ANTENNAS AND WAVE PROPAGATION

Course Code: L:3 T:2 P:0 C:4

III Year I Semester

UNIT I:

Antenna Basics and Thin Linear Wire Antennas: Principle of Radiation, Standing wave and Travelling Wave Current Distributions on wire antennas, Fields due to Hertzian Dipole, Near and Far fields, Far fields of Half Wave Dipole, Quarter Wave Monopole and Folded Half-Wave Dipole

Antenna Parameters–Radiation Resistance, Antenna Polarization, Radiation Patterns, Beam Width, Radiation Intensity. Beam Area, Directivity, Gain, Antenna Aperture, Effective length, Reciprocity in Antennas, Equivalence of characteristics in Transmission and Reception, Relation between Directivity and Maximum Effective Aperture, Friis Transmission Formula, Bandwidth, Antenna Temperature.

UNIT II:

Antenna Arrays

Uniform Linear Arrays of Isotropic Sources, Broadside Arrays (BSA). End fire Arrays (EFA), EFAs with Increased Directivity. Principle of Pattern Multiplication, Binomial arrays, Effect of Amplitude Distribution on Side-Lobe-Level and Beam width, Dolph-Chebychev Arrays.

UNIT III:

Special Antennas: Travelling Wave Antenna, Yagi-Uda Arrays, Vee and Rhombic Antennas, Small Loop Antenna, Helical Antenna, Log-Periodic Antenna, Micro strip Patch Antenna.

UNIT IV:

Aperture Antennas, Antenna Measurements: Slot Antenna, Waveguide Horn Antenna, Reflector Antennas: Flat-sheet/ Corner Reflectors, Parabolic Reflector, Lens Antennas - Dielectric Lenses, Metal-plate Lenses ,Antenna Measurements- Pattern Measurement, Outdoor/ Indoor Test Ranges, Absolute Gain Measurement.

UNIT V:

Radio-Wave Propagation: Ground Wave Propagation - Space and Surface Waves, Curved Earth Reflections,; Space Wave Propagation – Plane Earth Reflection, Effect of Earth Curvature, Visible Horizon, Effective Heights of Antennas, VHF Communication between aerials placed far apart; Surface Wave Propagation- Factors affecting Magnitude of Surface Wave; Propagation in Troposphere- Refraction in Troposphere, Standard Atmosphere, Radio horizon, Super Refraction, Condition for Duct Propagation, M-Curves, Tropospheric Scatter. Sky Wave Propagation–Structure and Layers of Ionosphere, Electrical Properties of Ionosphere, Refraction and Reflection by Ionosphere, Critical Frequency, MUF. LUF, Skip Distance, Maximum Single-hop Distance, Virtual Height, Ionospheric Measurements, Dominant mechanisms of Propagation in Various Frequency Ranges

TEXTBOOKS:

1. Antennas and Wave Propagation - J.D. Kraus, RJ. Marhefka and Ahmad S. Khan. TMH, New Delhi, 4th ed., (Special Indian Edition), 2010.
2. Antenna and Wave Propagation – Harish AR and Sachidananda M, Oxford University Press, 2007
3. Electromagnetic Waves and Radiating Systems - E.C. Jordan and K.G. Balmain. PHI, 2nd ed., 2000.

REFERENCES:

1. Antenna Theory and Design - Warren L. Stutzman, Gary A. Thiele, John Wiley & Sons, 3rd edition. 2013
2. Antenna Theory- Analysis and Design- C.A. Balanis, John Wiley & Sons, 3rd ed.. 2005.

DIGITALCOMMUNICATIONS

Course Code: L:3 T:2 P:0 C:4

III Year I Semester

UNIT I

Elements of Digital Communication Systems: Model of Digital Communication Systems, Digital Representation of Analog Signal, Sampling Theorem, Pulse Code Modulation**;** PCM Generation and Reconstruction, Quantization Noise, Non Uniform Quantization and Compounding, DPCM, Adaptive DPCM, DM and Adaptive DM, Noise in PCM and DM.

UNIT II

Digital Modulation Techniques: Introduction, ASK, ASK Modulator, Coherent ASK Detector, Non-Coherent ASK Detector, FSK, Band width and Frequency Spectrum FSK, Non Coherent FSK Detector, Coherent FSK Detector, FSK Detection using PLL, BPSK, Coherent PSK Detection, QPSK, Differential PSK.

UNIT III

Baseband Transmission and Optimal Reception of Digital Signal: Pulse Shaping for Optimum Transmissions, Baseband Signal Receiver, Probability of Error, Optimum Filter, Matched Filter, Probability of error using Matched Filter Optimal of Coherent Reception, Calculation of Error Probability of ASK,BPSK,BFSK,QPSK.

UNIT IV

Error Control Codes: Linear Block Codes; Matrix Description of Linear Block Codes, Error Detection and Error Correction Capabilities of Linear Block Codes. Cyclic Codes**;** Algebraic Structure, Encoding, Syndrome Calculation, Decoding. Convolution Codes**;** Encoding, Decoding using State, Tree and Trellis Diagrams, Decoding using Viterbi Algorithm.

UNIT V

Spread Spectrum Modulation: Use of Spread Spectrum, Direct Sequence Spread Spectrum(DSSS),and Code Division Multiple Access, Ranging using DSSS, Frequency Hopping Spread Spectrum, and PN-Sequences: Generation and Characteristics, Synchronization in Spread Spectrum Systems.

TEXT BOOKS:

- DigitalCommunications,8thEdition,JohnWiley&Sons,SimonHaykin,Inc2007

REFERENCES:

- Taub and Schilling, Principles of Communication Systems, 2ndEdition, TMH,1986
- Digital and Analog Communication Systems,JohnWiley&Sons,Inc,2002
- Analog and Digital Communications, second edition, Hsuhwei, Schaum's outline, TMH,2003
- Communication systems3rd edition, Simnon Hayking, John Wiley & Sons, 1999

VLSIDESIGN

Course Code: L: 3 T: 2P: 0 C: 4

III Year I Semester

UNITI

Introduction: Introduction to IC Technology MOS transistors, NMOS, CMOS& BiCMOS fabrication Technologies; fabrication processes: Oxidation, Lithography, Diffusion, Ionimplantation, Metallization, Etching, Planarization, Encapsulation, Integrated Resistors and Capacitors, Manufacturing issues.

UNIT II

Basic Electrical Properties: Basic Electrical Properties of MOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage Vt, gm, gds, Figure of merit ωo; Pass transistor, NMOS Inverter, Various pull-ups, CMOS Inverter-analysis and design, BiCMOS Inverters, Power, Sources of Power Dissipation, Dynamic Power, Static Power, Robustness, Variability, Reliability, Circuit simulation, SPICE tutorials, device models.

UNITIII

VLSI Circuit Design Processes, Gate Level Design: VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2μm CMOS Design rules for wires, contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, CMOS Nano technology. Switch logic, Alternate gate circuits, Time delays, driving large capacitive loads, wiring capacitance, Fan–in, Fan–out, Choice of layers.

UNITIV

Data path Subsystems, Array Subsystems: Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters. SRAM, DRAM, ROM, Serial Access Memories, Content Addressable Memory.

UNITV

Semi custom Integrated Circuit Design, IC Testing: PLAs, Programmable Array Logic, FPGAs, CPLDs, Standard cells design approach. Need for testing ICs, Test Principles, Wafer-level, Package- level testing, System-level Test Techniques, and Layout Design for improved Testability and Principles of Design for testability (DFT).

TEXTBOOKS:

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Douglas A. Pucknell, Sholeh Eshraghian, PHI,2011,
2. CMOS VLSI Design–A circuits and systems perspective, NeilH. EWeste, David Harris, Fourth Edition, Addison Wesley, 2011.

REFERENCES:

1. CMOS logic circuit Design-John. P. Uyemura, Springer,2013.
2. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rdEdition,1997.
3. VLSI Design–A. AlbertRaj, Latha, PHI, 2008
4. Introduction to VLSI–Mead & Convey, BS Publications,2010

COMPUTER ARCHITECTURE AND ORGANIZATION (OPEN ELECTIVE)

Course Code: L: 2T: 2 P: 0 C: 3

III Year I Semester

UNIT I:

Introduction

Computing and Computers, Evolution of Computers, VLSI Era, System Design;
Register Level, Processor Level, CPU Organization, Data Representation, Fixed Point Num bers, Floating Point Numbers, Instruction Formats, Instruction Types, addressing modes.

UNIT II:

Data Path Design

Fixed Point Arithmetic, Addition, Subtraction, Multiplication and Division, Combinational and SequentialALUs, Carry look ahead adder, Robertson algorithm, booth's algorithm, nonrestoring division algorithm,Floating Point Arithmetic, Coprocessor, Pipeline Processing, Pipeline design, Modified booth's Algorithm

UNIT III :

Control Design

Hardwired Control, Microprogrammed Control, Multiplier Control Unit, CPU Control Unit, Pipe line Control,Instruction Pipelines, Pipeline Performance, Superscalar Processing, Nano Programming.

UNIT IV:

Memory Organization

Random Access Memories, Serial Access Memories, RAM Interfaces, Magnetic Surface Re cording,Optical Memories, multilevel memories, Cache & Virtual Memory, Memory Allocation, Associative Memory.

UNIT V:

System Organization

Communication methods, Buses, Bus Control, Bus Interfacing, Bus arbitration, IO and system control, IOinterface circuits, Handshaking, DMA and interrupts, vectored interrupts, PCI interr upts, pipelineinterrupts, IOP organization, operation systems, multiprocessors, fault tolerance, RI SC and CISCprocessors, Superscalar and vector processor.

