple Radar range Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications, Related Problems.

Radar Equation: Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise and SNR, Integration of Radar Pulses, Transmitter power. PRF and Range Ambiguities, System Losses (qualitative treatment), Related Problems.

UNIT –II: CW and Frequency Modulated Radar

Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Applications of CW radar. Related Problems.

FM-CW Radar: Range and Doppler Measurement, Block Diagram and Characteristics, FM-CW altimeter, Multiple Frequency CW Radar.

UNIT –III: MTI and Pulse Doppler Radar

Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Double Cancellation Staggered PRFs. Range Gated Doppler Filters. Limitations to MTI Performance, MTI versus Pulse Doppler Radar.

UNIT –IV: Tracking Radar

Tracking with Radar, Sequential Lobing, Conical Scan, Mono pulse Tracking Radar – Amplitude Comparison Mono pulse (one- and two- coordinates), Phase Comparison Mono pulse, Tracking in Range Acquisition and Scanning Patterns.

UNIT –V: Detection of Radar Signals in Noise

Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation detection and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

UNIT –VI: Radar Receivers

Display types. Duplexers – Branch type and Balanced type, Circulators as Duplexers. Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Series versus parallel feeds, Applications, Advantages and Limitations.

Text Books:

1. Introduction to Radar Systems – Merrill I. Skolnik, TMH Special Indian Edition, 2nd Ed., 2007.

Reference Books:

1. Introduction to Radar Systems, 3rd edition – M.I. Skolnik, TMH Ed., 2005
2. Radar: Principles, Technology, Applications – Byron Edde, Pearson Education, 2004.
3. Radar Principles – Peebles, Jr., P.Z., Wiley, New York, 1998.
4. Principles of Modern Radar: Basic Principles – Mark A. Richards, James A. Scheer, William A. Holm, Yesdee,
5. Radar Engineering – GSN Raju, IK International.

Course outcomes:

After going through this course the student will be able to:

- Derive the radar range equation and to solve some analytical problems.
- Understand the different types of radars and its applications.
- Understand the concept of tracking and different tracking techniques.
- Understand the various components of radar receiver and its performance.

L	P	T	C
3	0	0	3

III Year - II Semester

DIGITAL TV ENGINEERING

Course Objectives

- To familiarize the students with Television transmitters and receive, and TV signal transmission.
- To make them understand different signal processing step monochrome television.
- To introduce colour television transmitters and receivers.

UNIT –I:Introduction to Television

Picture Transmission, Geometric Form, Aspect Ratio, Flicker, Image Continuity, no of scanning lines, progressive and interlaced scanning, Television systems and Standards, Composite Video Signal : Video signal levels, Need for Synchronization, Details of Horizontal and Vertical Sync Pulses, Equalizing Pulses, VSB Transmission, Complete Channel Bandwidth, Reception of Vestigial Sideband Transmission, Block Schematic study of a typical TV Transmitter.

UNIT –II: Camera and Picture Tubes

Camera Tube Types, Principle of working and constructional details of Videocon, Silicon diode array Vidicon and Solid-state Image Scanners, Color Camera, Color Picture Tube-Delta; Picture Tube Specifications.

UNIT –III: Monochrome Receivers

Block Schematic and Functional Requirements of a Monochrome Receiver, RF tuner, IF Subsystem, Video Detector, Sound Channel Separation, Sync Separation Circuits, Vertical and Horizontal Deflection Circuits, E.H.T. Generation, Study of Video IF Amplifier.

UNIT –IV: Color Television

Principles of Additive and Subtractive Color Mixing, Chromaticity Diagram, Compatibility and Reverse Compatibility, Color Signal Transmission, Bandwidth for Color Signal Transmission, Sub-carrier Modulation of Chroma Signals, Block diagram of Color TV Receiver, NTSC Encoding (Y, I, Q signals), NTSC Decoder.

