L: 3	CS 671 Database Management System
T: 1	*Theory: 100 marks*
P: 3	Sessional: 50 marks
	Practical: 50 marks
	Time: 3 hours

Introduction

Data Models

Relational Model, Relational Algebra & Relational Calculus

SQL and other relational query languages

Relational Database Design

Query Processing & Organization

File and File Management System

Object Oriented Databases.

Concurrency Control and Recovery

Distributed DBMS

Books/references:

1. Silberschatz, Korth and Sudarshan - Database System Concepts, McGraw Hill International Edition.

2. Mazumdar and Bhattacharya - Database Management System, Tata McGraw Hill.

L: 3	**CS 672 Computer Communication Networks**
T: 1	**Theory: 100 marks**
P: 0	***Sessional: 50 marks***
	Time: 3 hours

Uses of computer networks

Network goals, application structures, architectures, OSI Model and services. Network examples.

Physical layer

Transmission medium, telephone system. RS-232C, RS-449 standards. α21 switching, ISDN and terminal handling.

Medium access sublayer

ALOHA, CSMA, CSMA/CD, Collision free protocol, BRAP, MLMA etc. IEEE standard 802.3, Ethernet, token ring. FDDI, satellite networks and packet radio networks.

Data link layer

Framing, error detection and correction and data link protocols.

Network layer

Routing algorithm, flow control, queuing theory, analytical treatment of M/M/I and M/M/M.

Security and reliability of networks

Case study of' computer communication networks. TCP/IP.

Books/references:

1. Dimitri Bertsekas & Robert Gallager – Data Networks. PHI, 1992, 2/e.
2. W. Stallings - Data and Computer Communications, Prentice Hall, 1997.
3. A. S. Tannenbaum - Computer Networks. PHI, 1997, 3/e.

L: 3	ET 663 Microprocessor And Embedded Systems
T: 1	*Theory: 100 marks*
P: 3	Sessional: 50 marks
	Practical: 50 marks
	Time: 3 hours

Introduction to Computer Architecture and Organization: Architecture of 8-bit microprocessors, bus configurations, CPU module, introduction to assembly language and machine language programming, instruction set of a typical 8-bit microprocessor, subroutines and stacks, programming exercises.

Memory Technology: Timing diagrams, RAM, DRAM and ROM families, memory interfacing, programmable peripheral interface chips, interfacing of input-output ports, programmable interval timer. Memory map, peripheral I/O and memory- mapped I/O.

Data Transfer Schemes: Serial and parallel data transfer schemes, interrupts and interrupt service procedure. 8085 interrupts and vector locations, SIM and RIM instructions, RST instructions.

Introduction: To Microcontrollers, Architecture, RISC and CISC processors.

Instruction Set and Programming: Instruction set and programming 8051micro controllers.

Architecture: Instruction set and programming of 8 bit micro controllers PIC 16c74.

Development Tools: Simulators, debuggers, cross compilers, in circuit emulators for the micro controllers.

Interface Issues Related to Embedded Systems: A/D, D/A converters, timers, actuators, power, FPGA, ASIC, diagnostic port.

Techniques for Embedded Systems: State machine and state tables in embedded design, simulation and emulation of embedded systems. High-level language descriptions of S/W for embedded system, Java embedded system design.

Real Time Models, Language and Operating Systems: Event based, process based and graph based models, Petrinet models. Real time languages, real time kernel, OS tasks, task states, task scheduling, interrupt processing, clocking, communication and Synchronization. Control blocks, memory requirements and control, kernel services.

Text Books/ References:

1. Ramesh S.Gaonkar - Microprocessor Architecture, Programming and Applications (3e), Penram Pub., 1997.
2. Mazidi M. A. & J. G. Mazidi - The 8051 Microcontroller and embedded systems, Pearson, 2002.

3. Kenneth J Ayala – the 8051 Microcontroller architecture programming and applications, 2nd Edition Penram International publishing.
4. J.B. Peatman – Design with PIC microcontrollers , PH Engg. 1998.
5. Hintz – Micro controllers, Architecture, implementation and programming McGraw Hill.
6. Evesham - Developing Real - Time Systems - A Practical Introduction , Galgotia Publications, New Delhi, 1996.
7. Ball S.R - Embedded microprocessor systems - Real World Design, Prentice Hall, 1996.
8. Herma K - Real Time Systems – Design for Distributed Embedded Applications, Kluwer Academic, 1997.
9. Gassle J - Art of Programming Embedded Systems, Academic Press, 1992.
10. Gajski D.D, Vahid F, Narayan S - Specification and Design of Embedded Systems, PRT Prentice Hall, 1994.

