

DEVI AHILYA VISHWAVIDYALAYA, INDORE



FACULTY OF ENGINEERING

**SCHEME OF EXAMINATION
&
COURSE OF CONTENTS**

**BE III Year Program
(ELECTRONICS & INSTRUMENTATION ENGINEERING)**

INSTITUTE OF ENGINEERING & TECHNOLOGY
(www.iet.dauniv.ac.in)

Scheme for B.E. III (Electronics & Instrumentation) effective from July 2008

B. E. III YEAR ELECTRONICS & INSTRUMENTATION ENGINEERING
Th- Theory, CW – Class Work, SW – Sessional Work, Pr – Practical

Semester V

SNo	Sub Code	Subject	Maximum Marks							
			L	T	P	Th	CW	SW	Pr	TOTAL
1.	3EI301	Computer Networks	4	-	2	100	50	50	50	250
2.	3EI302	Analog and Digital Communication Engineering	4	-	2	100	50	50	50	250
3.	3EI303	Analog Electronics	4	-	2	100	50	50	50	250
4.	3EI304	Microcontrollers	4	-	2	100	50	50	50	250
5.	3EI305	Linear Devices and Applications	4	-	-	100	50	-	-	150
6.	3SS306	Principles of Management	2	-	-	-	50	-	-	50
	TOTAL		22		8	500	300	200	200	1200

Semester VI

SNo	Sub Code	Subject	Maximum Marks							
			L	T	P	TH	CW	SW	PR	TOTAL
1.	3EI351	Project – I	-	-	2	-	-	100	50	150
2.	3EI352	Soft Computing Techniques	4	-	2	100	50	50	50	250
3.	3EI353	Object Oriented Systems	4	-	2	100	50	50	50	250
4.	3EI354	Digital Signal Processing	4	-	-	100	50	-	-	150
5.	3EI355	Control Systems	4	-	2	100	50	50	50	250
6.	3EI356	Design Workshop	-	-	2	-	-	50	50	100
7.	3SS357	Entrepreneurship Development & IPR	2	-	-	-	50	-	-	50
	TOTAL		18		10	400	250	300	250	1200

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Electronic & Instrumentation) V Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
3EI301 Computer Networks	L	T	P		TH	CW	SW	PR	Total
	4	-	2	Max	100	50	50	50	250
Duration of paper: 3 hrs				Min	35	25	25	25	110

Objectives: The contents covers the different types of computer networks, the layered approach of protocol stack, its advantage, and protocols of each layer.

Pre-requisites: Fundamental knowledge of data transmission.

COURSE OF CONTENTS

Unit I

Computer network – Hardware, Software, Reference model, physical layer

Network and application, categories of network-LAN, MAN, WAN, Wireless Network, Internetwork, Reference models.– OSI,TCP/IP model and their comparison, Line configuration-point to point, multicast, broadcast, Network Topology – Mesh, Star, Tree, Bus, Ring, Hybrid

Physical Layer – Shannons maximum data rate of a channel, Transmission media – Guided as Magnetic, Twisted Pair, coaxial cable, fiber optics etc., wireless as radiowave, microwave, infrared

Unit II

Data Link Layer

Framing techniques, Error detection-correction, Multiplexing-TDM, FDM, WDM; switching – circuit, message, packet switching, Repeaters, Hubs, Bridges, switches, routers and gateways; Data link protocols-- unrestricted simplex protocol, stop & wait, sliding window, Go-back- n, selective repeat, data link layer in internet

Unit III

Medium Access control sublayer

Channel allocation, Multiple access protocols – ALOHA, CSMA, CSMA /CD, collision-free protocol

Ethernet- frame format, cabling, encoding, performance, fast Ethernet, gigabit ethernet

Broadband and wireless LAN, bluetooth

Unit IV

Network layer

Connectionless – connection oriented service, comparison of virtual circuit and datagram subnet,

Routing algorithms- shortest path, flooding, distance vector, hierarchical routing, congestion control and prevention

, Quality of service, network layer in internet- IP protocol and IP address,

IPv6, OSPF, BGP routing protocol

Unit V

Transport layer and application layer

Elements of transport protocol, internet transport protocol-UDP / TCP protocol, performance issues-

