RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Credit Based Grading System

Electronics & Communication Engineering, VIII-Semester

EC- 8001 VLSI Design

UNIT I

Introduction, Size and complexity of Integrated Circuits, The Microelectronics Field, IC Production Process, Processing Steps, Packaging and Testing, MOS Processes, NMOS Process, CMOS Process, Bipolar Technology, Hybrid Technology, Design Rules and Process Parameters.

UNIT II

Dc Models, Small Signal Models, MOS Models, MOSFET Models in High Frequency and small signal, Short channel devices, Sub threshold Operations, Modeling Noise Sources in MOSFET's, Diode Models, Bipolar Models, Passive component Models.

UNIT III

Introduction, Circuit Simulation Using Spice, MOSFET Model, Level 1 Large signal model, Level 2 Large Signal Model, High Frequency Model, Noise Model of MOSFET, Large signal Diode Current, High Frequency BJT Model, BJT Noise Model, Temperature Dependence of BJT.

UNIT IV

Random Logic and Structured Logic Forms, Register Storage Circuits, Quasi Static Register Cells, A Static Register Cell, Micro coded Controllers, Microprocessor Design, Systolic Arrays, Bit-Serial Processing Elements, Algotronix.

UNIT V

Basic CMOS Technology, A Basic n-well CMOS Process, Twin Tub Processes, CMOS Process Enhancement, Interconnects and Circuit Elements, Layout Design Rules, Latch up, Physical Origin, Latch up Triggering, Latch up Prevention, Internal Latch up Prevention Techniques.

List of Practicals:

1. Introduction to Simulation tools ie Microwind/Synopsis/Tanner Tool etc.
2. Simulation and analysis of basic logic and circuits.
3. Familiarization with MOS model parameters in PSPICE software.
4. Simulation of MOS Inverter with different loads using PSPICE software.

5. Simulation of CMOS Inverter for different parameters *Kn*, *Kp* as a design variable in PSPICE software.
6. Study of the switching characteristics of CMOS Inverter and find out noise margins.
7. Simulate CMOS amplifier using PSPICE software.
8. Layout design of a CMOS Inverter using any layout design tool. Layout design of a 2-input CMOS NAND/NOR gate using any layout design tool.
9. Simulate 1-bit full adder following behavioral and structural modeling using VHDL\Verilog.

References:

1. Geiger, Allen and Strader: VLSI Design Techniques for Analog and Digital Circuits, TMH.
2. Sorab Gandhi: VLSI Fabrication Principles, Wiley India.
3. Weste and Eshraghian: Principles of CMOS VLSI design, Addison-Wesley
4. Weste, Harris and Banerjee: CMOS VLSI Design, Pearson-Education.
5. Pucknell and Eshraghian: Basic VLSI Design, PHI Learning.
6. Botkar: Integrated Circuits, Khanna Publishers.
7. Sze: VLSI Technology, TMH.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA BHOPAL

Credit Based Grading System

Electronics & Communication Engineering, VIII-Semester

EC- 8002 ADVANCED COMMUNICATION SYSTEM

Unit-I

Spread Spectrum Modulation: Introduction, frequency hopping multiple access, CDMA, cellular CDMA systems, multi user detection, time hopping impulse radio.

Unit-II

Introduction, principle of OFDM, implementation of transceivers, frequency-selective channels, channel estimation, peak to average power ratio, inter carrier interference, adaptive modulation and capacity, multiple access, multi carrier code division multiple access, single carrier modulation with frequency-domain equalization.

Unit-III

Multi antenna system: smart antennas, multiple input multiple output systems, multi user MIMO.

Unit-IV

Problem description, cognitive transceiver architecture, principle of interweaving, spectrum sensing, spectrum management, spectrum sharing, overlay, underlay.

Unit V

Introduction and motivation, fundamentals of relaying, relaying with multiple parallel relays, routing and resource allocation in multi hop networks, routing and resource allocation in collaborative networks, applications, network coding.

List of Practicals:

1. Study and analysis of direct sequence spread spectrum communication system.
2. Study and analysis of frequency hppping spread spectrum communication system.
3. Study and analysis of acquisition and tracking system.
4. Study and analysis of OFDM architecture.
5. Study and analysis of cognitive trans-receiver.
6. Study and simulation of distance vector routing.
7. Study and simulation of Link state routing.

References:

1. Molisch: Wireless Communications, Wiley India.
2. Upena Dalal: Wireless Communications, Oxford University Press.
3. Kamilo Feher: Wireless Digital Communications, PHI Learning.
4. Zeimer, Peterson and Borth: Introduction to Spread Spectrum Communication, Pearson Education.
5. Mullet: Introduction to Wireless Telecommunication Systems and Networks, Cengage Learning.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Electronics & Communication Engineering, VIII-Semester

Elective-V EC-8003 (1) Principles Management & Economics

Unit I

Management Concept: Management, Administration and Organization Difference and Relationship between Organization Management and Administration. Importance of Management, Characteristics of Management.

Unit II

Management: Scientific Management, Principles of Management, Process of Management, Functions of Management, Levels of Management, Project Management.

