

**COMPUTER SCIENCE GENERAL SYLLABUS
THREE YEARS : SIX SEMESTERS**

SEMESTER	PAPER	TOPIC	PERIODS	MARKS
I	CS01201 (THEORY)	GENERAL CONCEPTS, ELEMENTS OF COMPUTER NETWORK & INTERNET BASICS	10	30
		BRIEF STUDIES ON OS	15	20
				50
	CS01251 (PRACTICAL)	DOS, WINDOWS & LINUX OS	8	10
		WORD PROCESSING		
		SPREADSHEET APPLICATION		
		CREATING PRESENTATIONS		
PROGRAMMING & PROBLEM SOLVING IN C		42	15	
		25		
SEMESTER - I TOTAL				75
II	CS02202 (THEORY)	ALGORITHMS & DATA STRUCTURES	15	30
		THEORY OF DBMS	10	20
				50
	CS02252 (PRACTICAL)	DBMS & SQL	25	25
				25
SEMESTER II TOTAL :				75

Paper – CS01201: Theory

General Concepts

Information: Definition, categories. Data: storage, retrieval and processing.

Computer: Hardware - CPU, primary and secondary storage, I/O devices, Software: classification-system and application; Stored program concept and Von-Neumann architecture; Evolution; types-supercomputers, mainframes, minis and workstations, PC's, Parallel machines

Computer Languages: Types-low level, assembly, high level, Object Oriented Languages.

Application Software: User specific application development; standard packages.

System Software: Classifications - Operating System (OS); translators – compilers and interpreters, preprocessors, assemblers, macro assemblers; loaders, linkers, line and screen editors; other utilities.

Virus: Concept, detection and protection.

Multimedia: Basic concept; associated hardware and software

Network & Internet: Introduction to Networking, Advantages of Networking; Basic Features, LAN, MAN and WAN; Internet, WWW, E-mail.

Basic Building Blocks:** Combinational logic - Boolean algebra; 2 variable Boolean Algebra, 3 variable Boolean Algebra, AND, OR, NAND, NOR, XOR gates; adder, multiplexer, demultiplexer/decoder, encoder-Sequential logic; flip-flops. (** only conceptual study with block diagram and truth/state table)

Computer Arithmetic: Positional number system and conversion -base 2, 8, 10, 16 with proof. Bits and bytes: use in arithmetic, storage capacity, data transmission, alphanumeric codes (ASCII, EBCDIC).

Integer representation - unsigned, signed magnitude, 1's complement, 2's complement, biased. Floating point representation - single and double precision IEEE format. Algorithms for integer and floating point addition, multiplication/division; range, precision and accuracy.

Brief Studies on OS

Introduction to operating systems. Abstract view of an operating system. Functions of OS, OS Evolution & Types: Batch Procession, multi-programming, time-sharing. Single User, Multi User, Multi Tasking, Embedded OS.

Processes and scheduling. Job/process concepts. Scheduling basics: CPU-I/O interleaving, (non-)preemption, context switching. Scheduling algorithms: FCFS, SJF, SRTF, priority scheduling, round robin. Combined schemes.

Memory management. Processes in memory. Logical addresses. Partitions: static *versus* dynamic, free space management, external fragmentation. Segmented memory. Paged memory: concepts, internal fragmentation, page tables. Demand paging/segmentation. Replacement strategies: OPT, FIFO, LRU (and approximations), NRU, LFU/MFU, MRU. Working set schemes.

I/O subsystem. General structure. Polled mode *versus* interrupt-driven I/O. Application I/O interface: block and character devices, buffering, blocking *versus* non-blocking I/O. Other issues: caching, scheduling, spooling, performance.

File management. File concept. Directory and storage services. File names and meta-data. Directory name-space: hierarchies, DAGs, hard and soft links. File operations. Access control. Existence and concurrency control.

Protection. Requirements. Subjects and objects. Design principles. Authentication schemes. Access matrix: ACLs and capabilities. Combined scheme. Covert channels.

Paper – CS01251: Practical

DOS, Windows & Linux OS, Word Processing, Spreadsheet Application, Creating Presentations, Introduction To Algorithm & Flowchart (Flowchart; algorithm-definition and characteristics; structured form-sequence; selection and iteration;), Programming & Problem Solving In C.

Paper – CS02202: Theory

Algorithms & Data Structure : Brief Introduction (15)

Algorithms and Problem Solving: recursive and non-recursive algorithms, Design of Algorithm: Concepts, sequence, selection and iteration, divide and conquer, greedy algorithm, efficiency, bigO notation (definition, basic properties and use)

Data Structures: Data types and structures - definition. Concept of sequential and linked allocation. Simple structures (concept and implementation) : array, stack, queue, binary tree.

Brief Study on sorting and searching; linear search, binary search, bubble sort, quick sort, merge sort, heap sort, hashing. (Description based on example).

Database Management (10)

Overview: Files and database. Data independence, 3-level DBMS architecture. Data dictionary. Database languages

Relational Model : Definition and properties.