Network performance measurement, system design for better performance

Domain name system, email, world wide web- architecture, HTTP

BOOKS RECOMMENDED

[1] Andrew S. Tannenbaum, *Computer Networks*, 4/E Pearson Education, 2003,

[2] William Stallings, *Data and Computer Communications*, 8/E Prentice Hall India, 2007

[3] Behrouz A. Forouzan, *Data Communications and Networking*, 4/E Tata McGraw-Hill, 2000

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Electronic & Instrumentation) V Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
3EI302 Analog & Digital Communication	L	T	P		TH	CW	SW	PR	Total
Duration of paper: 3 hrs	4	-	2	Max	100	50	50	50	250
				Min	35	25	25	25	110

Course Objectives : The course contents are aimed to provide the basics of signals and linear time invariant systems used in communication systems. and Knowledge of different types of analog and digital communication system, different modulation techniques used in these systems.

Prerequisite(s): The basic knowledge of Probability Theory.

Unit I

Signals and Systems: Types of Signals- Deterministic & Random, Periodic & Non-Periodic, Analog & Discrete, Energy & Power Signals. Classification of Systems, Fourier series, Fourier Transform & Its Properties, Convolution, Signal Transmission Through LTI Systems, Auto Correlation, Cross Correlation, Energy and Power Spectral Density, their relationship with Correlation function.

Probability, Random Variables & Their Moments, Gaussian Probability Density Functions, its Mean and Variance.

Unit II

Amplitude Modulation: Need of Modulation in a Communication System, Block Schematic of a Typical Communication System. AM Modulation System, Modulation Index, Generation(Squire Law & Switching Modulator) & Detection (Envelope & Squire Law Detector) Of AM Wave , Side Bands & Power Content In An AM Wave, A brief review of DSB-SC,SSB, VSB. Comparison of various AM Sysyems. AM Transmitter Block Diagram, Super Heterodyne Radio Receivers and its advantages.

Unit III

Frequency Modulation: Relationships Between Phase & Frequency Modulation, Narrowband FM, Wide Band FM & Their Spectrum, Transmission Bandwidth Of FM And PM Signals, Constant Bandwidth Characteristics Of FM, Overview of Methods of Generation(Direct & Indirect) & Detection Of FM(Discriminators : Balanced, Phase Shift And PLL Detector), Pre- Emphasis & De-Emphasis, FM Transmitters, FM Receivers(Block diagram). Comparison with AM Systems in presence of Noise.Frequency Division Multiplexing.

Unit IV

Sampling & Quantization: Sampling theorem, Types of Sampling, Digital Encoding Techniques, Quantization, Quantization Noise PCM, DPCM, DM, ADM, , Line Coding Techniques NRZ, RZ, Biphas, Duo Binary Etc., Their Comparison based on various desirable properties.

Unit V

A brief Overview of Generation, Detection, Band Width requirement, Constellation Points of Digital Modulation Techniques :ASK, FSK Binary PSK, QPSK, M-Ary FSK, MSK Introduction to Optimum Filter, Matched Filter. Channel Coding Techniques: Error Detection and Correction Codes, Parity Check Codes, Minimum Distance, Hamming Distance, Error Correction and Detection Capability. Overview of Linear Block Codes, Cyclic Codes, Convolutional Codes, their applications.

References:

- [1] Proakis and Salehi, *Fundamentals of Communication Systems*, Pearson Education, 2005
- [2] Lathi B.P., *Analog And Digital Communication systems*, Oxford Press, 2007
- [3] Singh R.P. & Sapre, *Communication systems Analog & Digital*, TMH, 2007
- [4] Haykin Simon, *Communication Systems*, John Willey & Sons, 2006
- [5] Carlson , *Communication Systems*, McGraw Hill,2004
- [6] Taub & Schilling, *Principles of Communication Systems*, 3/E,McGraw Hill,,2000

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Electronic & Instrumentation) V Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
3EI303 Analog Electronics Duration of paper: 3 hrs	L	T	P		TH	CW	SW	PR	Total
	4	-	2	Max	100	50	50	50	250
				Min	35	25	25	25	110

Course Objectives:

Analysis of transistor using H parameter model and Hybrid π model, Feedback concept applied to Amplifiers and Oscillators and Regulators.

