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SPPU B.E./B.Tech ENTC Sem 7 syllabus

VLSI Design & Technology

VLSI Design & Technology (404181)

Unit I: VHDL Modeling

Data objects, Data types, Entity, Architecture & types of modeling, Sequential statements, Concurrent statements, Packages, Sub programs, Attributes, VHDL Test bench, Test benches using text files. VHDL modeling of Combinational, Sequential logics & FSM, Meta-stability.

Unit II: PLD Architectures

PROM, PLA, PAL: Architectures and applications. Software Design Flow. CPLD Architecture, Features, Specifications, Applications. FPGA Architecture, Features, Specifications, Applications.

Unit III: SoC& Interconnect

Clock skew, Clock distribution techniques, clock jitter. Supply and ground bounce, power distribution techniques. Power optimization. Interconnect routing techniques; wire parasitic, Signal integrity issues. I/O architecture, pad design. Architectures for low power.

Unit IV: Digital CMOS Circuits

MOS Capacitor, MOS Transistor theory, C-V characteristics, Non ideal I-V effects, Technology Scaling. CMOS inverters, DC transfer characteristics, Power components, Power delay product. Transmission gate. CMOS combo logic design. Delays: RC delay model, Effective resistance, Gate and diffusion capacitance, Equivalent RC circuits; Linear delay model, Logical effort, Parasitic delay, Delay in a logic gate, Path logical efforts.

Unit V: Analog CMOS Design

Current sink and source, Current mirror. Active load, Current source and Push-pull inverters. Common source, Common drain, Common gate amplifiers. Cascode amplifier, Differential amplifier, Operational amplifier.

Unit VI: Testability 6L

Types of fault, Need of Design for Testability (DFT), Testability, Fault models, Path sensitizing, Sequential circuit test, BIST, Test pattern generation, JTAG & Boundary scan, TAP Controller.

Computer Networks

Computer Networks(404182)

Unit I: Physical Layer 6L

Data Communications, Networks, Network types, Protocol layering, OSI model, Layers in OSI model, TCP / IP protocol suite, Addressing, Guided and Unguided Transmission media. Switching: Circuit switched networks, Packet Switching, Structure of a switch.

Unit II: Data Link Layer 6L

Introduction to Data link Layer, DLC Services, DLL protocols, HDLC, PPP, Media Access Control: Random Access, Controlled Access, Channelization. Wired LAN: Ethernet Protocol, Standard Ethernet, Fast Ethernet, Gigabit Ethernet, 10 Gigabit Ethernet.

Unit III: Wireless LANS & Virtual Circuit Networks 6L

Introduction, Wireless LANS: IEEE 802.11 project, Bluetooth, Zigbee, Connecting devices and Virtual LANS: Connecting devices, Virtual LANS.

Unit IV: Network Layer 6L

Network Layer Services, Packet Switching, Network layer performance, IPv4, addresses, Forwarding of IP packets, Network layer protocols: IP, ICMPv4, Mobile IP, Unicast Routing: Introduction, Routing Algorithms, Unicast Routing protocols, Multicast Routing Introduction, Next Generation IP: IPv6 Addressing, The IPv6 protocol,

ICMPv6, Transition from IPv4 to IPv6.

Unit V:Transport Layer 6L

Introduction, Transport layer protocols and services, Port numbers
User Datagram Protocol (UDP), Transmission Control protocol (TCP),
SCTP, Quality of services: Dataflow characteristics, Flow Control.

Unit VI:Application Layer 6L

Introduction, World Wide Web and HTTP, FTP, Electronic mail, Telnet,
Name System (DNS), Cryptography and Network Security:
Introduction, Symmetric key ciphers and Asymmetric key Ciphers,
Introduction to network security.

Text Books

1. Behrouz A. Foruzan, "Data communication and Networking", Tata McGraw-Hill,5th Edition
2. James F. Kurose& W. Rouse, "Computer Networking: A Top down Approach", 6th Edition, Pearson Education.

Reference Books

1. Andrew S. Tannenbaum, "Computer Networks", Pearson Education, Fourth Edition,2003
2. Wayne Tomasi, "Introduction to Data Communication and Networking", 1/e, Pearson Education
3. Greg Tomsho, Ed Tittel, David Johnson. "Guide to Networking Essentials", fifth edition, Thomson India Learning, 2007.

Microwave Engineering

Microwave Engineering(404183)

Unit I : Transmission Lines and Waveguides

Introduction to Microwaves engineering: History of Microwaves, Microwave Frequency bands.

Applications of Microwave.

General solution for TEM, TE and TM waves, Parallel plate waveguide, and rectangular waveguide. Wave guide parameters. Introduction to coaxial line, Rectangular waveguide cavity resonators, Circular waveguide cavity resonators

Unit II : Microwave Components

Multi port junctions: Construction and operation of E-plane, H-plane, Magic Tee and Directional couplers.

Ferrites components: - Ferrite Composition and characteristics, Faraday rotation, Construction and operation of Gyrotator, Isolator and Circulator.

Striplines: Structural details and applications of Striplines, Microstrip line, Parallel Strip line, Coplanar Strip line, Shielded Strip Line.

Unit III : Microwave Network Analysis

Introduction and applications of Impedance and Equivalent voltages and currents, Impedance and Admittance matrices, The Transmission (ABCD) matrix

Scattering Matrix:-Significance, formulation and properties. S-Matrix calculations for-2 port network junction, E plane, H-plane and E-H (Magic Tee) Tees, Directional coupler, Isolator and Circulator. Related problems.

Unit IV : Microwave Tubes

Limitations of conventional tubes, O and M type classification of microwave tubes, reentrant cavity, velocity modulation.

O type tubes

Two cavity Klystron: Construction and principle of operation, velocity modulation and bunching process Applegate diagram.

Reflex Klystron: Construction and principle of operation, velocity modulation and bunching process, Applegate diagram, Oscillating modes, o/p characteristics, efficiency, electronic & mechanical tuning.

M-type tubes

Magnetron: Construction and Principle of operation of 8 cavity cylindrical travelling wave magnetron, hull cutoff condition, modes of resonance, PI mode operation, o/p characteristics, Applications.

Slow wave devices

Advantages of slow wave devices, Helix TWT: Construction and principle of operation, Applications.

Unit V :Microwave Solid State Devices

Microwave bipolar transistor, FET, MESFET, Varactor Diode, PIN Diode, Shottky Barrier Diode, Tunnel Diode, TEDs, Gunn Diodes, IMPATT diode and TRAPATT diode. Structural details, Principle of operation, various modes, specifications, and applications of all these devices.

Unit VI : Microwave Measurements

Measurement devices: Slotted line, Tunable detector, VSWR meter, Power Meter, S-parameter measurement, frequency measurements, Power measurement, Attenuation measurement, Phase shift measurement, VSWR measurement, Impedance measurement, Q of cavity resonator measurement

Text Books

1. Samuel Y. Liao, "Microwave Devices and Circuits", 3rd edition, Pearson
2. David M. Pozar, "Microwave Engineering", Fourth edition, Wiley.

Reference Books

1. M. Kulkarni, "Microwave and Radar engineering", 3rd edition, Umesh Publications
2. ML Sisodia & GS Raghuvamshi, "Microwave Circuits and Passive Devices" Wiley, 1987
3. M L Sisodia & G S Raghuvanshi, "Basic Microwave Techniques and Laboratory Manual", New Age International (P) Limited, Publishers.