

## SEMESTER 6

### EC7601 ANTENNAS AND WAVE PROPAGATION

#### UNIT I FUNDAMENTALS OF RADIATION

Definition of antenna parameters –(2M)- Gain, Directivity, Effective aperture, Radiation Resistance, Band width, Beam width, Input Impedance. Matching – **Baluns**, Polarization mismatch, Antenna noise temperature, Radiation from **oscillating dipole, Half wave dipole. Folded dipole, Yagi array.**

#### UNIT II APERTURE AND SLOT ANTENNAS

Radiation from rectangular apertures, Uniform and Tapered aperture, **Horn antenna, Reflector antenna**, Aperture blockage, Feeding structures, **Slot antennas, Microstrip antennas** – Radiation mechanism – Application, Numerical tool for antenna analysis

#### UNIT III ANTENNA ARRAYS (derivations - important)

**N element linear array**(derivation), Pattern multiplication(4m), **Broadside and End fire array** – Concept of Phased arrays, Adaptive array, Basic principle of antenna Synthesis-**Binomial array**

#### UNIT IV SPECIAL ANTENNAS

Principle of frequency independent antennas –Spiral antenna, **Helical antenna, Log periodic**. Modern antennas- **Reconfigurable antenna, Active antenna**, Dielectric antennas, Electronic band gap structure and applications, Antenna Measurements-Test Ranges, Measurement of Gain, Radiation pattern, Polarization, **VSWR**, Practical antennas for mobile handset and base station applications.

#### UNIT V PROPAGATION OF RADIO WAVES

Modes of propagation, **Structure of atmosphere, Ground wave propagation**, Tropospheric propagation, Duct propagation, Troposcatter propagation, Flat earth and Curved earth concept, **Sky wave propagation** – Virtual height, critical frequency, Maximum usable frequency – Skip distance, Fading, **Multi hop propagation**

### EC7602 COMMUNICATION NETWORKS

#### UNIT I NETWORK FUNDAMENTALS AND PHYSICAL LAYER

Communication Network Evolution and Recent Trends, **definition of layers(7)**, services, interface and protocols, **OSI reference model - layers and duties. TCP/IP reference model – layers and duties**. Physical layer - general description, characteristics, signaling media types, **topologies**, examples physical layer (RS232C, ISDN, ATM, SONET)

#### UNIT II DATA LINK LAYER AND NETWORK INTERCONNECTION

Logical link control Functions: - Framming, **Flow control, Error control**: CRC, LLC protocols:-HDLC, P to P(problems). Medium access layer: - Random access, Controlled access, Channelization, **IEEE standards**: - 802.3, 802.4 and 802.5. Internetworking, Interconnection issues, **Interconnection devices**: - Repeaters, Hubs, Routers/switches and Gateways.

### UNIT III MESSAGE ROUTING TECHNOLOGIES

**Circuit switching, packet switching, message switching**. Internet protocols; **IPV4, IPV6(difference), ARP, RARP, ICMP, IGMP, VPN**. Network Routing Algorithms:- **Distance vector routing, OSPF, Dijkstra's, Bellman Ford, Congestion control algorithms**. (one algorithm problem)

### UNIT IV END-END PROTOCOLS AND SECURITY

Process-process delivery: - **TCP, UDP and SCTP**. Application protocols: WWW, **HTTP, FTP** and TELNET, Network management protocol: **SNMP**, Network security.

### UNIT V DIGITAL SWITCHING

Switching functions, **Space Division Switch, Time Division Switch**, STS switching, TST switching, **No 4 ESS Toll switch**, digital cross connect systems, Recent advances in Switching Approaches, Introduction to Software Defined Networking

## **EC7603 RF AND MICROWAVE COMMUNICATION**

### UNIT I TWO PORT RF NETWORKS-CIRCUIT REPRESENTATION

**Low frequency parameters**-impedance, admittance, hybrid and ABCD. **High frequency parameters**-Formulation of S parameters, properties of S parameters-**Reciprocal and lossless networks, transmission matrix**, Introduction to component basics, wire, resistor, capacitor and inductor.

### UNIT II MICROWAVE TRANSISTOR AMPLIFIER DESIGN AND MATCHING NETWORKS

**Amplifier power relation, stability considerations, gain considerations**, noise figure, impedance matching networks, frequency response, **T and  $\Pi$  matching networks**, microstripline matching networks.