TEXTBOOKS:

1. John P.Hayes, 'Computer architecture and Organization', TMH Third edition, 1998.
2. V.Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, "Computer Organisation", V edition, McGraw-Hill Inc, 1996.

REFERENCES:

1. Morris Mano, “Computer System Architecture”, Prentice-Hall of India, 2000.
2. Paraami, “Computer Architecture”, BEH R002, Oxford Press.
3. P.Pal Chaudhuri, “Computer organization and design”, 2nd Ed., Prentice Hall of India, 2007.
4. G.Kane & J.Heinrich, “MIPS RISC Architecture”, Englewood cliffs, New Jersey, Prentice Hall, 1992.

LINEAR CONTROLSYSTEMS
(ELECTIVE)

Course Code: L:3 T:2 P:0 C:4

III Year I Semester

UNIT I

Introduction to control system: Classification, open-loop, closed-loop system

Mathematical Models of Physical Systems: Modeling of mechanical system elements, Electrical systems, Analogous Systems, Transfer function, Procedure for deriving transfer functions, Servomotors, Synchronous.

Block Diagrams: Block Diagram and Signal flow graphs: Block Diagrams, of a closed-loop system, block diagrams and transfer functions of multivariable systems, procedure for drawing a block diagram, block diagram reduction,

Signal Flow Graphs: construction of Signal Flow Graphs (SFG), Basic properties of signal flow graph, Signal flow graph algebra, construction of signal flow graph

UNIT II

Time Response Analysis I: Time response of control system, Standard test signals, Time response of first-order systems, second-order systems, steady state errors and error constrains, types of control systems, effect of adding poles and zeros to transfer functions, dominant poles of transfer functions.

UNIT III

Time Response Analysis II: Routh Stability Criterion: Introduction, Bounded Input and Bounded Output(BIBO), Necessary conditions for stability, Routh stability criterion, difficulties in the formulation of the Routh table, applications of the Routh stability criterion to linear feedback system, relative stability analysis. Root locus concepts, construction of root loci, rules for the construction of the root locus, effect of adding poles and zeros to G(s) and H(s).

UNIT IV

Frequency Domain Analysis: Correlation between time and frequency response, Polar plots, inverse polar plots, Bode plots, basic factors of G(jw)H(jw), general procedure for constructing Bode plots, all pass and minimum phase systems, computation of Gain Margin and Phase margin, Nyquist plots: principle of argument, Nyquist stability criterion.

UNIT V

State Space Analysis: Concepts of state, state variables and state models, state-space representation, state transition matrix and state transition equation.

TextBook:

1. I. J. Nagrath, M. Gopal,“Control Systems Engineering”,Fifth Edition, NewAge International, New Delhi, 2007.

References:

1. A.Anand Kumar, “Control Systems”, Seventh printing, PHI Learning New Delhi, 2012

2. Katsuhiko Ogata,“Discrete Time Control Systems”, Second Edition, PHI LearningNewDelhi,2006.

MODELING AND SIMULATION OF COMMUNICATION SYSTEMS

(ELECTIVE)

Course Code: L: 3 T: 2 P: 0 C: 4

III Year I Semester

UNIT I

Introduction: Concept of simulation and modeling, Roles of Simulation, Types of Simulation, Limits of Simulation, Simulation Languages (High Level versus Low Level), Real-time Simulation

UNIT II

Simulation Methodology Problem solving in Simulation Environment, Performance evaluation techniques, Parameters Estimation, What-if Questions, Design, Validation, Error Sources in Simulation, Validation, Consistency, Replication, Elimination of Initial Bias, Variance Reduction Techniques Design of Simulation Experiment: Data Stream Selection, Simulation Length of Run, Simulation Sampling Frequency

UNIT III

Digital Issues in Simulation Quantization, Number representation, Underflow, Overflow, Processing Delay, Signal Scaling

UNIT IV

Generation of Data Signals, Random Numbers and Processes Data Sources, Symbol Mapping, Pulse Shaping, Pseudo Random Numbers, Generation of Random Numbers, Generation of Random Variables using Common Distributions, Generation of Random Processes, Generation of Correlated Noise.

UNIT V

Representation of Signals and Systems in Simulation Analog / Discrete, Baseband / Passband, Deterministic / Stochastic, Time Domain / Frequency Domain … Elements of Communication Systems, Basic building blocks

Monte Carlo Methods Fundamental Concepts, Monte Carlo Estimations, Monte Carlo Integration, Convergence

TEXT BOOKS:

1. Principles of Communication systems Simulation with Wireless Applications", W.H. Tranter, K.S. Shanmugan, T.S. Rappaport, K.L. Kosbar, Prentice Hall, 2004, ISBN 0-13-494790-8.

2. "Simulation of Communication Systems, Modeling, Methodology and Techniques", M.C. Jeruchim, P.Balaban, K.S. Shanmugan, Cluwer Academic Publishers, 2nd Edition 2002, ISBN 0-306-46267-2.

REFERENCES:

1. “Simulation Techniques, Models of Communications, Signals and Process”, F.M. Gardner, J.D. Baker, John Wiley & Sons Inc. 1997, ISBN 0-471-51764-9

2. “Contemporary Communication Systems Using Matlab and Simulink”, J.G. Proakis, M.Salehi, G.Bauch, CL-Engineering 2003, ISBN 0-534-40617-3.

DATA BASE MANAGEMENT SYSTEMS
(ELECTIVE)

Course Code: L: 3T: 2 P: 0 C: 4

III Year I Semester

UNIT I:

Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models –Data base System Structure, Data base Users and Administrator – Transaction Management –Data base design and ER diagrams –Attributes and Entity sets – Relationships and Relationship sets –Design Issues, Extended ER Features, Concept Design with the ER Model

UNIT II:

Relational Model: Introduction to the Relational Model, Basic Structure, Database Schema, Keys Relational Algebra, Relational Calculus.Data on External storage-File organization and Indexing, cluster Indexes, Primary and Secondary Indexes-Index data structures-Hash based Indexing.

UNIT III:

Form of Basic SQL Query – Database Languages – DDL – DML – database Access for applications Programs, Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values, Integrity Constraint over relations, Introduction to Views – Destroying /altering Tables and Views.

UNIT IV:

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – Fourth Normal Form.

UNIT V:

Transaction Concept: Transaction State – Implementation of Atomicity and Durability-Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation-Testing for serializability – Lock based Protocols – timestamp based protocols – validation based protocols – Multiple Granularity Recovery and Atomicity – Log based recovery – Recovery with concurrent transactions- Buffer Management.

TEXT BOOKS:

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATAMcGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

REFERENCES:

1. Introduction to Database Systems, C.J.Date Pearson Education.
2. Data base Systems design, Implementation, and Management, Rob & Coronel 5th Edition, Thomson.
3. Database Management Systems P. Radha Krishna HI-TECH Publications 2005.

DIGITAL COMMUNICATIONS LAB

Course Code: L: 0 T: 0 P: 4 C: 2

III Year I Semester

List of Experiments:

1. Design and Implementation of Uniform Quantizer.
2. PCM Generation and Detection
3. Differential Pulse Code Modulation
4. Delta Modulation and Demodulation
5. Time Division Multiplexing of 2 Band Limited Signals
6. Design and implementation of ASK Generator and Detector
7. Design and implementation of PSK Generator and Detector
8. Design and implementation of FSK Generator and Detector
9. Quadrature Phase Shift Keying modulation & Detection.
10. Differential Phase Shift Keying
11. Design and Implementation of Convolutional Coders
12. Design and Implementation of Cyclic code Encoder and its corresponding Syndrome Calculator
13. Generation of PN Sequence and Gold Sequences
14. BER Analysis of binary digital Modulation Schemes (ASK, PSK and FSK) in the presence of Additive White Gaussian Noise
15. BER Analysis of Direct Sequence Spread Spectrum Communication system in the presence of AWGN and interference.

Note: A minimum of 12 (Twelve) experiments have to be performed and recorded by the candidate to attain eligibility for Practical Examination.

VLSI DESIGN LAB

Course Code: L:0 T:0 P:4 C:2

III Year I Semester

VLSI Programs/ Experiments:

1. Introduction to Layout Design Rules
2. Layout of Basic Logic Gates
3. Layout of CMOS Inverter
4. Layout of CMOS NOR/ NAND Gates
5. Layout of CMOS XOR and MUX Gates
6. Layout of CMOS1-bit Full Adder
7. Layout of Static/ Dynamic Logic Circuit (Register Cell)
8. Layout of Latch
9. Layout of Pass Transistor
10. Layout of any Combinational Circuit (Complex CMOS Logic Gate)-Learning about Data Paths
11. Analog Circuit Simulation (AC Analysis)–CS& CD Amplifier.
12. System Level Design using PLL

Note: A minimum of 10(Ten) experiments have to be performed and recorded by the candidate to attain eligibility for Practical Examination.

ADVANCED ENGLISH COMMUNICATION SKILLS LAB

Course Code: L: 0 T: 0 P: 4 C 2

III Year I Semester

Introduction

- Gather ideas and information, to organize ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

Syllabus:

The following course content is prescribed for the Advanced Communication Skills Lab:

- Functional English-starting a conversation–responding appropriately and relevantly–using the right body language–role play in different situations, Discourse Skills.
- Vocabulary Building–synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases, Collocations.
- Reading Comprehension–reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, Critical reading.
- Writing Skills–structure and presentation of different types of writing–Resume writing/
- E-correspondence/Technicalreportwriting/Portfoliowriting–planningfor writing – research abilities/data collection/organizing data/tools/analysis– improving one's writing.
- Group Discussion–dynamics of group discussion, intervention, summarizing, and modulation of voice, body language, relevance, fluency and coherence.
- Presentation Skills–Oral presentations (individual and group) through JAM sessions/seminars and written presentations through posters/projects/reports/ PPTs/e-mails/ assignments etc.

