COURSE STRUCTURE & SYLLABUS OF BACHELOR OF TECHNOLOGY (B.TECH)

In

Electronics & Telecommunication

Course Structure

Fourth Year

Seventh Semester

Syllabus

Paper Code	Name of the Subject
BEET1	Mobile Communication System
BEET2	RF & Microwave Engineering
BEET3	Micro Electronics
BEET4	Computer Communication Network
BEET5	Elective-I
BEET1P	RF & Microwave Practical
BEET4P	Computer Communication Network Practical

BEET 1 MOBILE COMMUNICATION SYSTEM

1. INTRODUCTION
Introduction to wireless communication systems

2. THE CELLULAR CONCEPT:
Frequency reuse handoff, interference, trunking and grade of service, improving the capacity of cellular systems.

3. MOBILE RADIO PROPAGARION :
Large scale path loss, reflection, ground reflection, model (2 ray model), diffraction, practical link budget design using path loss models, small scale fading and multi-path, small- scale multi-path propagation, parameter of multi –path channels, types of small scale fading, Raleigh and raleigh distribution diversity.

4. ANALOG CELLULAR MOBILE SYSTEM :
AMPS and ETACS system (overview call handling, air interface, N – AMPS).

5. DIGITAL CELLULAR MOBILE SYSTEM :
GSM- services, features, system architecture, radio subsystem, channel types, frame structure, signal processing security aspects, network operations.

6. LOW POWER WIRELESS COMMUNICATION SYSTEMS :
Cordless telephone, CT2, DECT,PHS, PACS

7. CDMA digital cellular standard (IS-95) :
Frequency and channel specification, forward and reverse CDMA channel.

8. MOBILE TERMINALS :
Over view, types, radiated power, functional architecture, encryption, subscriber identify module.

9. GLOBAL MOBILE SATELLITE SYSTEM :
Introduction to iridium system, global star system, ICO system, telederic system.

10. THIRD GENERATION MOBILE COMMUNICATION :
System IMT -2000, Introduction, radio aspects, network aspects.

BEET 2 RF & Microwave Engineering

1. INTRODUCTION
What are Microwaves, Characteristic Features of Microwaves, Applications of Microwaves, Outline of Books

2. TRANSMISSION STRUCTURES AND RESONATORS
Transmission Lines, Waveguides, Resonators.

3. GENERATION OF MICROWAVES BY VACUUM TUBES
Limitations of Conventional Tubes, Klystron Amplifiers, Relax Klystron Oscillator, Magnetrons, Traveling Wave Tubes (TWT).

4. MICROWAVE SOLID STATE SOURCES
Bipolar Transistors, field Effect Transistors, Transferred Electron Oscillators, Avalanche Diode Oscillators.

5. MICROWAVE NETWORK REPRESENTATION
Kirchhoff's Laws and Maxwell's Equations, Voltages and Currents, Waveguide Impedance, Scattering Matrix Representation, Scattering Matrices for some typical Networks.

6. MICROWAVE MEASUREMENTS
Detection of Microwaves, Microwave Power Measurement, Impedance Measurement, Measurement of Scattering Parameters, Frequency Measurement.

7. PASSIVE CIRCUIT COMPONENTS
Impedance Transformers, Microwave Filters, Directional Couplers.

8. FERRITE DEVICES
Introduction, Ferrites and Tensor Permeability, Wave Propagation in a Ferrite Medium, Faraday Rotation in Ferrites, Isolator Circulators, Faraday rotation Switch and Modulator, Port Circulators, Resonance Absorption in Ferrites, YIG Resonators.

9. MICROWAVE CONTROL AND LOGIC COMPONENTS
PIN diodes, PIN diode Switches, Phase Shifters, PIN Attenuators, Modulators and Limiters, Logic Circuits using transferred Electron Devices, logic Circuits using GaAs MESFETs.

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10. MICROWAVE INTEGRATED CIRCUITS
Planar Transmission Lines, Technology of Hybrid MICs, Advantages of MICs, Difficulties with MICs.

11. LUMPED ELEMENTS AT MICROWAVE FREQUENCIES
Design of Lumped Elements, Fabrication of Lumped Elements, Measurements on Lumped Elements, Circuits using Lumped Elements.

12. INDUSTRIAL APPLICATION
Industrial Control and Measurements, Doppler Motion Sensors, Applications Based on Microwave Heating.