L: 3	**CS 674 Operating Systems**
T: 1	**Theory: 100 marks**
P: 0	***Sessional: 50 marks***
	Time: 3 hours

Process Management

Process, thread and scheduling algorithms. Concurrent process. Issues related to concurrent processes like functionality, mutual exclusion, synchronization, deadlock and inter-process communication primitives like semaphores and the implementation using machine primitives. Deadlock detection, prevention and avoidance.

Memory Management

Allocation, protection, hardware support, paging and segmentation. Demand paging and virtual memory.

File management

Naming, file operation and their implementation.

File systems

Allocation, free space management, directory management and mounting. File system protection, security, integrity, reliability, device independence.

I/O management

Device drivers, disk scheduling, block I/O and character I/O.

Examples of operating systems

UNIX, DOS and WINDOWS NT.

Books / References:

1. A Silberschatz and P. B. Galvin - Operating System Concepts, Addison Wesley, 1990.
2. H. M. Deitel - Operating Systems, Addison Wesley, 1990, 2/e.
3. W. Stallings - Operating Systems, Prentice Hall. 1995, 2/e.
4. M. J. Bach - The Design of the UNIX Operating System, Prentice Hall of India, 1994.

L: 3	CS 675 Digital Communication and Information Theory
T: 1	*Theory: 100 marks*
P: 3	Sessional: 50 marks
	Practical: 50 marks
	Time: 3 hours

Introduction
Introduction to digital communications, review of signals and systems theory, random variables, and Stochastic Processes. Merits of digital systems.

Waveform Coding Techniques
Mathematical models for information sources. Preview of sampling theorem. Sampling, quantizing and coding for discrete sources. Pulse code modulation (PCM). Quantization noise, companding, DPCM, DELTA modulation (DM), ADM. Noise in PCM and DM svstems. Time Division Multipexing(TDM).

Basic digital modulation schemes

ASK, PSK, QAM and FSK

Baseband Digital Transmission
Baseband binary PAM systems. Intersymbol interference (ISI). Nyquists's criterion for distortionless baseband binary transmission. Nyquist and Raised Cosine Pulses. Square-Root Splitting of the Nyquist Pulse. Baseband M-ary, PAM systems. Optimum detection. Matched filters, correlation receivers.

Information Theory

Discrete message, Amount of information, Entropy, Information rate, Channel capacity, Shanon's Theorem, Capacity of Gaussian Channel, Bandwidth-SNR trade off.

Coding: Source coding & Channel coding, Parity Check bit coding for detection, Error correction & detection, Block codes, Convolutional code, Comparison of error rates in coded & uncoded transmission, Automatic repeat request (ARQ), Performance of ARQ system.

BOOKS & REFERENCES

1. Principles of Communication Systems: Taub & Schilling, Tata Mc Graw Hill.

L: 3	CS 676 Computer Graphics
T: 1	*Theory: 100 marks*
P: 3	Sessional: 50 marks
	Practical: 50 marks
	Time: 3 hours

OBJECTIVES:

1. Understand the fundamental graphical operations and the implementation on a computer.
2. Understand the mathematics behind computer graphics including the use of spline curves and surfaces.
3. Get a glimpse of recent advances in computer graphics.
4. Understand user interface issues that make the computer easy to use even for novices.

COURSE CONTENTS:

Introduction

What is computer graphics? Elements of a graphic workstation, device independence, fundamental problems in geometry. [10%]

Basic Raster Graphics

Scan conversion, filling and clipping. [32%]

Geometry Manipulation

Transformation matrices, homogeneous coordinates. [20%]

Elementary 3D Graphics Plane projections, vanishing points, specification of a 3D view. [15%]

Visibility: Image & object precision, z buffer algorithms, floating horizon. [23%]

Advance Issues: Any of the following topics:

1. Curves and S-surfaces: Parametric representation, Benzier and B-spline cuves.
2. Rendering: Ray tracing, antialiasing, faractals, Gourard and phong shading.
3. User interface: Issues of user interface, elements of window system (X, Mac-OS, MS-Windows), elements of tool-kit programming (Windows or JAVA based)

Text Books / References:

- R. H. Bartels, J. Beatty, B. A. Barsky – Introduction to Splines for Use in Computer Graphics, Morgan Kaufmann.
- J. Foley, A. Van Dam, S. Feiner and J. Hughes – Computer Graphics: Principles and Practice, Addison Wesley.
- D. Hearn and P. Baker – Computer Graphics, Prentice Hall.
- C. E. Leiserson, T. H. Cormen and R. L. Rivest – Introduction to Algorithms, McGraw Hill Book Company.
- W. Newmann and R. Sproull, Principles of Interactive Computer Graphics, McGraw Hill Book Company.
- R. Plastock and G. Kalley – Theory and Problems of Computer Graphics, Schaum's Outline Series of McGraw Hill Book Company.
- F. P. Preparata and M. I. Shamos – Computational Geometry: An Introduction, Springer-Verlag, Inc, New York.