Interview Skills–concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

Minimum Requirement:

The English Language Lab shall have two parts:

i) The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.

ii) The Communication Skills Lab with movable chairs and audio- visual aids with a P.A System, a T.V., a digital stereo–audio & video system and camcorder etc.

System Requirement (Hardware component): Computer network with LAN with minimum 60 multimedia systems with the following specifications:

i) P–IV Processor

a) Speed–2.8GHZ

b) RAM–512MBMinimum c)HardDisk–80GB

ii) Head phones of High quality

Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

Suggested Software:

- Clarity Pronunciation Power–part II
- Oxford Advanced Learner's Compass, 7th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)

The following software from 'train2success.com'

- preparing for being interviewed,
- Positive Thinking,
- Interviewing Skills
- Telephone Skills,
- Time Management
- Team Building,
- Decision making

English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press2009.
2. Advanced Communication Skills Laboratory Manual by SudhaRani, D,Pearson Education2011.

MANAGERIALECONOMICSANDFINANCIAL ANALYSIS

Course Code: L:3 T:2 P:0 C:4

III Year II Semester

UNIT I

Introduction& Demand Analysis: Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand fore casting, methods of demand fore casting.

UNIT II

Production& Cost Analysis: Production Function–Isoquantsand Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. Cost Analysis**:** Cost concepts.Break-evenAnalysis(BEA)-DeterminationofBreak-EvenPoint(simple problems)-Managerial Significance.

UNIT III

Markets& New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price- Output Determination in case of Perfect Competition and Monopoly. Pricing: Objectives and Policies of Pricing. Methods of Pricing. Business: Features and evaluation of different forms of Business Organization: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, New Economic Environment: Changing Business Environment in Post-liberalization scenario.

UNIT IV

Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

UNIT V

Introduction to Financial Accounting &Financial Analysis: Accounting concepts and Conventions-Double-Entry Book Keeping, Journal, Ledger, Trial Balance-Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). Financial Analysis**:** Analysis and Interpretation

TEXTBOOKS:

1. Aryasri: Managerial Economics and Financial Analysis,TMH,2009.
2. Atmanand: Managerial Economics, Excel, 2008.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi, 2009
2. H.Craig Peterson & W. CrisLewis, Managerial Economics, PHI,2009
3. Lipsey & Chrystel, Economics, Oxford University Press, 2009

MICROWAVE ENGINEERING

Course Code: L: 3 T: 2 P: 0 C: 4
III Year II Semester

Unit I:

Microwave Transmission Lines: Rectangular Waveguide- Solution of Wave Equations, Modes of Propagation, Power Transmission and losses, Mode Excitation, Characteristics; Circular Waveguide- Solution of Wave Equations, Modes of Propagation, Power Transmission and losses, Mode Excitation, Characteristics; Strip Line- Propagation Constant, Characteristic Impedance, Attenuation; Micro strip Line- Effective Dielectric Constant, Characteristic Impedance, Attenuation

Unit II:

Microwave Network Analysis, Reciprocal & Non-Reciprocal Networks Z-, Y-, S-Matrix Concepts, Properties of S-Matrix, S-Matrix of two, three, four port, Reciprocal and non-reciprocal networks: E- and H- Plane Tees, Magic Tees, Hybrid Rings, Isolators; Wilkinson Power Divider-Even and Odd Mode Analysis; Directional Couplers and 90^0, 180^0 Hybrid, Ferrite Devices.

UnitII:

Microwave Network Analysis, Reciprocal & Non-Reciprocal Networks: Filter design using Insertion Loss Method, Butterworth and Chebyschev realization of filters, Transformation of Low pass prototype to other filter types, Stepped Impedance Low Pass Filter, Realization of filters with Microstrip lines, Impedance Matching in RF Networks- L Network, Dealing with Complex Loads, 3-element matching, Wideband Matching Networks

Unit IV:

Microwave Tubes and Introduction to Microwave Solid State Devices: Microwave Tubes- Principles of Operation: Klystron, Reflex Klystron, Travelling Wave Tube, Magnetron; Microwave Diodes: Schottky Diode, PIN Diode; Transferred Electron Devices: Gunn Effect Diode, RWH Theory, Modes of operation; Avalanche Transit-time Devices: IMPATT, TRAPATT

Unit V

Noise, Distortion, Oscillators, Mixers, Multipliers: Noise in Microwave Circuits, Noise Figure, Non-linear Distortion; Microwave Oscillators, Oscillator Phase Noise; Frequency Multipliers- Manley-Rowe Relations; Mixers- Single-ended mixer, Balanced Mixer

TEXT BOOKS:

1. “Microwave Engineering”, David M Pozar, John Wiley & Sons, 4th ed., 2012
2.“Microwave Devices and Circuits”, Samuel Y Liao, Pearson Education, 3rd ed., 1990
3.“RF Circuit Design”, Christopher Bowick, Elsevier Inc, 2008

REFERENCES:

1.“RF Circuit Design- Theory and Applications”. Reinhold Ludwig and PavelBretchko, Prentice Hall Inc., 2000
2.“Foundations for Microwave Engineering”, RE Collin, John Wiley & Sons Inc, 2nd ed., 2002

DIGITALSIGNALPROCESSING

Course Code: L: 3 T: 2 P: 0 C: 4

III Year II Semester

UNIT I:

Introduction: Introduction to Digital Signal Processing: Discrete Time Signals &Sequences, Linear Shift Invariant Systems, Stability, and Causality, Linear Constant Coefficient Difference Equations, Frequency Domain Representation of Discrete Time Signals and Systems

UNIT II:

Discrete Fourier series: DFS Representation of Periodic Sequences, Properties of Discrete Fourier Series, Discrete Fourier Transforms: Properties of DFT, Linear Convolution of Sequences using DFT, Computation of DFT, Relation between DTFT, DFS, DFT and Z-Transform.

Fast Fourier Transforms: Fast Fourier Transforms (FFT)-Radix-2, Decimation-in-Time and Decimation-in-Frequency FFT Algorithms, Inverse FFT, and FFT with General Radix -N.

UNIT III:

Realization of Digital Filters: Applications of Z–Transforms, Solution of Difference Equations of Digital Filters, System Function, Stability Criterion, Frequency Response of Stable Systems, Realization of Digital Filters – Direct, Canonical, Cascade and Parallel Forms.

UNIT IV:

IIR Digital Filters: Analog filter approximations– Butter worth and Chebyshev, Design of IIR Digital Filters from Analog Filters, Step and Impulse Invariant Techniques, Bilinear Transformation Method.

UNIT V:

FIR Digital Filters: Characteristics of FIR Digital Filters, Frequency Response, Design of FIR Filters: Fourier Method, Digital Filters using Window Techniques, Frequency Sampling Technique, and Comparison of IIR & FIR filters.

TEXT BOOKS:

1. Digital Signal Processing, Principles, Algorithms, and Applications: JohnG. Proakis, Dimitris G. Manolakis, Pearson Education/PHI,2007.
2. Discrete Time Signal Processing–A.V.Oppenheim and R.W.Schaffer, PHI, 2009
3. Fundamentals of Digital Signal Processing–Loney Ludeman, JohnWiley, 2009

REFERENCES:

1. Johnny R. Johnson, Introduction to Digital Signal Processing, 2001.
2. Andreas Antoniou, Digital Signal Processing, TMH, 2006.
3.JohnG.Proakis, Dimitris G Manolakis, digital Signal Processing: Principles, Algorithmsand Applications, Pearson Education, PHI,2003

PRINCIPLES OF OPERATING SYSTEMS

(OPEN ELECTIVE)

Course Code: L: 2 T: 2 P: 0 C: 3

III Year II Semester

UNIT-I:

Computer System and Operating System Overview: Overview of computer operating systems, operating systems functions, operating systems structures and systems calls, Evaluation of Operating Systems.

UNIT-II:

Process Management – Process concept- process scheduling, operations, Inter process communication. Multi Thread programming models. Process scheduling criteria and algorithms, and their evaluation.

UNIT-III:

Concurrency: Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples

Memory Management: Swapping, contiguous memory allocation, paging, structure of the page table, segmentation

UNIT-IV:

Virtual Memory Management: virtual memory, demand paging, page-Replacement, algorithms, Allocation of Frames, Thrashing

Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock,

UNIT-VI:

File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.

File System implementation- File system structure, allocation methods, free-space management

Mass-storage structure overview of Mass-storage structure, Disk structure, disk attachment, disk scheduling, Introduction to Storage Area Networks (SAN), Introduction to Network Attached Storage.

TEXT BOOKS:

1. Operating System Principles, Abraham Silberchatz, Peter B. Galvin, Greg Gagne 8th Edition, Wiley Student Edition.
2. Operating systems - Internals and Design Principles, W. Stallings, 6th Edition, Pearson.