BEET 3 MICRO ELECTRONICS

PART – I- OVERVIEW AND MATERIALS

1. AN INTRODUCTION TO MICROELECTRONIC FABRICATION
Microelectronic Technologies : A simple Example, Unit Processes and Technologies, A Roadmap for the Course.

2. SEMICONDUCTOR SUBSTRATES
Phase diagrams and Solid Solubility, Crystallography and Crystal Structure, Crystal Defects, Czochralski Growth, Bridgman Growth of GaAs, Float Zone Growth, Wafer Preparation and Specifications.

PART – II- UNIT PROCESS –I : HOT PROCESSING AND LON IMPLANTATION

1. DIFFUSION
Fick's Diffusion Equation in one Dimension, Atomistic Models of Diffusion., Atomistic Models of Diffusion. Analytic solutions of Fick's Law, Corrections to simple Theory, Diffusion Coefficients for common Dopants, analysis of Diffusion profiles, Diffusion in SiO_2 Diffusion Systems, SUPREM simulations of Diffusion Profiles.

2. LON IMPLANTATION
Idealized Ion Implantation Systems, Coulomb Scattering, Vertical Projected Range, channeling and Lateral Projected Range, Implantation Damage, Shallow Junction formation, Buried Dielectrics, Ion Implantation Systems, Problems and Concerns, Implanted Profiles Using SUPREM.

PART – III- UNIT PROCESS –2 : PATTERN TRANSFER

1. OPTICAL LITHOGRAPHY
Lithography overview, Diffraction, the modulation Transfer Function and Optical Exposures, Source Systems and Spatial Coherence, Contact / Proximity Printers, Projection Printers, Advanced Mask Concepts, Surface Reflections and Standing Waves, Alignment

2. PHOTORESISTS
Photoresist types, Organic Materials and Polymers, Typical Reactions of DQN Positive Photoresist, contrast Curves, The Critical Modulation Transfer Function, Applying and Developing Photoresist, Second – Order Exposure Effects, Advanced Photoresists and Photoresist Processes,

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3. VACUUM SCIENCE AND PLASMAS
The kinetic Theory of Gasses, Gas Flow and Conductance, Pressure Ranges and Vacuum Pumps, Vacuum Seals and Pressure Measurement, The DC Glow Discharge, RF Discharges, High Density Plasmas,

4. ETCHING
Wet Etching, Chemical Mechanical Polishing, Basic Regimes of Plasma Etching, High Pressure Plasma Etching, Ion Milling, Reactive Ion Etching, Damage in Reactive Ion Etching, High Density Plasma (HDP) Etching, Liftoff.

BEET 4 : COMPUTER COMMUNICATION NETWORK

PART – I- LOCAL AREA NETWORKS

1. LAN TECHNOLOGY
Lan Applications, LAN Architecture, Bus LANs, Ring LANs, Star LANs, Wireless LANs, Bridges,

2. LAN SYSTEMS
Ethernet (CSMA/CD), Token Ring and FDDI, ATM LANs, Fibre Channel, Wireless LANS.

PART – II- COMMUNICATIONS ARCHITECTURE AND PROTOCOLS

1. INTERNET PROTOCOLS
Principles of Internetworking, Connectionless Internetworking, Internet Protocol, IPv6, IP Multicasting.

2. INTERNETWORK OPERATION
Routing Protocols, Integrated Services Architecture, Resource Reservation, RSVP, differentiated Services,

3. TRANSPORT PROTOCOLS
Connection-Oriented Transport Protocol Mechanisms, TCP, TCP Congestion control, UDP.

4. NETWORK SECURITY
Security Requirements and Attacks, confidentiality with Conventional Encryption, Message Authentication and Hash Functions, Public –Key Encryption and Digital Signatures, IPv4 and IPv6 Security.

5. DISTRIBUTED APPLICATION
Abstract Synax Notation one (ASN.1), Network Management, SNMP, electronic Mail :SMTP and MIME, Hypertext Transfer Protocol (HTTP).

PART –III- WIDE AREA NETWORK

1. CIRCUIT SWITCHING
Switching Networks, Circuit Switching Networks, Circuit Switching Concepts, Routing in Circuit – Switching Networks.

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2. PACKET SWITCHING
Packet Switching Principles, Routing, X.25

3. ATM AND FRAME RELAY
Protocol Architecture, ATM Logical Connections, ATM Cells, Transmission of ATM Cells.

4. CONGESTION CONTROL IN DATA NETWORKS
Effects of Congestion, Congestion Control, Traffic Management, Congestion Control in Packet – Switching Networks, ATM Traffic Management.

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