

## 3<sup>rd</sup> Semester

### DIGITAL IMAGE PROCESSING DC601

Introduction to Image Processing System:

Digital Image Fundamentals:

Image model, Relationship between pixels, Imaging Geometry, Camera model.

Manipulation on Images:

Images Transformation : Introduction to FT, DFT & FFT, 2D-DFT, DLT, KLT, DWT, Slant, Harr, Walsh transformation, Hadamard transformation, Hotelling transformation, Histogram, Sub-band coding.

Image Smoothing:

Neighborhood averaging, Median filtering lowpass filters, average of multiple images, Image sharpening by differentiation technique, High pass filtering.

Image Restoration:

Degradation models for continuous function, effect of diagonalization. On degradation, Algebraic approach to restoration. Interactive restoration, gray level interpolation.

Image Encoding & Segmentation:

Encoding : Mapping, Quantizer, Coder

Segmentation: Detection of discontinuation by point detection, line detection, edge detection.

Edge linking & boundary detection: Local analysis, Global by graph theoretic techniques.

Thresholding: Definition, Global thresholding

Filtering: Median, Gradient

Simple Method of representation signatures, Boundary Segments, Skeleton of region

Image compression:

Lossy and lossless techniques, standards of image compression, video compression, standards of video compression, motion compensation.

#### **Books:**

1. Digital Image Processing : Gonzalez & Wood, Addison-Wisley Publisher Comp. 1993.
2. Digital Image Processing : A.K Jain, PHI, Edition 1995.

## **MOBILE COMMUNICATION DC602**

An overview of wireless communication systems. First generation analog cellular systems, second generation digital cellular systems, third generation systems standards for wireless communications systems. GSM, IMT-2000, UMTS. Mobile Satellite Communication – GEO, LEO, MEO, Terrestrial mobile system.

Cellular communication fundamentals. Cellular systems. Geometry of a Hexagonal Cell. Cochannel interference ratio. Cellular system design in worst case with an omnidirectional antenna, cochannel interference reduction with use of directional antenna. Cell splitting. Frequency and spectrum management and handoffs Access Techniques.

GSM architecture and interfaces. GSM frequency bands, GSM PLMN, GSM PLMN Services, GSM interfaces. The Radio interface MS to BTS. Abis interface (BTS to MSC). Interface BSC to MSC.

Radio Propagation and cellular engineering concept. Propagation characteristics. Multipath faded radio signals. Radio link design. Receiver sensitivity and link budget.

Data services in GSM. GSM GPRS. Privacy and security in GSM

### **Books :**

1. Wireless Digital Communication- Feher 1991, PHI.
2. Principles & applications of GSM – Vijay K. Garg, and J.E. Wilkes 1999 – Prentice hall PTR.
3. Telecom Transmission handbook 4<sup>th</sup> ed Roger L. Freeman 1998 John Wiley & Sons. Inc. New York.
4. Mobile Cellular Telecomm. Lee 1995 Mc Graw Hill Inc.

## **ELECTIVE – III: 1. VLSI DESIGN DC 611**

Introduction to VLSI design – motivation for IC design, IC design process, design abstraction levels, CAD tools, elements of system specification and design.

Combinational logic design, logic minimization, synchronous sequential logic design. Finite state machines, Mealy and Moore models, Designing with programmable logic devices ROM, PLA, PAL, PLD.

A synchronous sequential logic- analysis procedure, state minimization, state assignment, static and dynamic hazards.

Introduction to VHDL – basic concepts in VHDL, language features, types of VHDL description – structural, data flow and behavioral descriptions of hardware, combinational and sequential design examples using VHDL.

Features and internal structure of CPLDs, FPGAs, designing with CPLDs and FPGAs. Introduction to IC floor planning and testing, design for testability, combinational logic testing, sequential logic testing, ATPG, boundary scan, built in self test.

Design examples and case studies

**Books:**

1. VHDL: Analysis and Modeling of digital Systems – Zainalabedin Navabi, Mc Graw Hill, 1993.
2. VHDL Primer – Bhaskar, PHI, 3<sup>rd</sup> Edition, 1999.
3. Digital Principles and Design- Donald D. Givone, Tata McGraw Hill, 2002.
4. Digital Design – M.M. Mano, Third Edition, Pearson Education 2001.
5. Digital Design – Principles and Practice – John.F.Wekerly, third edition, Pearson Education 2001.
6. Modern VLSI design – Wayne wolf, Pearson Education, 1997.
7. Specification and Design of Embedded Systems – daniel D. Gajski, Frank Vahid, Sanjiv Narayan, Jie Gong, Prentice Hall 1994.

*ELECTIVE III:2. DATA COMPRESSION AND CRYPTOGRAPHY*

**DC612**

***Internet and Communication Protocol, A brief history of Internet OSI TCPIP, the need for tunneling and encryption keys, Tunneling , Internet Protocol security.***

Deterring Needs – The evaluation of security assessments, assessing needs in house , the management role, web access question. Containers network vulnerability detection , penetration testing internal security needs.

Structured query language security and other specialties.

Trends in Internet crime , Denial of service attack, tools, that works for and agmust the Network, IP Spoofing attade the Telnet hole, Language vulnerabilities . Other – Java and Active X, Unix root control , Trojan Hares.

Virtual private network , Fire walls and disaster recovery planning , Security tools.

Different encryption & decryption algorithm concept of private & Public keys.

**Books :**

1. Introduction to cryptography- H Delfs H. Knebl – 2002 Springer.
2. Introduction to cryptography – J.A. Buchamann – 2001 Springer.
3. Information Security & Cryptography – ICISC 2001, K Kim Ed 2002 vo. 2288 Springer.
4. Understanding data comm.. & networks – Shay – Vikas Thomas Pub.
5. Information security & Cryptography – ICISC 2000 by D. Won. Vol 2015 ec. 2001 Springer (lect notes).

**ELECTIVE – III: 3. DESIGN OF COMMUNICATION NETWORKS  
DC 613**

Design considerations: Analog design trade offs – Bandwidth, performance, systems complexity.

Digital design trade offs – performance, bandwidth, bps/Hz comparisons, digital communication design requirements.

Design features of a computer communication networks: response time, throughput, link design, cost complexity , flow control , security aspects.

Design of cellular mobile system: design parameters at the base station, design parameters at the mobile unit, criteria of signaling design, channel assignment.

Case studies : Paging systems, Cellular telephone , Global positioning satellite.

Network planning for digital microwave network, optical communication, satellite networks, design aspects of LAN, MAN and WAN

**Books:**

1. Analog & Digital Communication Systems – Martin S. Rodess, Prentice Hall of India Pvt. Ltd. New Delhi, 3<sup>rd</sup> Edition.
2. Data Communications and Distributed networks – U.D Black, Prentice Hall of India Pvt. Ltd. New Delhi 3<sup>rd</sup> Edition 1997.
3. Mobile communications design fundamentals – Williams C.Y Lee, 2<sup>nd</sup> edition TMH, 1995.