Prerequisite(s): Basics of Semiconductor Theory, KCL, KVL, Knowledge of basic Network Theorems as Nortons, Thevenins, Maximum Power transfer.

COURSE OF CONTENTS

Unit I

Review of transistor theory, transistor at low frequencies ,two port device and hybrid model ,H-parameters, Emitter follower, comparison of transistor amplifier configurations , linear analysis of transistor circuits, Miller's theorem and its dual , cascading transistor amplifiers, simplified common emitter hybrid model, high input resistance transistor circuits ,biasing problems, Darlington pairs, Bootstrapping.

Unit II

Transistor at high frequencies, Hybrid π model ,CE short circuit current gain , concept of f_T and f_β and its measurement , current gain with resistive load ,single stage CE transistor amplifier response ,gain band width product, emitter follower at high frequencies. Multi stage amplifiers ,classification of amplifiers , distortions in amplifiers , frequency response of amplifier , Bode plots ,step response of an amplifier, square wave testing , band pass of cascaded stages ,low frequency response of an RC coupled stage , effect of an emitter bypass capacitor on low frequency response.

Unit III

Feedback amplifiers , classification of amplifiers , concept of feedback ,general characteristics of negative feedback amplifiers , input impedance , out put impedance , topologies, analysis of a feedback amplifier, types of coupling in amplifiers

Unit IV

Stability and oscillators , effect of feedback on amplifier bandwidth , frequency response of feedback amplifiers, stability , power amplifiers, class A,B,C,AB , their efficiencies , compensation , sinusoidal oscillators , Berkhausen's criteria , Resonant circuit oscillators , Wein bridge , Hartley's, Clapp's , crystal oscillators, push pull amplifiers.

Unit V

FET , JFET, pinch off , VI characteristics, MOSFET, small signal model , CS and CD amplifiers, biasing techniques ,PMOS, NMOS and CMOS ,application of FET , cascode amplifiers, regulated power supplies, series and shunt voltage regulators, monolithic regulators, switching regulators, regulators using IC's , current regulators and fold back

BOOKS RECOMMENDED

- [1] Millman and Halkias, *Integrated electronics*, 4/E TMH, 2004.
- [2] Robert Boylested, *Electronics devices and circuits*, 9/E PHI, 2007.
- [3] Malvino, *electronics principle*, 6/E PHI, 2007.
- [4] B S Sonde, "Power supplies and regulator"s.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Electronic & Instrumentation) V Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
3EI304 Microcontrollers	L	T	P		TH	CW	SW	PR	Total
	4	-	2	Max	100	50	50	50	250
Duration of paper: 3 hrs				Min	35	25	25	25	110

Course Objectives: Fundamentals of microcontrollers, Study of 8051 microcontroller, interfacing of various peripherals to microcontroller, building to embedded system.

Prerequisite(s): Fundamental knowledge of Digital Electronics, Microprocessor hardware and Assembly Language Programming.

COURSE OF CONTENTS

Unit I

The 8051 architecture

Microprocessor and Microcontroller, Comparison of microprocessors and microcontrollers Microcontroller survey – microcontrollers of different word length , make and features ,selection criteria for microcontroller ,8051 microcontroller hardware – I/O pins and internal architecture

Internal RAM,ROM organization , I/O port circuits ,connecting external memory

Unit II

Assembly Language Programming

Addressing modes ,data transfer ,arithmetic , logical ,branch transfer ,stack and bit related instructions

Programming 8051for basic operations, connecting 8255 ,Programming tools and techniques

Unit III

Interrupts

Timer interrupt , serial port interrupt , external interrupt ,reset , interrupt control ,interrupt priority

Interrupt destinations ,software generated interrupts, connecting A/D and D/A ,application programs using interrupt

Unit IV

Counter and timers

Timer modes of operation ,timer counter interrupt ,counter ,serial data transmission ,reception,

Serial data transmission modes , programming based on timer application and serial transmission

Unit V

Interfacing and applications

Scanning programs for small keyboards ,interrupt driven programs ,program for matrix keyboard

LCD display ,frequency measurement ,pulse measurement ,multiple interrupts, measurement and control of physical parameter as temperature ,stepper motor control

BOOKS RECOMMENDED

[1] Mazidi, McKinley, *The 8051 Microcontroller & Embedded system Using Assembly and C*, 2/E Pearson Education, 2006.

