

# **RAMGARH ENGINEERING COLLEGE**

(Estd. by Govt. of Jharkhand & run by Techno India Under PPP)

## **Department of Electronics and Communication Engineering SEMESTER-VII**

### **TELECOMMUNICATION SWITCHING SYSTEMS & NETWORKS**

#### **Introduction:**

Evolution of Telecommunication, Basics of Switching System, Classification of Switching System, limitation of Manual Switching System, Evolution of Automatic Switching System, Principle of Operation of Strangler & Crossbar Electromechanical Systems, pulse dialing & tone dialing-DTMF dialing, Signaling tones Circuit Switching & Packet Switching. (8L)

#### **Electronic Switching:**

Stored program control, centralized SPC, distributed SPC, software architecture, application software. (4L)

#### **Traffic Engineering:**

Blocking network, blocking probability, grade of service, traffic load, Parameters of traffic engineering, Erlang-B congestion formula, Electronic space division switching.(8L)

#### **Time Division Switching:**

Basic time division space switching, Basic time division time switching, time multiplexed space switching, time multiplexed time switching, combination switching, Frequency division switching,(4L)

#### **Telephone Networks:**

(2-3 Stage Networks) Subscriber loop systems, Switching hierarchy & routing, transmission systems, charging plan, signaling techniques-in channel & common channel signaling. Numbering Plan (4L)

#### **ISDN& ATM:**

Introduction, ISDN channels & access arrangements, ISDN service capabilities, user network interfaces, drawbacks of ISDN, introduction to B-ISDN. Introduction to ATM and cell transmission

& AAL (4L)

## **ANTENNA ENGINEERING**

Antenna fundamental and radiation mechanism (5L)

Vector potential concept, Gain, Effective aperture (3L)

Wire antenna, Loop antenna (2L)

Aperture antenna (1L)

Reflector antenna, Cassegrain antenna, Gregorian antenna(2L)

Planar antenna(1L)

Lens antenna(1L)

Broadband antenna (1L)

Frequency independent antenna(1L)

Antenna synthesis(4L)

Near field – Far field transformation(2L)

Antenna arrays, Grating lobes (2L)

Antenna for mobile communication (2L)

Antenna measurements: Radiation pattern, Gain and Radiation impedance.

(4L)

## VLSI DESIGN

### **Analog VLSI Circuit Design: -**

- i)** Review of MOSFET characteristics, scaling and small-geometry effects, MOSFET capacitances.  
(5L)
- ii)** MOS resistor, MOS current source, current mirror circuits. MOS voltage source, Linear voltage and current converters.(4L)
- iii)** CMOS operational amplifier (OPAMP) design: - Differential amplifier, level shifter, source follower, output stage voltage and power amplifiers. Cascode OPAMP. Compensation techniques  
(6L)
- iv)** Analog Filters: - Switched capacitor (SC) fundamentals, first order SC circuits, second-order SC circuits and cascade design. (4L)
- v)** Analog to digital and digital to analog converters, speed of conversion and over sampling issues.(4L)
- vi)** VLSI Interconnects: - distributed RC model, transmission line model. Future inter connect technologies.(3L)

### **Digital VLSI Circuit Design: -**

- i)** MOS inverters, CMOS inverter, state characteristics, switching characteristics, power dissipation issues.(4L)
- ii)** CMOS logic gates: NAND, NOR, XOR, CMOS logic design of half and full adders. CMOS transmission gates, pseudo-nMOS, domino logic gates.(5L)
- iii)** Sequential MOS Logic Circuits: The SR latch circuit, clocked latch and flip-flop, CMOS D-latch and edge-triggered circuits, Schmitt trigger circuit, Comparator.(5L)
- iv)** Dynamic Logic Circuits: Pass transistor logic, synchronous dynamic circuit techniques.(3L)
- v)** Semiconductor Memories: ROM circuits, SRAM circuits, DRAM circuits, drivers and buffers, Buffer scaling and design issues.(4L)

## **DATABASE MANAGEMENT SYSTEMS**

### **Introduction**

File & Data Base Concept, Overview of DBMS, Data Models, Database Administrator, Database Users, Schema. Data Independence

### **Entity-Relationship Model**

Basic concepts , Keys, Entity-Relationship Diagram, Cardinality ratios, Strong & Weak Entity Sets,

Specialization, Generalization, Aggregation.

### **Relational Model**

Procedural & Non Procedural Languages, Relational Algebra, Extended Relational, Algebra Operations,

Views, Modifications of the Database, Relational Calculus

### **SQL**

Basic Concepts, Set operations, Aggregate Functions, Null Values, assertions, views, Nested Sub-queries,

Cursors, Stored procedures and triggers

### **Integrity Constraints & Introduction to RDBMS**

Domain Constraints, Referential Integrity Constraints, Codd's rule

### **Functional Dependencies and Normalization**

Functional Dependency, Armstrong's axioms, Canonical Cover, Closure, Full and Partial Functional

dependencies, Prime & Non Prime attribute, 1NF, 2NF, 3NF, BCNF, Multi valued Dependency, 4NF, 5NF,

DKNF.

### **Transaction & Concurrency Control**

Transaction concept, ACID properties, Conflict & View serializability, Test for Conflict serializability,

Concurrency Control, Lock base protocols, Two phase locking.

### **Storage Strategies**

Single-Level Index (primary, secondary, clustering), Multi-level Indexes, Dynamic Multi-level Indexes,

Hashing Techniques, B tree and B+ tree

### **Query Optimization**

Full Table scan, Indexed-based scan, Merge join, Nested loop join, Equivalence rules, Heuristic

Optimization, Cost Based Optimization.

### **Backup & Recovery**

Physical & Logical Backup, Transaction logs, Causes of failures, Recovery techniques.

### **Distributed Databases**

Basic Concepts, Data Fragmentation, Replication and Allocation Techniques, Types of Distributed Database

Systems, Query Processing, Overview of Client-Server Architecture and Its relationship to Distributed

Databases.

## **WIRELESS COMMUNICATION**

### **Introduction to Wireless Communication Systems: –**

Evolution of mobile radio communications, mobile radio systems around the world, radio communication systems – paging systems, cordless telephone systems, cellular telephone systems;  
comparison of common wireless communications, trends in cellular radio and personal communication, second generation (2G) cellular networks, third generation (3G) wireless networks,  
introduction to radio wave propagation, free space propagation model (8L)

**Basics of mobile communication** – Limitations of conventional mobile system, mobile cellular communication – introduction, concept of frequency reuse, cluster size, cellular system architecture  
– mobile station, base station, MSC, channel assignment strategies, call handover strategies,  
interference and system capacity, improving capacity in cellular systems – cell splitting, sectoring,  
repeaters, microcell zone concept. (7L)

**Global system for mobile communication** – GSM services and features, system architecture, GSM radio subsystem, GSM channel types, location updating and call setup, introduction to CDMA  
digital cellular standard, comparison between GSM and CDMA. (8L)

**Wireless networking** – wireless local area network standards, technology – RF and IR wireless LAN, diffuse, quasi-diffuse and point-to-point IR wireless LAN, advantages and applications of  
Wireless LAN, introduction to WI-FI, Bluetooth, 3G and 4G wireless systems (7L)