REFERENCES:

1. Modern Operating Systems, Andrew S Tanenbaum 3rd Edition PHI.
2. Operating Systems A concept - based Approach, 2nd Edition, D. M. Dhamdhere, TMH.
3. Principles of Operating Systems, B. L. Stuart, Cengage learning, India Edition.
4. Operating Systems, A. S. Godbole, 2nd Edition, TMH
5. An Introduction to Operating Systems, P.C.P. Bhatt, PHI.
6. Operating Systems, S, Haldar and A. A. Arvind, Pearson Education.
7. Operating Systems, R. Elmasri, A. G. Carrick and D. Levine, McGraw Hill.
8. Operating Systems in depth, T. W. Doeppner, Wiley.

COMPUTER NETWORKS

(ELECTIVE)

Course Code: L: 3 T: 2 P: 0 C: 4

III Year II Semester

Unit I

Computer Network Architecture: Layered structure, design issues for the layers, interfaces and services, OSI reference model, overview of TCP/IP architecture, Hardware and software components, network topologies.

Unit II

Peer to Peer Protocols: Peer – to – Peer protocols and service models; ARQ protocols and adaption function; Data-Link Controls-HDLC and PPP; Link sharing using packet multiplexers; Medium Access Control Protocols.

Packet-Switching protocols: Routing and Congestion Control Protocols-Interior & Exterior Routing Protocols.

Unit III

TCP/IP Architecture:

The Internet Protocols-IPv4 & IPv6, UDP & TCP, DHCP and Mobile IP; Internet Routing Protocols, Multicast Routing. Broadband Technology and services.

Unit IV

ATM Networks:

Layers, QoS, ATM Adaptation Layers, Signaling and PNNI Routing.Internetworking: Virtual Circuit and Datagram Subnets: Internet Control Protocols; Security Protocols; Internetworking: Virtual Circuit and Datagram Subnets: Internetworking Protocols; Tunneling; Fragmentation: Firewalls. Security Protocols: Security and Cryptographic Algorithm.

Unit V

Application Protocols

Application Protocols: Introduction, providing services, Applications layer paradigms, Client server model, Standard client-server application-HTTP, FTP, electronic mail, WWW, DNS, SSH, SMTP.

Text Books:

- Computer Networks - Andrew S Tanenbaum, 4th Edition, Pearson Education
- Data Communications and Networking - Behrouz A. Forouzan, Fifth Edition TMH, 2013.

References:

- An Engineering Approach to Computer Networks - S. Keshav, 2nd Edition, Pearson Education.
- Understanding communications and Networks, 3rd Edition, W. A. Shay, Cengage Learning.
- Introduction to Computer Networks and Cyber Security, Chwan-Hwa (John) Wu, J. David Irwin, CRC Press.
- Computer Networks, L. L. Peterson and B. S. Davie, 4th edition, ELSEVIER.
- Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, K. W. Ross, 3rd Edition, Pearson Education.

INFORMATION THEORY AND CODING
(ELECTIVE)

Course Code: L: 3 T: 2 P: 0 C: 4
III Year II Semester

UNIT-I

Information Theory: Definition of Information, Entropy, Mutual Information, Properties of Mutual Information, Fundamental Inequality, I.T. Inequality, Divergence, Properties of Divergence, Divergence Inequality, Relationship between entropy and mutual information, Chain Rules for entropy, relative entropy and mutual information.

UNIT II

Channel Capacity: Uniform Dispersive Channel, Uniform Focusing Channel, Strongly Symmetric Channel, Binary Symmetric Channel, Binary Erasure Channel. Channel Capacity of the all these channels, Channel Coding Theorem, Shannon-Hartley Theorem
Data Compression: Kraft inequality, Huffman codes, Shannon-Fano coding, Arithmetic Coding

UNIT III

Linear Block Codes: Systematic linear codes and optimum decoding for the binary symmetric channel; Generator and Parity Check matrices, Syndrome decoding on symmetric channels; Hamming codes; Weight enumerators and the Mac Williams identities; Perfect codes. Cyclic Codes, BCH codes; Reed-Solomon codes, Justeen codes, MDS codes, Alterant, Goppa and generalized BCH codes; Spectral properties of cyclic codes.

UNIT IV

Decoding of BCH codes: Berlekamp's decoding algorithm, Massey's minimum shift register synthesis technique and its relation to Berlekamp's algorithm. A fast Berlekamp – Massey algorithm.

UNIT V

Convolution codes Wozencraft's sequential decoding algorithm, Fann's algorithm and other sequential decoding algorithms; Viterbi decoding algorithm, Turbo Codes, Concatenated Codes.

TEXT BOOKS:

1. F.J. MacWilliams and N.J.A. Slone, The theory of error correcting codes,North Holland, 1977.
2. R.E. Balahut, Theory and practice of error control codes, Addison Wesley, 1983.

REFERENCES

1. Thomas M. Cover, Joy A. Thomas, "Elements of Information Theory", Wiley Publishers.
2. Ranjan Bose," Information Theory Coding, Cryptography", TMH Publication.

PRINCIPLES OF SOFTWARE ENGINEERING

(ELECTIVE)

Course Code: L: 3 T: 2 P: 0 C: 4

III Year II Semester

UNIT - I:

Introduction to Software Engineering: The evolving role of software, Changing Nature of Software, Software myths.

A Generic view of process: Software engineering- A layered technology, a process framework, The Capability Maturity Model Integration (CMMI), Process patterns, process assessment, personal and team process models.

Process models: The waterfall model, Incremental process models, Evolutionary process models, The Unified process.

UNIT - II:

Software Requirements: Functional and non-functional requirements, User requirements, System requirements, Interface specification, the software requirements document.

Requirements engineering process: Feasibility studies, Requirements elicitation and analysis, Requirements validation, Requirements management.

System models: Context Models, Behavioural models, Data models, Object models, structured methods.

UNIT – III

Design Engineering: Design process and Design quality, Design concepts, the design model.

Creating an architectural design: Software architecture, Data design, Architectural styles and patterns, Architectural Design.

Object-Oriented Design: Objects and object classes, An Object-Oriented design process, Design evolution.

Performing User interface design: Golden rules, User interface analysis and design, interface analysis, interface design steps, Design evaluation.

UNIT - IV:

Testing Strategies: A strategic approach to software testing, test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, the art of Debugging.

Product metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

Metrics for Process and Products: Software Measurement, Metrics for software quality.

Risk management: Reactive vs. Proactive Risk strategies, software risks, Risk identification, Risk projection, Risk refinement, RMMM, RMMM Plan.

UNIT - V:

Quality Management: Quality concepts, Software quality assurance, Software Reviews, Formal technical reviews, Statistical Software quality Assurance, Software reliability, The ISO 9000 quality standards.

TEXT BOOKS:

- Software engineering a practitioner's Approach, Roger S Pressman, 6th edition. McGrawHill International Edition.
- Software Engineering, Ian Summerville, 7th edition, Pearson education.

REFERENCES:

- Software Engineering, A Precise Approach, PankajJalote, Wiley India, 2010.
- Software Engineering: A Primer, Waman S Jawadekar, Tata McGraw-Hill, 2008
- Fundamentals of Software Engineering, Rajib Mall, PHI, 2005
- Software Engineering, Principles and Practices, Deepak Jain, Oxford University Press.
- Software Engineering1: Abstraction and modelling, Diner Bjorner, Springer International edition, 2006.

DIGITALSIGNALPROCESSINGLAB

Course Code: L: 0 T: 0 P: 4 C: 2

III Year II Semester

Experiments Based on MATLAB/ Lab View/ C Programming Equivalent:

1. Generation of Sinusoidal waveform/ signal based on recursive difference equations
2. Linear and circular convolutions and DFT
3. To find frequency response of a given system given in (Transfer Function/ Differential equation form) (Frequency response of analog Butter worth filter)
4. Implementation of DFT, inverse DFT and FFT of given sequence
5. Determination of Power Spectrum of a given signal(s).
6. Implementation of LP FIR filter for a given sequence (Frequency response and time-domain simulation of FIR filter (1))
7. Implementation of HP FIR filter for a given sequence
8. Implementation of LP IIR filter for a given sequence (First order IIR filter (LP): Frequency- response and time-domain simulation)
9. Implementation of HP IIR filter for a given sequence First order IIR filter (HP): Frequency response and time-domain simulation
10. Generation (Recovery) of Sinusoidal signal through filtering
11. Generation of DTMF signals
12. Implementation of Decimation Process
13. Implementation of Inter polation Process
14. Implementation of I/D sampling rate converters
15. Impulse response of first order and second order systems.

Experiments Based On DSP Processor:

1. Generation of Sine wave with Buffer
2. Generation of Sum of sinusoidal signals
3. Linear Convolution of Two Signal sequences
4. Circular Convolution of Two signal sequences
5. Dot Product of Two Sequences
6. Square and Saw tooth wave generation
7. DFT of a sequence
8. IDFT of a sequence
9. Low pass and High Pass IIR filter design
10. Low pass and High Pass FIR filter design

NOTE: A minimum of 12 experiments (Matlab based + DSP Processor based) are to be performed and recorded by the candidate to attain eligibility for Practical Examination.

OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB

Course Code: L: 0 T: 0 P: 4 C: 2

III Year II Semester

Week 1: Write java programs that implement the following

a) Constructor
b) Parameterized constructor
c) Method overloading
d) Constructor overloading.

Week 2:a) Write a Java program that checks whether a given string is a palindrome or not. Ex: MADAM is a palindrome.

b) Write a Java program for sorting a given list of names in ascending order.

c) Write a Java Program that reads a line of integers, and then displays each integer and the sum of all the integers (Use StringTokenizer class of java.util)

Week 3: Write java programs that implement the following keywords

a) this keyword
b) super keyword
c) static keyword
d) final keyword

Week 4: a) Write a java program to implement method overriding

b) Write a java program to implement dynamic method dispatch.

c) Write a Java program to implement multiple inheritance.

d) Write a java program that uses access specifies.