[2] Kenneth J.Ayala, *The 8051 Microcontroller*, 3/E Penram International, 2007.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Electronic & Instrumentation) V Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
3EI305 Linear Devices and application Duration of paper: 3 hrs	L	T	P		TH	CW	SW	PR	Total
	4	-	-	Max	100	50	-	-	150
				Min	35	25	-	-	60

Course Objectives:

In-depth knowledge of Operational Amplifier including its circuit analysis, design and applications.

Prerequisite(s): Analysis using R- parameter model, Feed-back concept.

COURSE OF CONTENTS

Unit I

Operational amplifier

Introduction, internal architecture diagram, differential amplifier-balanced, unbalanced, level shifter
Power amplifier, Feedback concept, ideal and practical op-amp characteristic, common-mode-rejection
Ratio, offset error voltages and currents

Unit II

Basic op-amp circuits

Designing--Inverting ,noninverting amplifier, adder , subtractor ,voltage follower, integrator differentiator,
comparator, zero crossing detector ,Schmitt trigger ,Voltage-to-current, current-to-voltage converter instrumentation
amplifier ,logarithmic amplifier,

Unit III

Oscillators and signal generator

Designing -Frequency stability of oscillator , hartley ,colpitt ,crystal , phase shift ,wein's bridge oscillator ,Pulse and
squarewaveform generator ,triangular waveform generator ,sweep frequency generator

Unit IV

Active filters

Low pass,high pass ,bandpass, band-reject ,all pass filter , first order and higher order filters-
Butterworth ,chybeshev filter ,

Unit V

IC voltage regulators

LM-305 ,319 ,723 ,gyrator,NIC convertor

BOOKS RECOMMENDED

- [1] Gayakwad, operational amplifier, 4/E Pearson Education, 2006.
[2] Aatre *Network theory and Filter design*, PHI, 2000.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Electronic & Instrumentation) V Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
3SS306 Principles of Management	L	T	P		TH	CW	SW	PR	Total
	2	-	-	Max	-	50	-	-	50
	Duration of paper: 3 hrs			Min	-	25	-	-	25

Objectives: To impart the basics of Management Concepts, Evolution of management as discipline and to deal with different Principles & Functions of Management.

Prerequisite(s): -Basic knowledge of principle of management.

COURSE OF CONTENTS

Unit I

The Nature of Management:

Definition and role of management; the function of a manager, Scientific management. Various schools of management thought. The Functions & Principles of management.

Unit II

Planning:

Nature and purpose of planning, Components of planning objective of business.

Unit III

Organization:

Nature and purpose of organizing Structure, Centralization, Decentralization, Span of control, Delegation of authority relationship. Formal and informal organization.

Unit IV

Directions & Staffing:

Direction process, Theories of motivation and leadership, Need analysis, Communication.

Unit V

Control:

Meaning and process of control, techniques of control evaluation, developing and compensating the employees, Merit rating.

BOOKS RECOMMENDED:

- [1] Koontz and O'Donnel, *Essentials of Management*, 6/E TMH Jan, 1986
- [2] R.D Agrawal, *Organization & Management*, 1/E PHI, 1997
- [3] Peter Drucker, *Practice of Management*, 1992
- [4] Mc Farland, *Management, Principal and Practice*.
- [5] L.M Prasad, *Principal and Practice & Mgt*.
- [6] T.N Chhabra, *Principal and Practice & Mgt*, 1/E
- [7] G.R Terry, *Principal of Management's*.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Electronic & Instrumentation) VI Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
3EI351 PROJECT PHASE - I	L	T	P		TH	CW	SW	PR	Total
	-	-	2	Max	-	-	100	50	150
				Min	-	-	50	25	75

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Electronic & Instrumentation) VI Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
3EI352 Soft Computing Techniques Duration of paper: 3 hrs	L	T	P		TH	CW	SW	PR	Total
	4	-	2	Max	100	50	50	50	250
				Min	35	25	25	25	110

Objective: To provides an understandable approach to Soft Computing based methods for problem solving by combining different methods of AI, fuzzy systems, and neural networks.