Unit III

Decision Making: Introduction and Definition, Types of Decisions, Techniques of Decision Making, Decision making under certainty Decision making under uncertainty, Decision Making under risk.

Unit IV

Managerial Economics: Introduction, Factors Influencing Manager, Micro and Macro-economics, Theory of the Cost, Theory of the Firm, Theory of Production Function.

Unit V

Productivity: Input-Output Analysis, Micro-economics Applied to Plants and Industrial Undertakings, Production and Production system, Productivity, Factors affecting Productivity, Increasing Productivity of Resources.

References:

1. Peter Drucker, Harper and Row: The Practice of Management.
2. Koontz: Essentials of Management, TMH.
3. Staner: Management, PHI Learning.
4. Daft: Principles of Management, Cengage Learning.
5. T. N. Chhabra: Principle and Practice of Management, Dhanpat Rai, New Delhi.
6. Hirschey: Managerial Economics, Cengage Learning.
7. T. R. Banga and S.C. Sharma: Industrial Organisation and Engineering Economics, Khanna Publishers.

8. O.P. Khanna: Industrial Engineering and Management, Dhanpat Rai.
9. Joel Dean: Managerial Economics, PHI learning.
10. V. L. Mote, Samuel Paul and G.S. Gupta: Managerial Economics Concepts & Cases, TMH, New Delhi.
11. V. L. Mote: Managerial Economics, TMH, New Delhi.

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Electronics & Communication Engineering, VIII-Semester

Elective-V EC-8003 (2) Mobile Computing

Unit I:

Antenna , radiation pattern, antenna types, antenna gain, propagation modes, types of fading. Model for wireless digital communication, multiple access technique-SDMA, TDMA, FDMA, CDMA, DAMA, PRMA, MAC/CA, Cellular network organization, operations of cellular system, mobile radio propogation effects, , handoff, power control, sectorization, traffic engineering, Infinite sources, lost calls cleared, grade of service, poison arrival process.

Unit II:

GSM- Services, system architecture, radio interface, logical channels, protocols, localization and calling, handover, security, HSCSD, GPRS-architecture, Interfaces, Channels, mobility management DECT, TETRA, UMTS.

Unit III:

IEEE 802.11: LAN-architecture, 802.11 a, b and g, protocol architecture, physical layer, MAC layer , MAC management, HIPERLAN-protocol architecture, physical layer, access control sub layer, MAC sub layer. Bluetooth-user scenarios- physical layer, MAC layer.

Unit IV:

Mobile IP, DHCP, Ad hoc networks: Characteristics, performance issue, routing in mobile host. Wireless sensor network, Mobile transport layer: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, transaction oriented TCP. Introduction to WAP.

Unit V:

Intruders, Intrusion detection, password management, viruses and related threads, worms, trojan horse defense, difference biometrics and authentication system, firewall design principle.

References:-

1 J. Schiller, “Mobile Communication”, Addision , Wiley
2 William C.Y Lee, “Mobile Communication Design Fundamental”, John Wiley.
3 Upena Dalal,” Wireless Communication”, Oxford Higher Education
4 Dr. Kamilo Feher, “Wireless Digital communication”, PHI
5 William Stalling, “Wireless Communication and Network”, Pearson Education

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Electronics & Communication Engineering, VIII-Semester

Elective-V EC-8003 (3) Digital Control System

UNIT I

Basic element of discrete data control system, advantages of discrete data control system, introduction to Z-transform, Z-transform of elementary function, their properties and theorems, inverse Z-transform, Z-transform method for solving difference equations, limitations of Z-transform method.

UNIT II

sampling theorem, Impulse sampling and data hold, reconstructing original signals from sampled signals, the pulse transfer function, pulse transfer function of zero order hold and the relation between G(S) and G(Z), closed loop systems, the sampled signal flow graph.

UNIT III

Mapping between the S plane and the Z plane, stability analysis of closed loop systems in Z-plane, Jury stability test, transient and steady state response analysis, design based on root locus method.

UNIT IV

Introduction to State space analysis, state space representation of discrete time system, solving discrete time state space equation, pulse transfer function matrix, discretization of continuous time state space equation, Liaqpunov stability analysis.

UNIT V

Controllability, Observeability, Useful transformations in state space analysis and design, design via pole placement, state observers.

Reference Books :

- Digital Control -B.C. Kuo
- Control System Engineering – Nagrath Gopal
- Discrete time control systems – Katsuhiko ogata
- Control systems, principles and design – M Gopal

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

Credit Based Grading System

Electronics & Communication Engineering, VIII-Semester

Elective-VI EC-8004 (1) Advanced Digital Signal Processing

Unit I

Introduction: Introduction of signals, systems and signal processing, discrete time systems, Discrete Time Fourier Transform, Z Transform.

Unit II

Discrete Random Signals: Discrete Time random process, Average spectrum representation of infinite energy signals, response of linear system to random signals.

Power Spectrum Estimation:

Basic principles of spectrum estimation, estimates of the auto covariance, power spectrum, cross covariance and cross spectrum.