Relational Algebra: Operations-select, project, cross product, join, set.

Query language : Introduction to SQL - basic concepts. Transaction processing

Design : Basics of ER diagram to relational scheme;

Related topics : Introductory concepts - Concurrency and recovery; security and integrity.

Paper – CS02252: Practical

DBMS and SQL

SEMESTER	PAPER	TOPIC	PERIODS	MARKS
III	CS03203 (THEORY)	COMPUTER ARCHITECTURE & ORGANISATION	40	50
				50
	CS03253 (PRACTICAL)	DATA STRUCTURE	25	25
				25
SEMESTER – III TOTAL				75
IV	CS04204 (THEORY)	OBJECT ORIENTED PROGRAMMING	30	30
		DATA WAREHOUSING AND DATA MINING – AN INTRODUCTION	10	20
				50
	CS04254 (PRACTICAL)	C++	25	25
				25
SEMESTER IV TOTAL :				75

Paper – CS03203: Theory

Basic Building Blocks ** : Combinational logic - Boolean algebra; AND, OR, NAND, NOR, XOR gates; adder, multiplexer, demultiplexer/decoder, encoder-Sequential logic; flip-flops, registers, counters (synchronous and asynchronous) (** only conceptual study with block diagram and truth/state table)

Computer Arithmetic and ALU : Positional number system and conversion -base 2,8,10,16. Bits and bytes : use in arithmetic, storage capacity, data transmission, alphanumeric codes (ASCII, EBCDIC).

Integer representation - unsigned, signed magnitude, 1's complement, 2's complement, biased. Floating point representation - single and double precision IEEE format. Algorithms for integer and floating point addition, multiplication/division; range, precision and accuracy. Basic structure of an ALU

CPU : Addressing modes, instruction formats. Handling of interrupts and subroutines. Instruction pipe lining, CISC and RISC processor.

Control Unit: Instruction and execution cycle; control of sequence, jump and branch instruction; shift instruction. Concept of horizontal and vertical micro programming.

I/O : Controller, interrupt. DMA, Memory mapped I/O. Standard buses. Concept of interfacing. Devices; VDU, mouse, keyboard, joystick, scanner, printers-DMP, laser, ink jet. line/matrix.

Memory : Memory devices* - Static and dynamic RAM, ROM, cache; secondary memory (floppy disk, hard disk, tape, CD ROM, DVD); large memory using chips. (* brief description of basic characteristics, principle of operation related parameters, nomenclature and comparative study where applicable)

Paper – CS04204: Theory

Object Oriented Programming concepts (30)

Object Oriented vs. Procedural Programming, Object, Class, Data Abstraction, Data Encapsulation, Inheritance and Information Sharing.

Data warehousing and Data Mining – an introduction (10)

Introduction to Data Mining : What is data mining? Types of Databases, Data mining functionalities, Data Mining application areas. **Introduction to Data Warehousing** :Operational Database systems and Data Warehouses : Multidimensional data model :Data Warehouse architecture **Introduction to data Processing**: Data Cleaning : Data Integration and transformation : Data reduction : Concept Hierarch.

SEMESTER	PAPER	TOPIC	PERIODS	MARKS
V	CS05205 (THEORY)	ELEMENTS OF SYSTEM ANALYSIS AND DESIGN	40	25
	CS05255 (PRACTICAL)	UNIX & SHELL PROGRAMMING	20	25
		SEMESTER V TOTAL		
VI	CS06206 (THEORY)	COMPUTER NETWORKS	40	25
	CS06256 (PRACTICAL)	HTML	20	25
		SEMESTER VI TOTAL		

Paper – CS05205: Theory

Introduction: System definition, characteristics, real-time and distributed system. System life Cycle: Waterfall model, description of different phases. Planning: Data Gathering techniques, feasibility study, cost-benefit analysis. Design and modeling: Logical and physical design; flowcharts and structured charts, DFD and ERD. Form design. User interface design. Modularity: Module specification concepts, coupling and cohesion. Maintenance: Evaluation, testing and validation. Maintenance issues.

Paper – CS06206: Theory

Introduction to Computer networks : distributed processing and resource sharing concepts. Classes-LAN, MAN, WAN

Architecture - OSI and TCP/IP protocol - brief study. Basic idea of protocols.

Communication Concepts: Analog and digital communication-basic concept and comparison. Signal-types frequency spectrum, strength, bandwidth, data rate, channel capacity. S/N ratio, modulation and demodulation FSK, ASK

Transmission media (brief idea, characteristics, comparison) : guided (twisted-pair, co-axial, optical fiber) and unguided (microwave, satellite-geo synchronous and low-orbit, VSAT)

LAN: Ethernet and token ring topology (principle of operation, characteristics, comparison). High-speed LANs, Inter networking-modems, bridges and routers, connectivity concepts. Network security

The Internet: basic idea; DNS and URL, IP address, browsers-mail: architecture and services