UNIT –V: Digital Television

Digital System Hardware, Signal Quantization and Encoding, Digital Satellite Television, Direct to Home, Digital TV Receiver, Merits of Digital TV Receivers, LCD AND PLASMA SCREENS: LCD Technology, LCD Matrix types and operation, LCD Screens for Television, Plasma and conduction of charge, Plasma TV Screens, LCD color receiver, Plasma Color Receiver, Working Principles of LED TV.

UNIT –VI: New Era Projection Television

Direct View and Rear projection Systems. Front Projection Systems, Reflective Projection Systems, digital light Processing (DLP) Projection system, Projection TV for Home Theatres.

Text Books:

1. RR Gulati: Modern Television Practice, Principles Technology and Servicing Third Edition New Age

International Publishers.

2. Gerald W. Collins, “Fundamentals of Digital Television Transmission”, John Wiley, 2001.

Reference Books:

1. A M Dhake “TV and Video Engineering” ,2 nd Edition, TMH, 2006

2. Colour Television Theory and Practice-S.P.BaI, TMH, 1994

3. Basic Television and Video Systems-B.Grob and C.E.Herndon, McGraw Hill, 1999.

Course Outcomes

Upon completion of the course, the students will be able to:

- Understand TV standards and picture tubes for monochrome TV.
- Distinguish between monochrome and color Television transmitters and receivers.
- Analyze and Evaluate the NTSC and PAL color systems.

L	P	T	C
3	0	0	3

III Year - II Semester

DIGITAL SYSTEM DESIGN

Course Objectives:

- Introduction of digital logic families and interfacing concepts for digital design is considered.
- VHDL fundamentals were discussed to modeling the digital system design blocks.
- VHDL compilers, simulators and synthesis tools are described, which are used to verify digital systems in a technology-independent fashion.
- Design and implementation of combinational and sequential digital logic circuits is explained.

UNIT –I:Digital Logic Families and Interfacing

Introduction to logic families, MOS logic circuits with NMOS & PMOS logic, CMOS logic, CMOS steady state and dynamic electrical behavior, CMOS logic families. Bipolar logic, transistor-transistor logic, TTL families, CMOS/TTL interfacing.

UNIT –II:Introduction to VHDL

Design flow, program structure, levels of abstraction, Elements of VHDL: Data types, data objects, operators and identifiers. Packages & Libraries .VHDL Programming using structural and data flow modeling,Subprograms.

UNIT –III:Behavioral Modeling

Process statement, variable assignment statement, signal assignment statement, wait statement , if statement, case statement ,null statement, loop statement, exit statement, next statement.

UNIT –IV:Combinational Logic Design

Binary Adder-Subtractor, Ripple Adder, Look Ahead Carry Generator, ALU, Decoders, encoders, multiplexers and demultiplexers, parity circuits, comparators, Dual Priority Encoder, Design considerations of the above combinational logic circuits with relevant Digital ICs, modeling of above ICs using VHDL.

UNIT –V:Sequential Logic Design

Ring Counter, Johnson Counter, Modulus N Synchronous Counters, Shift Registers, Universal Shift Registers, Design considerations of the above sequential logic circuits with relevant Digital ICs, modeling of above ICs using VHDL.

UNIT –VI:Basic design steps

State diagram, state table, state assignment, choice of flip flops and derivation of next state and output expressions, timing diagram. Mealy and Moore type FSM for serial adder, VHDL code for the serial adder. Analysis of Asynchronous circuits.

Text Books:

1. Digital Design Principles & Practices – John F. Wakerly, PHI/ Pearson Education Asia, 3rd Ed., 2005.
2. VHDL Primer – J. Bhasker, Pearson Education/ PHI, 3rd Edition.

Reference Books:

1. Fundamentals of Digital Logic with VHDL Design- Stephen Brown, ZvonkoVranesic, McGrawHill, 3rd Edition.

Course Outcomes:

L	P	T	C
3	0	0	3

III Year - II Semester

MANAGERIAL ECONOMICS & FINANCIAL ANALYSIS

Course Objectives:

- The objective of the course is to create awareness about different economic business and accounting issues**.**

UNIT –I:Introduction to Managerial Economics and demand Analysis: Definition of Managerial Economics –Scope of Managerial Economics and its relationship with other subjects –Concept of Demand, Types of Demand, Determinants of Demand- Demand schedule, Demand curve, Law of Demand and its limitations- Elasticity of Demand, Types of Elasticity of Demand and Measurement- Demand forecasting and Methods of forecasting.