Week5: a) Write a Java program that reads a file name from the user, then displays information about whether the file exists, whether the file is readable, whether the file is writable, the type of file and the length of the file in bytes.

b) Write a Java program that reads a file and displays the file on the screen, with a line number before each line.

c) Write a Java program that displays the number of characters, lines and words in a text file

Week 6: a) Write a Java program for handling Checked Exceptions.

b) Write a Java program for handling Unchecked Exceptions.

Week 7: a) Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every two seconds and the third thread displays "Welcome" every three seconds.

b) Write a Java program that correctly implements producer consumer problem using the concept of inter thread communication.

Week 8: a) Develop an applet that displays a simple message.

b) Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.

Week 9: Write a Java program that works as a simple calculator. Use a grid layout to arrange

button for the digits and for the +, -,*, % operations. Add a text field to display the result.

Week 10: a)Write a Java program for handling mouse events.
b)Write a Java program for handling key events.

Week 11: Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the textfields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1or Num2 were not an integer, the program would throw Number Format Exception. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.

Week 12:a) Write a java program that simulates a traffic light. The program lets the user select one of three lights: red, yellow, or green. When a radio button is selected, the light is turned on, and only one light can be on at a time No light is on when the program starts.
b) Write a Java program that allows the user to draw lines, rectangles and ovals.

Week 13: Create a table in Table.txt file such that the first line in the file is the header, and the remaining lines correspond to rows in the table. The elements are separated by commas. Write a java program to display the table using JTable component.

TEXT BOOKS :

1. Java; thecomplete reference,7th editon, Herbert Schildt, TMH.
2. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI.
3. Introduction to Java programming, Sixth edition, Y.Daniel Liang, Pearson Education.
4. Big Java, 2nd edition, Cay Horstmann, Wiley Student Edition, Wiley India Private Limited.

MANAGEMENT SCIENCE

Course Code: L: 3 T: 2 P: 0 C: 4

IV Year I Semester

Unit-I:

Concepts of Management and Organization: Nature, Importance, Functions and Theories of Management; Systems Approach to Management; Leadership Styles; Social Responsibilities of Management.

Designing Organizational Structures: Basic concepts relating to Organisation; Departmentation and Decentralization, Types and Evolution of mechanistic and organic structures of organisation and suitability.

Unit-II:

Operations &Marketing Management: Principles and Types of Plant Layout, Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement.

Statistical Quality Control: Control Charts for Variables and Attributes (Simple Problems) and Acceptance Sampling, Deming's contribution to quality. Objectives of InventoryControl, EOQ, ABC Analysis, Purchase Procedures, Stores Management and Stores Records - Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle, Channels of Distribution.

UNIT III:

Human Resources Management (HRM): Concepts of Personnel Management, HRM and HRD and Industrial Relations (IR), HRM vs. PMIR. Basic functions of HR Manager: Manpower planning, Recruitment and Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Analysis, Job Description, and Job Evaluation.

UNIT IV:

Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing (simple problems).

UNIT V:

Strategic Management and Contemporary Strategic Issues: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives. Contemporary Management Practices: Basic concepts of MIS, End User Computing, Materials Requirement Planning (MRP), Just-In-Time (JIT) System, Total Quality Management (TQM), Six Sigma and Capability Maturity Model (CMM) Levels, Supply Chain Management, Enterprise Resource Planning (ERP), Performance Management,

Business Process Outsourcing (BPO), Business Process Re-engineering and Bench Marking, Balanced Score Card.

TEXT BOOKS:

1. Aryasri: Management Science, TMH, 2009.
2. Stoner, Freeman, Gilbert, Management, 6th Ed, Pearson Education, New Delhi, 2004.
3. P. Vijay Kumar, N. Appa Rao and Ashnab, Chnalill, Cengage Learning India, 2012.

REFERENCES:

1. Kotler Philip and Keller Kevin Lane: Marketing Management, Pearson, 2012.
2. Koontz and Weihrich: Essentials of Management, McGraw Hill, 2012.
3. Thomas N. Duening and John M. Ivancevich Management - Principles and Guidelines, Biztantra, 2012.
4. Kanishka Bedi, Production and Operations Management, Oxford Uiversity Press, 2012.
5. Samuel C. Certo: Modern Management, 2012.
6. Schermerhorn, Capling, Poole and Wiesner: Management, Wiley, 2012.
7. Parnell: Strategic Management, Cengage, 2012.
8. Lawrence R Jauch, R. Gupta and William F. Glueck: Business Policy and Strategic Management Science, McGraw Hill, 2012.

CELLULAR AND MOBILE COMMUNICATIONS

Course Code: L: 3 T: 2 P: 0 C: 4

IV Year I Semester

UNIT I

Introduction to Cellular Mobile Radio Systems: Introduction to Cellular Mobile System, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital 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, Cell splitting, consideration of the components of Cellular system.

UNIT II

Interference: Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-cochannel interference-different types.

Cell Coverage for Signal and Traffic: Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

UNIT III

Cell Site And Mobile Antennas: Sum and difference patterns and their synthesis, Omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas.

UNIT IV

Frequency Management and Channel Assignment: Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non-fixed channel assignment.

UNIT V

Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

Digital Cellular Networks: GSM, multiplex access scheme, TDMA, CDMA.

TEXTBOOKS:

1. Mobile Cellular Telecommunications–W.C.Y. Lee, Tata McGraw Hill, 2ndEdition, 2006.
2. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd

Edition,2007.

REFERENCES:

1.Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edition, 2002.
2.Wireless and Mobile Communications – Lee McGraw Hills, 3rd Edition, 2006.
3.Wireless Communication and Networking – Jon W. Mark and WeihuaZhqung, PHI, 2005.
4.Wireless Communication Technology – R. Blake, Thompson Asia Pvt. Ltd., 2004.

EMBEDDED SYSTEMS DESIGN

Course Code: L: 3 T: 2 P: 0 C: 4

IV Year I Semester

UNIT -I: Introduction to Embedded Systems

Definition of Embedded System, Embedded Systems Vs General Computing Systems, History of Embedded Systems, Classification, Major Application Areas, Purpose of Embedded Systems, Characteristics and Quality Attributes of Embedded Systems.

UNIT -II: Typical Embedded System

Core of the Embedded System: General Purpose and Domain Specific Processors, ASICs, PLDs, Commercial Off-The-Shelf Components (COTS), Memory: ROM, RAM, Memory according to the type of Interface, Memory Shadowing, Memory selection for Embedded Systems, Sensors and Actuators, Communication Interface: Onboard and External Communication Interfaces.

UNIT -III: Embedded Firmware

Reset Circuit, Brown-out Protection Circuit, Oscillator Unit, Real Time Clock, Watchdog Timer, Embedded Firmware Design Approaches and Development Languages.

UNIT -IV: RTOS Based Embedded System Design

Operating System Basics, Types of Operating Systems, Tasks, Process and Threads, Multiprocessing and Multitasking, Task Scheduling.

UNIT -V: Task Communication

Shared Memory, Message Passing, Remote Procedure Call and Sockets, Task Synchronization: Task Communication/Synchronization Issues, Task Synchronization Techniques, Device Drivers, How to Choose an RTOS.

TEXT BOOKS:

1.Introduction to Embedded Systems - Shibu K.V, Mc Graw Hill.

2.Embedded Systems - Raj Kamal, TMH.

REFERENCES:

1. Embedded System Design - Frank Vahid, Tony Givargis, John Wiley.

2. Embedded Systems – Lyla, Pearson, 2013

3.An Embedded Software Primer - David E. Simon, Pearson Education.

PRINCIPLES OF SATELLITE COMMUNICATIONS

(OPEN ELECTIVE)

Course Code: L: 2 T: 2 P: 0 C: 3

IV Year I Semester

UNIT-I

Introduction: Origin of satellite communications, Historical background, basic concepts of satellite communications, frequency allocations for satellite services, applications, future trends of satellite communications.

UNIT-II

Orbital Mechanics and Launchers: Orbital Mechanics look angle determination, orbital perturbations, orbit determination, launches and launch vehicles, orbital effects in communication systems performance.

UNIT-III

Satellite Subsystems: Attitude and orbital control system, Telemetry, Tracking, command and monitoring, power systems, communication subsystems, satellite antenna equipment reliability and space qualification.

UNIT-IV

Satellite Link Design: Basic transmission theory, system noise temperature and G/T ratio, design of down links, uplink design, design of satellite links for specified C/N, Link budget.

UNIT-V

Earth Station Technology: Introduction, transmitters, receivers, Antennas, tracking systems, terrestrial interface, primary power test methods.

Low Earth Orbit and Geo-stationary Satellite Systems: Orbit consideration, coverage and frequency considerations, delay and throughput considerations, system considerations, operational NGSO constellation designs.

Text Books:

1. Satellite communications-Timothi Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley publications, 2nd Edition, 2003.
2. Satellite communications Engineering-Wilbur L.Prichard, Robert A. Nelson & Henry G.Suyderhoud, 2nd Edition, Pearson Publications, 2003.

References:

1. Satellite communications: Design principles-M. Richharia, BS publications, 2nd Edition, 2003.
2. Fundamentals of Satellite communications-K.N.Rajarao, PHI, 2004.
3. Satellite communications-Dennis Roddy, McGraw Hill, 2nd Edition, 1996.