Unit III

Discrete Fourier Transform: Discrete Fourier series, Discrete Fourier Transform (DFT), properties of DFT, linear convolution using the DFT, two dimensional DFT, FFT algorithms, Radix-2 , Radix-4 and split – Radix calculation.

Unit IV

Digital Filter Design Techniques: design of IIR and FIR digital filters , computer aided design of IIR and FIR, design of digital filter based on least square method , comparison of IIR and FIR design of digital filter based on least square method , comparison of IIR and FIR digital filters.

Unit V

Linear Predictors And Optimum Linear Filters: Relationship between filter parameter and auto correlation sequence, forward and backward linear prediction.

Multi Rate Digital Signal Processing: decimation by a factor D , interpolation by factor I, sampling rate conversion by a rational factor I/D , filter design and implementation for sampling rate conversion.

Reference Books:

- Discrete time signal processing by Oppenheim Schafer.
- Digital signal processing by S.K.Mitra.
- Digital signal processing by J. G. Proakis.

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Credit Based Grading System

Electronics & Communication Engineering, VIII-Semester

Elective-VI EC-8004 (2) Cyber Security & IOT

Unit I

Introduction, Classifications of Cybercrimes: E-Mail Spoofing, Spamming, Cyber defamation, Industrial Spying/Industrial Espionage, Hacking, Software Piracy, Password Sniffing, Credit Card Frauds, Cyberstalking, Botnets, Phishing, Pharming, Man-in-the-Middle attack, Password Cracking, Keyloggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, DoS and DDoS Attacks, SQL Injection, Buffer Overflow, Malware, Ransomware, Types of Identity Theft, Techniques of ID Theft, Cyber terrorism, Browser Attacks, Reverse Engineering, Cross site scripting

Unit II

Introduction to Cyber Security, Cyber Security Goals, Cyber Security policy, Domain of Cyber Security Policy, Elements, Cyber Security Evolution, Implementing Hardware Based Security, Software Based Firewalls, Security Standards, Assessing Threat Levels, Forming an Incident Response Team, Reporting Cybercrime, Difference between cyber forensics and cyber security.

Unit – III

The Internet of Things: An Overview, The "Internet" of "Things", The Technology of the Internet of Things, Importance of Internet of Things, Understanding Smart Devices, Design Principles for Connected Device, Network Connections, Traditional Network, Transferring Data Over a Network, Understanding IP Address, Wireless Technologies, Wi-Fi, Bluetooth, Cellular Networks, Mesh Networks.

Unit – IV

Internet Principles, Internet Communications, IP, TCP, The IP Protocol Suite (TCP/IP), UDP, IP addresses, DNS, Static IP address Assignment, Dynamic IP Address Assignment, IPv6, MAC Address, TCP and UDP Ports, HTTP Ports other Common Ports, Application Layer Protocols.

Unit – V

Prototyping: Sketching, Familiarity, Cost versus Ease of Prototyping, Prototypes and Production, Embedded Platform, Physical Prototypes and Mass Personalization, Introduction to Cloud, Climbing into the Cloud, Open Source, Closed Source, Mixing Open and Closed Source.

Reference Books

1. Nina Godbole and Sunit Belpure , Cyber Security Understanding Cyber Crimes, Computer Forensics and Legal Perspectives, Wiley
2. Jennifer L. Bayuk, J. Healey, P. Rohmeyer, Marcus Sachs, Jeffrey Schmidt, Joseph Weiss Cyber Security Policy Guidebook, John Wiley & Sons 2012.
3. McEwen Adrian and Cassimally Hakim, “Designing the Internet of Things” Wiley India Pvt. Ltd., 2016.
4. Miller Michael, “The Internet of Things”, Pearson India Education Services Pvt. Ltd., 2015.

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Credit Based Grading System

Electronics & Communication Engineering, VIII-Semester

Elective-VI EC-8004 (3) RADAR ENGINEERING

Unit-I

Radar block diagram and operation, radar range equation, application of radar, pre diction of range performance, receiver, integration of radar pulses, radar cross section, PRF, Doppler effects, CW radar, FMCW radar, FM CW altimeter, multiple frequency radar.

Unit-II

MTI radar, delay line canceller, multiple or staggered pulse repetition, Doppler filter, MTI radar processor, limitations to MTI performance.

Unit-III

Radar cross section, Scattering cross section, effect of polarization on cross section, target scattering matrixes.

Unit-IV

Radar signal and networks, real radar signals, complex radar signals, analytical radar signals,duration frequency and bandwidth of signals, transmission of signals through networks, matched filter, ambiguity function, uncertainty function.

Unit-V

Radar receiver, display, duplexer, radar antenna, radar resolution, noise figure, mixers, low noise front ends, displays- type A and PPI representations, receiver protectors.

Reference Books:

1. Skolnik: Introduction to Radar Systems, TMH.
2. Toomay and Hannen: Principles of Radar, PHI Learing.
3. Edde: Radar- Principles, Technology Applications, Pearson Education.
4. Peebles: Radar Principles, Wiley India.