UNIT –II:Production and Cost Analysis

Concept of Production function- Cobb-Douglas Production function - Law of Variable proportions-Isoquants and Isocosts and choice of least cost factor combination-Concepts of Returns to scale and Economies of scale-Different cost concepts: opportunity costs, explicit and implicit costs- Fixed costs, Variable Costs and Total costs –Cost –Volume-Profit analysis-Determination of Breakeven point(simple problems)Managerial significance and limitations of Breakeven point.

UNIT –III:Introduction to Markets & Pricing Policies

Market Structures: Perfect Competition, Monopoly, Monopolistic competition and Oligopoly – Features – Price and Output Determination - Methods of Pricing: Average cost pricing, Limit Pricing, Market Skimming Pricing, Internet Pricing: (Flat Rate Pricing, Usage sensitive pricing) and Priority Pricing.

UNIT –IV:Types of Business Organization and Business Cycles

Features and Evaluation of Sole Trader, Partnership, Joint Stock Company – State/Public Enterprises and their forms – Business Cycles : Meaning and Features – Phases of a Business Cycle.

UNIT –V:Introduction to Accounting

Double Entry Systems – Personal account, Real account, Nominal account GAAP-Preparation of final accounts –Trading account, Profit and Loss account, Balance sheet simple problems -Ratio Analysis.

UNIT –VI:Capital and Capital Budgeting

Meaning of Capital- Capital Budgeting- Traditional Methods (payback period, accounting rate of return) and modern methods(Discounted cash flow method, NetPresent Value method,Internal Rate of Return Method and Profitability Index).

References:

1.Dr. B. Kuberudu and Dr. T. V. Ramana: Managerial Economics & Financial Analysis, Himalaya PublishingHouse, 2014.

2. V. Maheswari: Managerial Economics, Sultan Chand.2014

3. Suma Damodaran: Managerial Economics, Oxford 2011.

4. Vanitha Agarwal: Managerial Economics, Pearson Publications 2011.

5. Sanjay Dhameja: Financial Accounting for Managers, Pearson.

6. Maheswari: Financial Accounting, Vikas Publications.

Course Outcomes:

- To adopt the Managerial Economic concepts for decision making and forward, planning.
- To outline the different types of business organizations and provide a framework for analyzing money in its functions as a medium of exchange.
- To implement various techniques for assessing the financial position of the business.

L	P	T	C
3	0	0	3

III Year - II Semester

LIFE SCIENCES FOR ENGINEERING

Course Objectives

- Introduce the molecular basis of life.
- Provide the basis for classification of living organisms.
- Describe the transfer of genetic information.
- Introduce the techniques used for modification of living organisms.
- Describe the applications of biomaterials.

UNIT –I: Comparison of biological organisms with manmade systems, Classification of living organisms, Cellular basis of life, differences between prokaryotes andeukaryotes, classification on the basis of carbon and energy sources ,molecular taxonomy.

Learning Outcomes: After completing this unit, the student will be able to

- summarize the basis of life
- distinguish prokaryotes from eukaryotes
- compare biological organisms and manmade systems
- classify organisms

UNIT –II: Water, Biomolecules: sugars, starch and cellulose, Amino acids and proteins, lipids, Nucleotides and DNA/RNA, structure and functions of proteins and nucleic acids, hemoglobin, antibodies and enzymes, Industrial applications of enzymes, Fermentation and its industrial applications.