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

(ELECTIVE)

Course Code: L: 3 T: 2 P: 0 C: 4

IV Year I Semester

UNIT - I:

Block Schemantics of Measuring Systems: Performance characteristics, Static characteristics, Accuracy, Precision, Resolution, Types of Errors, Gaussian Error, Root Sum Squares formula, Dynamic Characteristics, Repeatability, Reproducibility, Fidelity, Lag; Measuring Instruments: DC Voltmeters, D' Arsonval Movement, DC Current Meters, AC Voltmeters and Current Meters, Ohmmeters, Multimeters, Meter Protection, Extension of Range, True RMS Responding Voltmeters, Specifications of Instruments.

UNIT - II:

Signal Analyzers: AF, HF Wave Analyzers, Harmonic Distortion, Heterodyne wave Analyzers, Spectrum Analyzers, Power Analyzers, Capacitance-Voltage Meters, Oscillators. Signal Generators: AF, RF Signal Generators, Sweep Frequency Generators, Pulse and Square wave Generators, Function Generators, Arbitrary waveform Generator, Video Signal Generators, and Specifications.

UNIT - III:

Oscilloscopes: CRT, Block Schemantic of CRO, Time Base Circuits, Lissajous Figures, CRO Probes, High Frequency CRO Considerations, Delay lines, Applications: Measurement of Time, Period and Frequency Specifications.

Special Purpose Oscilloscopes: Dual Trace, Dual Beam CROs, Sampling Oscilloscopes, Strorage Oscilloscopes, Digital Storage CROs.

UNIT - IV:

Transuducers: Classification, Strain Gauges, Bounded, unbounded; Force and Displacement Transducers, Resistance Thermometers, Hotwire Anemometers, LVDT, Thermocouples, Synchros, Special Resistance Thermometers, Digital Temperatue sensing system, Piezoelectric Transducers, Variable Capacitance Transducers, Magneto Strictive Transducers.

UNIT - V:

Bridges: Wheat Stone Bridge, Kelvin Bridge, and Maxwell Bridge.

Measurement of Physical Parameters: Flow Measurement, Displacement Meters, Liquid level Measurement, Measurement of Humidity and Moisture, Velocity, Force, Pressure - High Pressure, Vacuum level, Temperature - Measurements, Data Acqisition Systems.

TEXTBOOKS:

1. Electronic instrumentation: H.S.Kalsi - TMH, 2nd Edition 2004.
2. Modern Electronic Instrumentation and Measurement Techniques: A.D. Helbincs, W.D. Cooper: PHI, 5th Edition, 2003.

REFERENCES:

1. Electronic Instrumentation and Measurements - David A. Bell, Oxford Uiv. Press, 1997.
2. Electronic Measurements and Instrumentation: B. M. Oliver, J. M. Cage TMH Reprint.
3. Measurement Systems - Emest O. Doebelin and Dhanesh N Manik, 6th Ed., TMH.
4. Electronic Measurements and Instrumentations by K. Lal Kishore, Pearson Education - 2010.
5. Industrial Instrumentation: T. R. PadmanabhamSpiriger 2009.

DIGITAL SIGNAL PROCESSORS AND ARCHITECTURES (ELECTIVE)

Course Code: L: 2 T: 2 P: 0 C: 3

IV Year I Semester

UNIT-1

Introduction to Digital Signal Processing: Introduction, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), linear time-invariant systems, Digital filters, Decimation and interpolation.

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

UNIT-II

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

UNIT-III

Programmable Digital Signal Processors: 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

Analog Devices Family of DSP Devices: Analog Devices Family of DSP Devices-ALU and MAC block diagram, Shifter Instruction, Base Architecture of ADSP 2100, ADSP-2181 high performance processor.

Introduction to Blackfin Processor-The Blackfin Processor, Introduction to Micro Signal Architecture, Overview of Hardware Processing Units and Register files, Address Arithmetic Unit, Control Unit, Bus Architecture and Memory, Basic Peripherals.

UNIT-V

Interfacing Memory and I/O Peripherals to Programmable DSP Devices: Memory space organization, External bus interfacing signals, Memory interface Parallel I/O interface, Programmed I/O, interrupts and I/O, Direct memory access (DMA).

Text books:

1. Digital Signal Processing - Avtar Singh and S.srinivasan, Thomson Publications, 2004
2. A practical Approach to Digital Signal Processing–K. Padmanabhan, R. Vijayarajeswaran, Ananth, S, New Age International, 2006/2009

Reference:

1. Embedded Signal Processing with the Micro signal Architecture Publisher: Woon–Seng Gan, Sen M. Kuo,Wiley-IEEE Press, 2007

DIGITAL CONTROL SYSTEMS

(ELECTIVE)

UNIT I

TRANSFER FUNCTIONS, BLOCKDIAGRAMS, AND SIGNAL FLOW GRAPHS:

Review of Z-Transform, Applications of Z-Transform, Signals between sampling instants-Submultiple sampling method & Delayed Z-Transform and the modified Z-Transform. Introduction to Pulse Transfer Function and Z-Transfer function, Relation between G(s) and G(z), Closed loop systems, Sampled Signal Flow Graph, Modified Z-Transfer function, Multirate Discrete Data Systems.

UNIT II

STATE VARIABLE TECHNIQUE:

State Equations of Discrete Data systems with Sample and Hold Devices, State equations of Digital Systems with All-Digital Elements, The State Transition Equations(the recursive method and the ztransform method), Relationship between State Equations and Transfer Functions, Characteristic Equation, Eigen Values and Eigen Vectors, Methods of Computing the Transition Matrix(The Cay-ley Hamilton Theorem, The Z-Transform Method), State Diagrams of Digital Systems.

UNIT III

TIME DOMAIN AND Z-DOMAIN ANALYSIS

Introduction, Prototype Second Order system, Comparison of Time Responses of Continuous Data and Discrete Data systems, Steady State Error analysis of Digital Control systems, Correlation between time response and root locations in S-plane and Z-plane, Dominant Characteristic Equation, Root loci of Digital Control systems, Effects of adding poles and Zeroes to Open loop transfer function.

UNIT IV

DESIGN OF DISCRETE DATA CONTROL SYSTEMS

Introduction, Cascade Compensation by continuous data Controllers, Design of Continuous Data Controllers with Equivalent Digital Controllers, Digital controllers, Design of Digital Control systems with Digital controllers through Bilinear transformation, Design in the Z-plane using Root Locus Diagram.

UNITV

DESIGN OF DIGITAL CONTROL SYSTEMS

Control System parameters, Conventional design tools- Root locus and Bode plots, compensation-Phase lead, phase lag and PID controllers. Applications of DSPs in control systems-PID controllers, Motor control and Robotics.

Text Book: BC Kuo, “Digital Control Systems”, Second Edition, Saunders College Publishing, 1992.

References:

1.Nekoogar F and Moriarty G, “Digital Control Using Digital Signal Processing”, Prentice Hall inc, 1999.

2.M. Gopal, “ Digital Control and State Variable Methods(conventional and intelligent Control) Systems, Third Edition, TMH.

MICROWAVE ENGINEERING LAB

Course Code: L: 0 T: 0 P: 4 C: 2

IV Year I Semester

List of Experiments:

1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Attenuation Measurement.
4. Directional Coupler Characteristics.
5. VSWR Measurement.
6. Impedance and Frequency Measurement.
7. Waveguide parameters measurement.
8. Scattering parameters of Circulator.
9. Scattering parameters of Magic Tee.

Equipment required for Laboratories:

- Regulated Klystron Power Supply
- VSWR Meter -
- Micro Ammeter - 0 – 500 μA
- Multimeters
- CRO
- GUNN Power Supply, Pin Moderator
- Reflex Klystron
- Crystal Diodes
- Microwave components (Attenuation)
- Frequency Meter
- Slosted line carriage
- Probe detector
- wave guide shorts
- Pyramidal Horn Antennas
- Directional Coupler
- E, H, Magic Tees
- Circulators, Isolator

- Matched Loads

EMBEDDED SYSTEMS DESIGN LAB

Course Code: L: 0 T: 0 P: 4 C: 2

IV Year I Semester

Experiments:

1. Program to configure system clock and GPIO
2. Program to use a software delay to toggle an LED on the evaluation board
3. Program to enable and configure Timers and Interrupts
4. Program to generate an exception
5. Program to enable and configure ADC and sample sequencer
6. Program to measure and display values from internal temperature sensor and add Hardware averaging
7. Program to use ROM peripheral driver library calls and to note size difference
8. Program to run USB bulk example code and windows side app on evaluation board
9. Program to create code to write to FLASH memory and read/write to EEPROM
10. Program to enable FPU and profile floating point code
11. Program to connect Kentec Display and to experiment with demo project
12. Program to write graphics library code
13. Program to transmit and receive data using UART

COMMUNICATION PROTOCOLS LAB

Course Code: L: 0 T: 0 P: 4 C: 2

IV Year I Semester

Experiments:

1. Write code to display string on the LCD
2. Write code to display a counter which runs from 0 to 100 on the LCD display(should be three digit number)
3. Serial communication on chip-UART –To transmit single character.
4. Write a code to receive and transmit back a character using serial communication
5. Write a program to transmit a character 'a' serially at a baud rate of 9600every second using the bit banging technique on PD1 port line.
6. Write a program to receive serial data at a baud rate of 9600 and display the received character on LCD. Use PD0 port line and bit banging technique for the reception.
7. Write a program to read serial data from an ultrasonic range finding module and displaying it.
8. Write a code to interface 7 segment display using I2C.
9. Write a code to interface 7 segment display using SPI.
10. Write arduino code for string which key has been pressed in the GRIET capacitive tour shield and toggle the LED connected to that switch
11. Write a program to transfer data using ZigBee.
12. Write a program to transfer data using Wi-Fi.
13. Write a program to transfer data using Bluetooth using blue term.
14. Write a program to Control of two ac loads using Bluetooth
15. Write a program to display numbers 0 to 9 on the 7 segment display on the GRIET software interface shield using bit banging.