Prerequisite: Overview of Artificial Intelligence and Digital systems.

COURSE OF CONTENTS

Unit -I

Fuzzy Set Theory and Fuzzy Relations:

Classical Sets and Fuzzy Sets, Classical Set. Operations on Classical Sets, Properties of Classical Sets, Mapping of Classical Sets to a Function, Fuzzy Sets, Fuzzy Set Operations, Properties of Fuzzy Sets, Classical and Fuzzy Relations, Cartesian Product of Classical Relations, Fuzzy Relations, Tolerance and Equivalence Relations, Fuzzy Numbers, Fuzzy Arithmetic, Alpha cut, MATLAB based Exercises.

Unit – II

Introduction to Fuzzy Inference System :

Membership Functions, Introduction, Features of Membership Function, Classification of Fuzzy Sets, Fuzzification, Membership Value Assignments, Defuzzification, Lambda Cuts for Fuzzy Sets, Lambda Cuts for Fuzzy Relations, Defuzzification Methods, Fuzzy Rule-Based System, Formation of Rules, Decomposition of Rules, Aggregation of Fuzzy Rules, Properties of Set of Rules, Fuzzy Inference System, Fuzzy Inference Methods, Mamdani's Fuzzy Inference Method, Takagi-Sugeno Fuzzy Method (TS Method), MATLAB based problems.

Unit-III

Neural Networks and Perceptron model

Introduction to Neural Network. Models of a Neuron. Network Architectures. Learning Processes. Supervised and Unsupervised Learning, Perceptron. Back-Propagation Algorithm. XOR Problem. Generalization. Approximations of Functions. Self-Organizing Map algorithm. Learning Vector Quantization, MATLAB based problems.

Unit-IV

Fuzzy Neural Networks

Integration of fuzzy logic and neural networks, Fuzzy Hybrid neural, Computation of fuzzy logic inferences by hybrid neural net, Tuning fuzzy control parameters by neural nets, Fuzzy rule extraction from numerical data, Neuro-fuzzy classifiers, ANFIS, Applications of fuzzy neural systems, MATLAB based problems

Unit V

Genetic Algorithms

Introduction, Structure of Evolutionary Algorithms, Components of Evolutionary Algorithms, Representation, Evaluation/Fitness Function, Population Initialization, Selection, Recombination, Mutation, Reinsertion, Multi-objective Evolutionary Algorithms, and MATLAB based problems

BOOKS RECOMMENDED

- [1] S. Haykin, "Neural Networks: A Comprehensive Foundation", Prentice Hall, 1999.
- [2] G J Klir and T A Folger, "Fuzzy sets, uncertainty, and information", Prentice-Hall, 1992.
- [3] D. Driankov, H. Hellendoorn and M Reinfrank, "An introduction to fuzzy control", Springer-Verlag, 1993.
- [4] G J Klir and B Yuan, "Fuzzy Sets and Fuzzy Logic - Theory and Applications", Prentice-Hall, 1995.
- [5] C. Bishop, "Neural Networks for Pattern Recognition", Oxford University Press, 1995.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Electronic & Instrumentation) VI Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
3EI353 Object Oriented Systems	L	T	P		TH	CW	SW	PR	Total
	4	-	2	Max	100	50	50	50	250
Duration of Theory Paper: 3 Hours				Min	35	25	25	25	110

Course Objectives: To familiarize with the Object oriented concepts through Java programming.

Prerequisite(s): Computer Programming

COURSE OF CONTENTS

Unit-I

Introduction to Object Oriented Programming:

Object Oriented Concepts, Merits of Object Oriented Technology. Abstraction, Encapsulation, Information Hiding. Object Model: definition, State, behavior, Identity and messages. Concept of object initialization, constructors, constructor overloading. Access modifiers: Class attributes and methods. Introduction to object model of software development.