Learning Outcomes: After completing this unit, the student will be able to

- outline the importance of water (L2)
- explain the relationship between monomeric units and polymeric units (L2)
- explain the relationship between the structure and function of proteins (L2)
- interpret the relationship between the structure and function of nucleic acids (L2)
- summarize the applications of enzymes in industry (L2)
- explain the applications of fermentation in industry (L2)

UNIT –III: Bioenergetics, Respiration: Glycolysis and TCA cycle, Electron transport chain and oxidative phosphorylation, Mechanism of photosynthesis, Human physiology, neurons, synaptic and neuromuscular junctions.

Learning Outcomes: After completing this unit, the student will be able to

- apply thermodynamic principles to biological systems (L3)
- explain the mechanism of respiration and photosynthesis (L2)
- summarize the principles of information transfer and processing in humans (L2)

UNIT –IV: Mendel's laws, gene mapping, Mitosis and Meiosis, Epistasis, single gene disorders in humans, Genetic code, DNA replication, Transcription, Translation.

Learning Outcomes: After completing this unit, the student will be able to

- define Mendel's laws (L1)
- demonstrate the mapping of genes (L2)
- explain interactions among genes and their significance (L2)
- differentiate the mitosis and meiosis (L4)
- explain the medical importance of gene disorders (L2)
- IdentifyDNA as a genetic material in the molecular basis of information transfer (L3)

UNIT –V: Recombinant DNA Technology: recombinant vaccines, transgenic microbes, plants and animals, animal cloning, biosensors, biochips.

Learning Outcomes: After completing this unit, the student will be able to

- outline the principles of recombinant DNA technology (L2)
- appreciate the potential of recombinant DNA technology (L2)
- summarize the use of biological materials for diagnostic devises (L2)

UNIT –VI: Biostatistics covering, Introduction to Biostatistics:-Terms used, types of data; Measures of Central Tendencies- Mean, Median, Mode, Normal and Skewed distributions;
Analysis of Data- Hypothesis testing and ANNOVA (single factor) (4 Lectures)

Text Book(s):

1. N. A. Campbell, J. B. Reece, L. Urry, M. L. Cain and S. A. Wasserman, "Biology: A global approach", Pearson Education Ltd, 2018.
2. Arthur T Johnson, Biology for Engineers, CRC press, 2011.

Reference Books:

1. Alberts et.Al., The molecular biology of the cell, 6/e, Garland Science, 2014.
2. E. E. Conn, P. K. Stumpf, G. Bruening and R. H. Doi, "Outlines of Biochemistry", John Wiley and Sons, 2009.

Course Outcomes;

After studying the course, the student will be able to:

- Explain catalytic properties of enzymes.
- Summarize application of enzymes and fermentation in industry.
- Identify DNA as a genetic material in the molecular basis of information transfer.
- Apply thermodynamic principles to biological systems.
- Analyze biological processes at the reductionist level.

L	P	T	C
0	0	2	1

III Year - II Semester

MICROPROCESSOR AND MICROCONTROLLERS LAB

Course Objectives:

- To study programming based on 8086 microprocessor and 8051 microcontrollers.
- To study 8086 microprocessor-based ALP using arithmetic, logical and shift operations.
- To study modular and Dos/Bios programming using 8086 microprocessors.
- To study to interface 8086 with I/O and other devices.
- To study parallel and serial communication using 8051 micro controllers.

List of Experiments:

PART- A: (Minimum of 5 Experiments has to be performed)

8086 Assembly Language Programming and Interfacing

1. Programs for 16 -bit arithmetic operations (using Various AddressingModes).

a. Addition of n-BCDnumbers. b. Multiplication and Divisionoperations.

2. Program for sorting anarray.
3. Program for Factorial of givenn-numbers.
4. Interfacing ADC to8086
5. Interfacing DAC to8086
6. Interfacing stepper motor to8086

PART-B: (Minimum of 5 Experiments has to be performed)

8051 Assembly Language Programming and Interfacing

1. Finding number of 1's and number of 0's in a given 8-bit number
2. Average ofn-numbers.
3. Program and verify Timer/ Counter in8051.
4. Interfacing Traffic Light Controller to8051.
5. UART operation in8051
6. Interfacing LCD to8051.