The following are required components in communication protocols lab, with

- Arduino open software,
- Windows 8.1 Operating Systems
- Arduino board,
- LCD module,
- USR module,

- Sevensegment display,
- Capacitive touch shield,
- ZIGBEE Module,
- WIFI Module,
- BLUETOOTH Module,
- Load like Bulb,
- LED,

DIGITAL IMAGE PROCESSING

Course Code: L: 2 T: 2 P: 0 C: 3

IV Year II Semester

UNIT I

Digital image fundamentals - Digital Image through scanner, digital camera. Concept of gray levels. Gray level to binary image conversion. Sampling and quantization. Relationship between pixels. Imaging Geometry.

UNIT II

Image Transforms 2-D FFT, Properties. Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, Slant transform, Hoteling transform. Image enhancement Point processing. Histogram processing. Spatial filtering. Enhancement in frequency domain, Image smoothing, Image sharpening.

UNIT III

Color image processing: Pseudo color image processing, full color image processing. Image Restoration Degradation model, Algebraic approach to restoration, Inverse filtering, least mean square filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT IV

Segmentation and Thresholding: Image segmentation, Detection of discontinuities. Edge linking and boundary detection, Thresholding, Region oriented segmentation.

UNIT V

Image Compression Techniques: Image compression Redundancies and their removal methods, Fidelity criteria, Image compression models, Source encoder and decoder, Error free compression, Lossy compression.

Text book:

1. Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education, 2nd Education, 2002.
2. Fundamentals of Digital Image processing – A.K.Jain , PHI.

References:

1. Digital Image processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.
2. Digital Image Processing – William K. Pratt, John Wilely, 3rd Edition, 2004.
3. Fundamentals of Electronic Image Processing – Weeks Jr., SPIC/IEEE Series, PHI.

RADAR SYSTEMS
(ELECTIVE)

Course Code: L: 2 T: 2 P: 0 C: 3

IV Year II Semester

Unit I

Introduction to RADAR: General form of RADAR range equation – block diagram of simple pulsed RADAR and determination of range - maximum Unambiguous range, Radar resolution cell volume, pulse repetition frequency

Unit II

Radar Radiation Patterns and Displays: Cosecant squared radiation pattern for RADAR antennas - RADAR displays - synthetic and Raw displays, Radar Types based on frequency, Waveform, prf, applications. Detection and false alarm Probability - integration of RADAR pulses-RADAR cross section of various targets.

Unit III

Radar Systems: Doppler frequency shift and determination of velocity –Block diagram and working principle of CW Doppler RADAR, FMCW Radar and Pulsed Doppler RADAR. MTI Radar block diagram and use of Delay line cancellers- Blind speed.

Unit IV

Digital MTI processingTracking Radar: Monopulse tracking-Amplitude comparison monopulse system in one/ two coordinates (block diagram)-phase comparison monopulse, Sequential lobing, Conical scan tracking Radar –tracking in range-comparison between Monopulse and conical scan tracking RADARs.

Unit IV

Radar Receivers: Block diagram of super heterodyne receiver- Detection of Radar signals in noise –Matched filter criterion- detection criterion – Extraction of information and waveform design.

Special purpose radars: Synthetic Aperture Radar- Height finder- 3D radars -Radar Beacons-Radar Jamming.

Text book:

1. Introduction to Radar Systems – Merrill I. Skolnik, SECOND EDITION, McGraw-Hill, 1981.

References:

1. Introduction to Radar Systems – Merrill I. Skolnik, THIRD EDITION, Tata McGraw-Hill, 2001.

OPTICAL COMMUNICATIONS
(ELECTIVE)

Course Code: L: 2 T: 2 P: 0 C: 3

IV Year II Semester

UNIT I

Overview of optical fiber communication - 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 fibers- Modes, Vnumber, Mode coupling, Step Index fibers, Graded Index fibers.

UNIT II

Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. [2]. Fiber materials — Glass, Halide, Active glass, Chalgenide glass, Plastic optical fibers. Signal distortion in optical fibers- Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses.

Information capacity determination, Group delay, Types of Dispersion - Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion. Pulse broadening. Optical fiber Connectors- Connector types, Single mode fiber connectors, Connector return loss.

UNIT III

Fiber Splicing- Splicing techniques, Splicing single mode fibers. Fiber alignment and joint loss-Multimode fiber joints, single mode fiber joints,. Optical sources- LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product. Injection Laser Diodes-Modes, Threshold conditions, External quantum efficiency,Laser diode rate equations,Resonant frequencies. Reliability of LED & ILD.

UNIT IV

Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling.

Optical detectors- Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparison of Photo detectors. Optical receiver operation-Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers.

UNIT V

Optical system design: Considerations, Component choice, multiplexing. Point-to- point links, System considerations, Link power budget with examples. Overall fiber dispersion in Multi mode and Single mode fibers, Rise time budget with examples.

Text books:

1. Optical Fiber Communications – Gerd Keiser, McGraw-Hill International edition, 3rd Edition,2000.
2.Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002.

References:

1. Fiber Optic Communications – D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005.
2. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – GovindP. Agarwal , John Wiley, 3rd Edition, 2004.
4. Fiber Optic Communications – Joseph C. Palais, 4th Edition, Pearson Education, 2004.

WIRELESS COMMUNICATION NETWORKS
(ELECTIVE)

Course Code: L: 2 T: 2 P: 0 C: 3

IV Year II Semester

UNIT-I

The Cellular Concept-System Design Fundamentals: Introduction, Frequency Reuse, Channel Assignment Strategies, Handoff Strategies- Prioritizing Handoffs, Practical Handoff Considerations, Interference and system capacity — Co channel Interference and system capacity, Channel planning for Wireless Systems, Adjacent Channel interference , Power Control for Reducing interference, Trunking and Grade of Service, Improving Coverage & Capacity in Cellular Systems- Cell Splitting, Sectoring.

UNIT—II

Mobile Radio Propagation: Large-Scale Path Loss: Introduction to Radio Wave Propagation, Free Space Propagation Model, Relating Power to Electric Field, The Three Basic Propagation Mechanisms, Reflection- Reflection from Dielectrics, Brewster Angle, Reflection from prefect conductors, Ground Reflection (Two-Ray) Model, Diffraction-Fresnel Zone Geometry, Knife-edge Diffraction Model, Multiple knife-edge Diffraction, Scattering, Outdoor Propagation Models- Longley-Ryce Model, Okumura Model, Hata Model, PCS Extension to Hata Model, Walfisch and Bertoni Model, Wideband PCS Microcell Model, lndoor Propagation Models-Partition losses (Same Floor), Partition losses between Floors, Log-distance path loss model.

UNIT —III

Mobile Radio Propagation: Small —Scale Fading and Multipath: Small Scale Multipath propagation-Factors influencing small scale fading, Doppler shift, Impulse Response Model of a multipath channel- Relationship between Bandwidth and Received power, Small-Scale Multipath Measurements-Direct RF Pulse System, Spread Spectrum Sliding Correlator Channel Sounding, Frequency Domain Channels Sounding, Parameters of Mobile Multipath Channels-Time Dispersion Parameters, Coherence Bandwidth, Doppler Spread and Coherence Time, Types of Small-Scale Fading-Fading effects Due to Multipath Time Delay Spread, Flat fading, Frequency selective fading, Fading effects Due to Doppler Spread-Fast fading, slow fading.

UNIT -IV

Equalization and Diversity: Introduction, Fundamentals of Equalization, Training A Generic Adaptive Equalizer, Equalizers in a communication Receiver, Linear Equalizers, Non-linear Equalization-Decision Feedback Equalization (DFE), Maximum Likelihood Sequence Estimation (MLSE) Equalizer, Algorithms for adaptive equalization-Zero Forcing Algorithm, Least Mean Square Algorithm, Recursive least squares algorithm. Diversity Techniques-Derivation of selection Diversity improvement, Derivation of Maximal Ratio Combining improvement, Practical Space Diversity Consideration-Selection Diversity, Feedback or

Scanning Diversity, Maximal Ratio Combining, Equal Gain Combining, Polarization Diversity, Frequency Diversity, Time Diversity, RAKE Receiver.

UNIT -V

Wireless Networks: Introduction to wireless Networks, Advantages and disadvantages of Wireless Local Area Networks, WLAN Topologies, WLAN Standard IEEE 802.11 ,IEEE 802.11 Medium Access Control, Comparision of IEEE 802.11 a,b,g and n standards, IEEE 802.16 and its enhancements, Wireless PANs, Hiper Lan, WLL.

TEXT BOOKS

- Wireless Communications, Principles, Practice — Theodore, S.Rappaport, 2nd Ed., 2002, PHI.
- Wireless Communications-Andrea Goldsmith, 2005 Cambridge University Press.

REFERENCE BOOKS

- Principles of Wireless Networks — Kaveh Pah Laven and P. Krishna Murthy, 2002, PE
- Wireless Digital Communications — Kamilo Feher, 1999, PHI.
- Wireless Communication and Networking — William Stallings, 2003,PHI.
- Wireless Communication — Upen Dalal, Oxford Univ. Press
- Wireless Communications and Networking — Vijay K. Gary, Elsevier.