Unit-II

Introduction to Java classes and objects:

Java features: Java syntax, data types, data type conversions, control statements, operators and their precedence. Introduction to Class: Instance members and member functions. String Handling, Wrapper classes: Arrays and Vectors.

Unit-III

Inheritance and Polymorphism :

Class relationships: Inheritance and its types, Merits and Demerits. Association. Association inheritance, Polymorphism: Dynamic method dispatch, Runtime polymorphism, Abstract classes, Interfaces and packages.

Unit-IV

Exception Handling and Multithreading:

Exceptions: Need for exceptions, Checked Vs Unchecked exceptions, creating exceptions. Multithreading: Introduction, Priorities and scheduling, Thread Synchronization and its life cycle.

Unit-V

Java I/O, Applets and Event Handling:

Basic concept of streams I/O stream & reader-writer classes. File handling. Applet and its Life Cycle, Basic GUI elements, Event Delegation Model and event handling

BOOKS RECOMMENDED

- [1] Cay S.Horstmann, *Core JAVA Vol-1*, 8/E Pearson Education, 2008.
- [2] Herbert Schildt, *The complete Reference*, 5/E Tata McGraw Hill, 2002.
- [3] Scott W Amber, *The Object Primer*, 3/E Cambridge, 2005.
- [4] Timothy, Budd, *Object Oriented Programming*, 3/E Pearson Education, 2002.
- [5] Kathy Sierra, Bert Bates, *Head First Java*, 2nd Edition, Oreilly

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Electronic & Instrumentation) VI Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
	L	T	P		TH	CW	SW	PR	Total
3EI354 Digital Signal Processing	4	-	-	Max	100	50	-	-	150
Duration of paper: 3 hrs				Min	35	25	-	-	60

Objectives: To provide the analysis techniques like for discrete time systems analyze the discrete time systems in time and frequency domain using Z- Transform and Fourier transforms to learn the signal processing tool box of MATLAB for implementing the basic problems of DSP designing of digital filters.

Prerequisite(s): Awareness about the analysis of analog signals and systems and analog filter design.

COURSE OF CONTENTS

Unit-I

Introduction to signal processing , Discrete time signals and sequence operations ,properties . Discrete time systems ,their properties ,Linear time invariant systems ,convolution ,properties of LTIV systems ,Inverse system ,Linear constant coefficient difference equations and their solutions .,MATLAB exercises

Unit-II

Frequency domain representation of discrete time signals and systems ,suddenly applied complex exponentials inputs , representation of sequences by Fourier transforms , conditions of their convergence ,symmetry properties of the FT, Fourier transform theorems, MATLAB exercises

Unit-III

Introduction to Z- transforms , ROC and their properties , Inverse Z – transform, Z-transform properties ,Initial value theorem ,structures for discrete time systems ,block diagram representation of linear constant coefficient difference equations , Direct form I ,II . signal flow graph representation of LCCDE, basic structures for IIR systems , direct forms,cascade,parallel forms ,transposed forms ,basic structures for FIR systems ,Direct form , cascade form structures for linear phase FIR systems, MATLAB exercises

Unit-IV

Representation of periodic sequences , the discrete Fourier series ,properties of DFS, Fourier transform of periodic signals ,sampling the FT, Fourier representation of finite duration sequences , the discrete Fourier transform ,properties of DFT ,symmetry properties ,circular convolution ,linear convolution using DFT, Implementing LTIV systems using DFT, MATLAB exercises

Unit-V

Efficient computation of DFT , Goertzel algorithm , decimation in time FFT algorithm, In place computation, alternative forms , decimation in frequency FFT algorithm , In place computation, alternative forms. Filter design techniques ,design of discrete time IIR filters from continuous time filters, filter design by impulse invariance , bilinear transformation ,design of FIR filters by windowing ,properties of commonly used windows, MATLAB exercises

BOOKS RECOMMENDED

- [1] Oppenheim and Schafer, *Discrete time signal processin*, 2/E PHI, 2005.
- [2] Proakis and Manolakis, *Discrete time signal processing*, PHI, 2005.
- [3] S. Mitra, *Discrete time signal processing*, Pearson Education.