Equipment Required:

1. Regulated Power supplies
2. Analog/Digital Storage Oscilloscopes
3. 8086 Microprocessor kits
4. 8051 microcontroller kits
5. ADC module
6. DAC module
7. Stepper motor module.

Course Outcomes:

- Demonstrate ability to handle arithmetic operations using assembly language programming in TASM and training boards.
- Demonstrate ability to handle logical operations using assembly language programming in TASM.
- Demonstrate ability to handle string instructions using assembly language programming in TASM.
- Demonstrate ability to handle sorting operations and using assembly language programming in TASM.

L	P	T	C
0	0	2	1

III Year - II Semester

DIGITAL SIGNAL PROCESSING LAB

Course Objectives:

The main objectives of this course are:

- To generate Discrete Time Signals
- To generate frequency response of analog LP/HP filters
- To analyze the stability of system
- To implement Linear and Circular Convolution
- To implement FIR and IIR filters
- To compute FFT of 1-D signal and power density spectrum

List of the Experiments / Programs

1. Generation of discrete time signals for discrete signals
2. MATLAB program to generate sum of sinusoidal signals.
3. MATLAB program to find frequency response of analog LP/HP filters.
4. Transfer Function Stability Analysis: using Pole-zero plot, Bode plot, Nyquist plot and z-plane plot.
5. To verify linear convolution.
6. To verify the circular convolution.
7. To design FIR filter (LP/HP) using windowing technique
    a) Using rectangular window
    b) Using triangular window
    c) Using Kaiser window
8. To Implement IIR filter (LP/HP) on DSP Processors
9. To find the FFT of given 1-D signal and plot.
10. To compute power density spectrum of a sequence.

Course Outcomes:

At the end of this course the student can able to:

- Generate the discrete time signals
- Plot the frequency response of analog LP/HP filters
- Analyze the stability of the system
- Compute Linear and Circular Convolution
- Design FIR and IIR filters
- Find the FFT of 1-D signal and power density spectrum

L	P	T	C
0	0	3	1.5

III Year - II Semester

ADVANCED ENGLISH COMMUNICATION SKILLS LAB

Course Objectives:

- To expose students to different contexts through right vocabulary
- To inculcate the habit of reading and understanding any text
- To enable students to acquire the ability of writing for business purposes
- To enable students to acquire interview skills and group discussion dynamics

UNIT –I:

Selected High GRE Words, Idioms & Phrases – Discourse Skills – using visuals – Synonyms and antonyms, word roots, one word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases, collocations.**(2 sessions)**

UNIT –II:

Reading Comprehension – General Vs Local Comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning. **(2 sessions)**

UNIT –III:

Writing Skills – Structure of Resume writing —Short Report Writing (Business/Technical) - **(2 sessions)**

UNIT –IV:

Presentations (Technical)

UNIT –V: Group Discussion – Dynamics of Group Discussion, Intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation**. (2 sessions)**

UNIT –VI: Interview Skills – Concept and process – pre-interview planning, opening strategies, answering strategies, interview through teleconference & video-conference and mock interviews. **(3 sessions)**

Suggested Software:

1. K-Van solutions Software with CD
2. Oxford advanced learner's compass, 7th Edition

Suggested Reading:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.

2. Business and Professional Communiction: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl.Sage South Asia Edition.Sage Publications. 2011.

3. English Vocabulary in Use Series, Cambridge University Press 2008.

4. Communication Skills by Leena Sen, PHI Learning Pvt. Ltd., New Delhi, 2009.

5. A Course Book of Advanced Communication Skills Lab published by University Press, Hyderabad.

Course Outcomes:

Upon the completion of the course, the student will be able to:

- Choose vocabulary contextually.
- Comprehend, analyse and interpret the text in a definite time frame.
- Write resumes cohesively and coherently.
- Construct andelaborate on a given topic.
- Comprehend and practice the dynamics of group discussion.
- Comprehend the concept and process of interview; answering through mock interviews.