PRICIPLES OF CLOUD COMPUTING
(ELECTIVE)

Course Code: L: 2 T: 2 P: 0 C: 3

IV Year II Semester

UNIT I :

INTRODUCTION

Introduction to Cloud Computing - Understanding Cloud Computing - Developing Cloud Services - A Simple Model of the Cloud - Infrastructure as a Service - Platform as a Service - Software as a Service.

UNIT II :

DATA CENTERS

Overview of Data Centers - Application Architecture Models - Data Center Architecture - Data Center Services- Server Architecture : Client and Server 108 SE-Engg&Tech-SRM-2013 Packet Processing - Configuring a Web Server - Network Architecture Design Options - Application Architectures : Integration of Applications - Multitier Applications.

UNIT III :

DATA CENTER DESIGN AND SECURITY

Data Center Design: Types of Server Farms and Data Centers - Data Center Topologies - Data Center Security: Vulnerabilities and Common Attacks - Network Security Infrastructure - Security Fundamentals - Data Center Security Framework.

UNIT IV:

VIRTUALIZING SOFTWARE

Introduction to Server Virtualizing software – Introduction to VMware vSphere - Configuring vSphere Environment - Creating and Managing Virtual Networking - Configuring and Managing Storage - Managing Virtual Machines.

UNIT V:

USING CLOUD SERVICES

Collaborating on Calendars, Schedules, Task Management, Event Management, Project Management - Collaborating on Databases - Storing and Sharing Files and Other Online Content - Collaborating via Web-Based Communication Tools - Collaborating via Social Networks and Groupware - Collaborating via Blogs and Wikis.

TEXT BOOKS:

1. Michael Miller, “Cloud Computing”, Pearson Education, New Delhi, 2009.
2. Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing: A Practical Approach”, McGraw Hill, 2009.

REFERENCES:

1. Mauricio Arregoces, Maurizio Portolani, “Data Center Fundamentals”, Cisco Press, 2004

2. Scott Lowe, Jason W, Mc. Carty and Mathew K. Johnson, “VMware, Vsphere 4 Administration, Instant Reference”, Published by Sybex, 2009.

3. George Reese, “Cloud Application Architectures Building Applications and Infrastructure in the Cloud”, O'Reilly Media, 2009.

4. GranttSauls “Introduction to Data Centers”, Certified Data Centers Specialist, Tutorial. 5. Brendan O’Brien, Alberto Rodriguez, Stephen Sutherland and Mark Wheatley, “Server Virtualization Software”, Tutorial, 2009.

RADIO NAVIGATIONAL AIDS
(ELECTIVE)

Course Code: L: 2 T: 2 P: 0 C: 3

IV Year II Semester

UNIT –I

Navigational Systems: Review of Navigational Systems: Aircraft navigational system, Geometry of the earth. Navigation equation, Navigation errors, Radio navigation system types and Performance parameters, ILS System, Hyperbolic navigation systems, Loran, Omega, Decca Radio direction finding, DME, TACAN and VORTAC.

UNIT -II

Inertial Navigation: Inertial navigation system, Sensing instruments: Accelerometer. Gyro-copes, Analytic and Gimbaled platforms, Mechanization, Error analysis, Alignment.

UNIT –III

Global Positioning System (GPS) for Navigation: Overview of GPS, Reference systems. Satellite orbits, Signal structure, Geometric dilution of precision (GDOP), or Precision dilution of recision (PDOP), Satellite ephemeris, Satellite clock, Ionospheric group delay. Tropospheric group delay, Multipath errors and Receiver measurement errors.

UNIT -IV

Differential GPS and WAAS: Standard and precise positioning service local area DGPS and Wide area DGPS errors, Wide Area Augmentation System (WAAS) architecture, Link budget and Data Capacity, Ranging function, Precision approach and error estimates.

UNIT –V

GPS Navigational Applications: General applications of GPS, DGPS, Marine, Air and Land Navigation, Surveying, Mapping and Geographical information systems, Military and Space.

TEXT BOOKS:

1. Myron Kavton and Walter Friend, R. - “Avionics Navigation Systems”, Wiley,1997
2. Parkinson. BW. Spilker - “Global Positioning System Theory and Applications”, Progress in Astronautics, Vol. I and II, 1996.

REFERENCES:

1. Hoffman. B., Wellenhof. H... Lichtenegger and J. Collins - “GPS Theory and Practice”, Springer Verlang Wien New York, 1992.
2. Elliot D. Kaplan - “Understanding GPS Principles and Applications”, Artech House. Inc., 1996. 3. Lieck Alfred. - “GPS Satellite Surveying”, John Wiley, 1990

DIGITAL IMAGE PROCESSING LAB

Course Code: L:0 T: 0 P:4 C: 2

IV Year II Semester

LIST OF PROGRAMS

1. Write program to read, display, resize and perform various conversions on digital image using MATLAB software.

- Read and display image in MATLAB
- Resize given image
- Convert given color image into gray-scale image
- Convert given color/gray-scale image into black & white image
- Draw image profile
- Separate color image in three R G & B planes
- Create color image using R, G and B three separate planes
- Flow control and LOOP in MATLAB

2. To write and execute image processing programs using point processing method.

- Obtain Negative image
- Obtain Flip image
- Thresholding
- Contrast stretching

3. To write and execute programs for image arithmetic operations.

- Addition of two images
- Subtract one image from other image
- Calculate mean value of image
- Different Brightness by changing mean value

4. To write and execute programs for image logical operations.

- AND operation between two images
- OR operation between two images
- Calculate intersection of two images

5. To write a program for histogram calculation and equalization.

- Standard MATLAB function
- Program without using standard MATLAB functions

6. To write and execute program for geometric transformation of image.

- Translation

- Scaling
- Rotation
- Shrinking
- Zooming

7. To understand various image noise models and to write programs for image restoration.

- Remove Salt and Pepper Noise
- Minimize Gaussian noise
- Median filter and Weiner filter

8. To write and execute programs to remove noise using spatial filters.

- Understand 1-D and 2-D convolution process
- Use 3x3 Mask for low pass filter and high pass filter

9. To write and execute programs for image frequency domain filtering.

- Apply FFT on given image
- Perform low pass and high pass filtering in frequency domain
- Apply IFFT to reconstruct image

10. To write a program for edge detection using different edge detection mask.

11. To write and execute program for converting from RGB to HSI.

12. To write and execute program for Discrete Cosine transform on given image and perform inverse Discrete Cosine transform to reconstruct image.

13. To write and execute program for wavelet transform on given image and perform inverse wavelet transform to reconstruct image.

14. To write and execute programs for image transforms.

15. Fuzzy based project to be simulated by the student.

AUDIO AND VIDEO ENGINEERING

(ELECTIVE)

Course Code: L: 2 T: 2 P: 0 C: 3

IV Year II Semester

UNIT I

Audio Devices and Applications

Microphone sensitivity, Nature of response and directional characteristics, Measurement microphones, various types of microphones, Various types of loud speakers, Characteristic impedance of loud speakers, Headphone types, The basics of magnetic recording, Sound cards, Sound mixers, PA systems and installations, Digital consoles.

UNIT II

Introduction to Video Signals

Video signal dimensions, Horizontal sync composition, Vertical sync details, function of vertical pulse train, Scanning sequence details, geometric form and aspect ratio, Image continuity, No. of scanning lines, Interlaced scanning, Resolution, brightness, Contrast, Picture transmission, TV transmitter, TV receiver, Synchronization, Receiver controls, Perception of brightness and colour, Additive and subtractive colour mixing , Video signals for colour transmission, luminance signal(Y), Compatibility, Colour difference signals, encoding of colour difference signals, Formation of chrominance signals.

UNIT III

Television signal Transmission and Propagation

Picture signal transmission, Positive and negative modulation, vestigial sideband transmission, Standard channel BW, Television transmitter, TV signal propagation, Interference suffered by TV channels, TV broadcast channels for terrestrial transmission

UNIT IV

Television Receiver

RF Tuner, IF Subsystem, Video amplifier, Sound section, Sync separation and processing, Deflection circuits, Scanning currents in the yoke, DC power supplies, Electronic tuners, IF subsystem, Y signal channel, Chroma decoder, Separation of U and V colourphasors.

UNIT V

Television Systems and Standards

NTSC colour system, PAL colour system, SECAM colour TV system, ATSC, ISDB-T and DTMB, Overview of DVB-T, DVB-C and DVB-IP, DVB-H, Cable television network

Text Books:

1. Audio Video Systems Principles Practices and Troubleshooting, by Bali & Bali, Khanna Publications
2. Audio Engineering, Know it all series, Newnes Press, ISBN 978-1-85617-526-5
3. Audio Video Systems (R.G. Gupta) Tata McGraw Hill 1995
4. R.R.Gulati, " Monochrome Television Practice, Principles, Technology and servicing , Second edition, New age International Publishes, 2004
5. R.R.Gulati "Monochrome and colour television ", New age International Publisher, 2003

References:

1. Modern Television Practice by R.R. Gulati.
2. Essential Guide to Digital Video by John Watkinson, Snell & Wilcox Inc Publication.
3. Guide To Compression By John Watkinson, Snell & Wilcox Inc Publication
4. A.M Dhake, "Television and Video Engineering", Second edition, TMH, 2003.
5. S.P.Bali, " Colour Television, Theory and Practice", TMH, 1994