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Electronic & Instrumentation) VI Semester					
Subject Code & Name	Instructions Hours per Week			Marks					
3EI355 Control Systems	L	T	P		TH	CW	SW	PR	Total
	4	-	2	Max	100	50	50	50	250
	Duration of paper: 3 hrs			Min	35	25	25	25	110

Objective: Is to provide fundamentals of control engineering & the concept of mathematical modeling of the physical system. The subject gives various classical analysis tools for design & stability the systems in time domain & frequency domain.

Prerequisites: Knowledge of Laplace transforms, Basics of Matlab & Simulink

COURSE OF CONTENTS

Unit I

Introduction to the Control System & Modeling

Block diagram, open loop & close loop system, Servomechanism, Feed forward & Feed back control, Digital Control, Multivariable Control System, Non-Linear Control System.

Modeling of Physical Systems, Linear Approximations of Physical Systems, The transfer function, Block Diagram algebra, Signal Flow graphs, Mason's Gain Formula, A.C. & D.C Servomotors, Synchros, Pneumatic & Hydraulic devices for control, Analog computer simulation

Unit II

Time Domain Analysis & Stability

Effect of using feedback, Sensitivity of control systems, Test signals, Time response of prototype First & second order system, Performance specifications of the prototype I & II order system, Effects of additions of poles and zeros to open loop & close loop transfer functions, time response of higher order s, stems & concept of dominant pole, Steady-state error & error constants, Types of controllers & their control action, Stability : BIBO & Zero input, Absolute & relative, Routh Hurwitz criterion, The Root-locus concept, Guidelines for sketching Root-locus, Root contours, Root-locus of systems with Dead time, MATLAB based problems.

Unit III

Frequency Domain Analysis of Control System

Cocept of complex frequency, Performance specification in frequency domain, Co-relation between frequency domain & time domain, Principal of argument, Polar plots, Bode plots, Nicholas Charts, Stability Analysis in Frequency Domain, Nyquist Criteria, stability margins, Relative stability , Systems with dead time, MATLAB based problems.

Unit IV

Design of feedback control systems

Approaches to system design, Cascade compensation networks, Design of Compensators in Time & Frequency domain, MATLAB based problems.

Unit V

State Variable Techniques

State variable representation for an LTI system, Different Canonical forms, Co- relation between state models & Transfer function, Solution of State Equations, Concepts of controllability & observability, MATLAB based problems.

BOOKS RECOMMENDED

- [1] B.C. Kuo, *Automatic Control System, seventh edition* , 6/E(PHI), 2006.
- [2] Nagrath & Gopal, *Control System Engineering*, 5/E edition - (Newage Publishers), 2007.
- [3] M.Gopal, *Control Systems (Principles & Design)* - 5/E (TataMcGraw Hill), 2007.
- [4] Bishop & Dorf , *Modem Control System* - (Addison Welseley)

Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Electronic & Telecommunication) VI Sem					
Subject Code & Name	Instructions Hours per Week			Marks					
3EI356 Design Workshop	L	T	P		Th	Cw	Sw	Pr	Total
	-	-	2	Max	-	-	50	50	100
				Min	-	-	25	25	50
Duration of Theory Paper: Only Internal Test									

Course Objective: To introduce the Design and Realization of Electronics systems to solve engineering problems; good engineering Design practice; tools and materials relevant to electronics and electrical engineering. To provide initial training in Design skills required by Professional Engineers.

Prerequisites: Understandability of methods for A/D and D/A conversion, including concepts of resolution and accuracy necessary for conversion. Knowledge of Power requirements and efficiency, Power conversion and consumption and power demands of ICs, Supply decoupling. Estimation of power consumption in system from data sheets. Design of simple power supplies.

COURSE OF CONTENTS

Unit-I

Review

Review of DC Circuits, Active Circuits, Diodes, Bipolar Junction Transistors, Field Effect transistors, Capacitance & Inductance (including transformers), 1st & 2nd order Circuits (overview) Lap lace Transforms (overview), s-Domain Circuit Analysis.