### UNIT III PASSIVE MICROWAVE DEVICES AND CIRCUITS

Open, short and matched terminations; coupling probes and loops; power divider; **directional coupler; attenuators; phase shifter; circulator; isolator**; Impedance matching Devices– Tuning screw, **stub and quarter-wave transformers**

### UNIT IV MICROWAVE GENERATION

High frequency effects in Tubes, **Two cavity klystron amplifier; Reflex klystron oscillator; TWT amplifier, Backwards wave oscillator; Magnetron oscillator** – Theory and applications. Solid state devices: **Gunn diode oscillator**; BARITT, TRAPATT and IMPATT diode oscillator and amplifier, **YIG Devices** (Yttrium-Iron Garnet).

### UNIT V MICROWAVE MEASUREMENTS

Measuring Instruments – **VSWR meter, Power meter, Spectrum Analyser, Network Analyser** – principles; Measurement of Impedance, frequency, power,

VSWR, Q factor, dielectric constant, **S-Parameter**. Hazards of microwaves, permitted power levels for practical applications.

## **EC7651 VLSI DESIGN**

### UNIT I MOS TRANSISTOR PRINCIPLES (focus on problems of all below)

MOS Technology and VLSI, Pass transistors, NMOS, CMOS Fabrication process and Electrical properties of CMOS circuits and Device modelling. Characteristics of CMOS inverter, Scaling principles and fundamental limits. Propagation Delays, CMOS inverter scaling, **Stick diagram**, Layout diagrams, Elmore's constant, Logical Effort.

### UNIT II COMBINATIONAL LOGIC CIRCUITS

Static CMOS logic Design, Design techniques to improve the speed, power dissipation of CMOS logic, low power circuit techniques, Ratioed logic. **Pass transistor Logic**, Transmission CPL, **DCVSL, Dynamic CMOS logic, Domino logic, Dual Rail logic**, NP CMOS logic and NOR array logic.

### UNIT III SEQUENTIAL LOGIC CIRCUITS

**Static and Dynamic Latches and Registers**, Timing Issues, Pipelines, Clocking strategies, **Memory Architectures, and Memory control circuits.**

### UNIT IV DESIGNING ARITHMETIC BUILDING BLOCKS & TESTING

**Data path circuits, Architectures for Adders, Accumulators, Multipliers, Barrel Shifters**, Need for testing- Manufacturing test principles- Design for testability. Case study: Analysis of area, power and delay for 16 bit adder and 8 bit multiplier.

### UNIT V IMPLEMENTATION STRATEGIES

**Full Custom and Semicustom Design, Standard Cell design and cell libraries, FPGA building block architectures, FPGA interconnect routing procedures.** Demo: Complete ASIC flow using Backend tool and fabrication flow Overall case study: Development of IC in commercial aspects (design, testing and fab cost)

## **MG7451 PRINCIPLES OF MANAGEMENT**

### UNIT I INTRODUCTION TO MANAGEMENT AND ORGANIZATIONS

Definition of Management –Science or Art – **Manager Vs Entrepreneur- types of managers-managerial roles and skills** – Evolution of Management –Scientific, human relations , system and contingency approaches– Types of Business organization- Sole proprietorship, partnership, company-public and private sector enterprises- Organization culture and Environment – **Current trends and issues in Management.**

### UNIT II PLANNING

Nature and purpose of planning – planning process – types of planning – objectives – setting objectives – policies – Planning premises – **Strategic Management – Planning Tools and Techniques – Decision making steps and process(V.Imp)**

### UNIT III ORGANISING

Nature and purpose – Formal and informal organization – organization chart– organization structure – types – **Line and staff authority – departmentalization** – delegation of authority – **centralization and decentralization** –Job Design - Human Resource Management –**HR Planning, Recruitment, selection, Training and Development**, Performance Management , Career planning and management.

### UNIT IV DIRECTING

Foundations of individual and group **behaviour– motivation – motivation theories(V.Imp) – motivational techniques – job satisfaction** – job enrichment – leadership – **types and theories of leadership** –communication – process of communication – **barrier in communication** – effective communication – communication and IT.

### UNIT V CONTROLLING

System and process of controlling –**budgetary and non-budgetary control techniques – use of computers and IT in Management control** – Productivity problems and management – **control and performance – direct and preventive control** – reporting.