

## COMPUTER SCIENCE GENERAL SYLLABUS

### THREE YEARS : SIX SEMESTERS

SEMESTER	PAPER	TOPIC	PERIODS	MARKS	TEACHER
<b>Semester I to IV are for both Honours (except Comp.Sc. Hons) &amp; General students.</b>					
I	G-1 (THEORY)	GENERAL CONCEPTS, ELEMENTS OF COMPUTER NETWORK & INTERNET BASICS	10	30	
		BRIEF STUDIES ON OS	15	20	
				<b>50</b>	
	G-2 (PRACTICAL)	DOS, WINDOWS & LINUX OS	8	15	
		WORD PROCESSING			
		SPREADSHEET APPLICATION CREATING PRESENTATIONS			
		PROGRAMMING & PROBLEM SOLVING IN C	42	35	
			<b>50</b>		
<b>SEMESTER - I TOTAL</b>				<b>100</b>	
II	G-3 (THEORY)	ALGORITHMS & DATA STRUCTURES	15	30	
		THEORY OF DBMS	10	20	
				<b>50</b>	
	G-4 (PRACTICAL)	DBMS & SQL	25	25	
		HTML & SCRIPTING	25	25	
				<b>50</b>	
<b>SEMESTER II TOTAL :</b>				<b>100</b>	

#### Paper – G1 (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 – G2 (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 – G3 (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 – G4 (Practical)**

DBMS & SQL

HTML & Scripting.