Unit-II

Power supplies and components

Sources of power. Ideal and practical supplies: regulation. Batteries: primary and secondary, types, capacity and life. AC power supplies: rectification, simple, half-wave and full-wave; need for filter (capacitor) to reduce ripple. Zener diode regulator. Linear regulator circuits; dropout. Power dissipation: heat sinks, thermal resistance, calculation of heat sink required. Switching supplies: principle of operation, configurations. Passive components: specification, construction. Printed circuit boards (PCBs); effect of non-ideal PCB tracks; good grounding practice. Pin-through-hole (PTH) and surface mount (SMD) devices.

Unit-III

Analog to digital and digital to analog conversion

Relation between analog and digital data: precision, resolution, range and accuracy. Types of classical analog to digital converters (ADC): successive approximation, pipeline. Reference sources. Signal conditioning, sample-and-hold circuit. Sampling rate, Nyquist criterion, aliasing and need for anti-aliasing filter, over sampling. Sigma-delta converters, principle of operation, effect of over sampling ratio.

Unit-IV

Electronic Computer Aided Design

Computer-aided design for electronic circuits, graphical schematic capture, drawing standards for electronic systems, simulation using EDA software available, generation of part lists, printed circuit board layout and production.

Unit-V

Electronics Design Project

System Design project: assembly, test and rework of printed circuit board; Design of Engineering system including analogue, digital and hybrid electronics and real-time software; use of test instruments including generated test patterns; software; integration of hardware and software.

BOOKS RECOMMENDED

- [1].P Horowitz and W Hill, *The Art of Electronics*, 2/e Cambridge, 1989
- [2].A S Sedra and K C Smith, *Microelectronic Circuits*, 5/e Oxford ,2004
- [3].B Baker A Baker's Dozen, *Real Analog Solutions for Digital Designers*, Newnes ,2005
- [4].W Jung, *Op Amp Applications Handbook*, Newnes, 2005
- [5].W Kester, *Mixed-signal and DSP Design Techniques*, Newnes, 2003
- [6].W Kester, *Data Conversion Handbook*, Newnes, 2004
- [7].R Mancini, *Op Amps for Everyone*, Newnes, 2003
- [8].S J Sangwine *Electronic Components and Technology*, StanleyThornes, 1998

Devi Ahilya University, Indore, India Institute of Engineering & Technology			BE III Year (Electronic & Instrumentation) VI Semester						
Subject Code & Name	Instructions Hours per Week			Marks					
3SS357	L	T	P		Th	Cw	Sw	Pr	Total
Entrepreneurship Development & IPR	2	-	-	Max	-	50	-	-	50
Duration of Theory Paper: Only Internal Test				Min	-	25	-	-	25

Objectives: To impart the basics of Entrepreneurship development Concepts. To develop the skills of entrepreneurship & to encourage the students to become an entrepreneur. To impart the basics of Intellectual property Rights.

Pre-requisites: -NIL

COURSE OF CONTENTS

Unit I

Introduction:

Definition of Entrepreneurship and role of an entrepreneur. Entrepreneurial characteristics, values and attitudes. Entrepreneurship development programmes.

Unit II

Modes & Methodology of setting up a Small Scale Industry:

Project Identification, Market Survey, Location & Building, Technical Know - How, Raw material & other Utilities, Professional & Skilled Manpower, Project Report, Finance, Whom to Approach.

Unit III

Institutional Support to Entrepreneurs:

Need for Institutional support different Government & Non Government institutions to support Entrepreneurs like, NSIC, SIDO, SSIB, SSIDC, SISIs, DTICs, industrial Estates, Specialized Institutions. Registration of a small scale Industry.

Unit IV

Intellectual Property Rights:

Introduction of IPR, various perspective of IPR like Innovation & Creation, Innovators & Creators, Sharing of Knowledge, Trade Marks etc. General Provisions & Basic principles of IPR.

Unit V

Patents:

Definitions, Need for a patents, what can be patented, Patent laws, Rights of Patent Holders, Filing of a Patent, Industrial Scenario.

BOOKS RECOMMENDED:

- [1] Colombo plan staff college for Technician Education, Manila, *Entrepreneurship Development*, Tata McGrawHill 1998
- [2] N.K. Acharya, *Text book on intellectual Property Rights*, Asha Law House New Delhi, New Edition 2001.

