

**Syllabi for the subject of Computer Science
in B.Sc. (Non Medical with Computer Science) w.e.f. 2021-22**

CS-11 COMPUTER FUNDAMENTALS

Maximum Marks: 50

Time: 3 hours

External: 40

Internal: 10

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of eight (objective type/short-answer type) questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks (i.e. 8 marks)

Course Objective: The objective of the course is to give basic competencies for application of a computer to everyday tasks using standard packages.

Learning Outcomes: At the end of the course a student is expected to describe

1. the organization and operation of a computer processor, primary and secondary memory, peripheral devices and to give computer specifications;
2. explain the representation of data and information in computer systems, use standard word, and spreadsheets, graphics generation packages,
3. use standard database system

UNIT-I

Introduction to Information Technology, concept of bit and byte, binary, octal, decimal and hexa-decimal number systems and their conversion, data representation, complement form, BCD codes, fixed point and floating point representation

UNIT-II

Computer and its components, mini computer, micro computer, personal computer, super computer, note book/ laptop, networking of computers, Local Area Network, Metropolitan Area Network, Wide Area Network, network topologies: Bus, Ring, Star, Mesh and Hybrid, Internet and Intranet, modem.

UNIT-III

Memory Organization: Memory hierarchy, RAM, ROM, dynamic RAM, flash memory, secondary memory and its characteristics, hard disk drives, cache memory and its organization, floppy drive and CD/ DVD drive.

UNIT-IV

Peripheral devices: common input and output devices, printer, plotter, scanner, joy stick, web camera, touch panel, light pen and card reader.

Text Books:

1. P.K. Sinha, Computer Fundamental, BPB Publication.

CS-12 DIGITAL ELECTRONICS

Maximum Marks: 50

Time: 3 hours

External: 40

Internal: 10

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of eight (objective type/short-answer type) questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks (i.e. 8 marks).

Course Objectives: The objectives are to study

1. To acquire the basic knowledge of digital logic levels and application of knowledge to understand digital electronics circuits.
2. To prepare students to perform the analysis and design of various digital electronic circuits.

Learning Outcomes: After studying this course the students

1. To understand and examine the structure of various number systems and its application in digital design.
2. The ability to understand, analyze and design various combinational and sequential circuits.
3. Ability to identify basic requirements for a design application and propose a cost effective solution.

UNIT - I

Information Representation: Number Systems, Binary Arithmetic, Fixed-point and Floating-point representation of numbers, BCD Codes, Error detecting and correcting codes, Character Representation – ASCII, EBCDIC, Unicode

UNIT - II

Binary Logic: Boolean Algebra, Boolean Theorems, Boolean Functions and Truth Tables, Canonical and Standard forms of Boolean functions, Simplification of Boolean Functions – Venn Diagram, Karnaugh Maps.

UNIT - III

Digital Logic: Basic Gates – AND, OR, NOT, Universal Gates – NAND, NOR, Other Gates – XOR, XNOR etc. NAND, NOR, AND-OR-INVERT and OR-AND-INVERT implementations of digital circuits, Combinational Logic – Characteristics, Design Procedures, analysis procedures, Multilevel NAND and NOR circuits.

UNIT - IV

Combinational Circuits: Half-Adder, Full-Adder, Half-Subtractor, Full-Subtractor, Encoders, Decoders, Multiplexers, Demultiplexers, Comparators, Code Converters, BCD to Seven-Segment Decoder.

Recommended Books:

1. M. Morris Mano, Digital Logic and Computer Design, Prentice Hall of India Pvt. Ltd.
2. V. Rajaraman, T. Radhakrishnan, An Introduction to Digital Computer Design, Prentice Hall of India Pvt. Ltd.
3. Andrew S. Tanenbaum, Structured Computer Organization, Prentice Hall of India Pvt. Ltd.
4. Nicholas Carter, Schaum's Outlines Computer Architecture, Tata McGraw-Hill

CS-21 PROGRAMMING IN C

Maximum Marks: 50
Time: 3 hours

External: 40
Internal: 10

Note: Examiner will be required to set Nine Questions in all. First Question will be compulsory, consisting of eight (objective type/short-answer type) questions covering the entire syllabus. In addition to that eight more questions will be set, two questions from each Unit. A candidate will be required to answer five questions in all, selecting one question from each unit in addition to compulsory Question No. 1. All questions will carry equal marks (i.e. 8 marks)

Course Objectives: The course is designed to provide complete knowledge of C language. Students will be able to develop logics which will help them to create programs, applications in C.

Learning Outcomes: After the completion of this course,

1. The students will be able to develop applications.
2. By learning the basic programming constructs they can easily switch over to any other language in future.

UNIT-I

Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Compilation and Executing a C program, , Types of errors in programming, Techniques of Problem Solving: Flow-chart, algorithms, pseudo code, Structured programming concepts
History of C, Importance of C, Structure of a C Program, use of main() function, use of library functions and header files, introduction to preprocessor directives, compilation process of a c program, C character set, identifiers and keywords, data types and their memory requirements, constants and variables, scope of a variable, assignment statement, unformatted & formatted I/O

UNIT-II

Arithmetic (Unary & Binary), Relational, Logical, Bitwise, and Conditional operators. Arithmetic expressions, evaluation of arithmetic expressions, understanding operators precedence and associativity in expression evaluation, type casting and conversion, conditional statements, iterative/looping statements, break and continue, goto statement.

Functions: Prototype, Declaration and Definition of a function, Arguments/Parameters in Functions, Functions with variable number of Arguments, Utility of functions, Recursion. Storage classes in C: auto, extern, register and static storage class, their scope, storage, & lifetime.

UNIT-III

Arrays: Definition, Creating and Using One Dimensional Arrays, Initializing an Array, Accessing individual elements in an Array, Manipulating array elements using loops, Two dimensional Arrays: memory representation schemes: row major, column major. simple programs. Introduction to Multi-dimensional arrays.

Understanding a Pointer Variable, Simple use of Pointers (Declaring and Dereferencing Pointers to simple variables), Pointer arithmetic. Pointers to Pointers, Problems with Pointers, passing pointers as function arguments, Call by Reference, Pointers and Arrays,. Pointers and strings, malloc, calloc, sizeof functions

UNIT-IV

String, String I/O, Array and strings, reading and writing strings, String manipulation functions: String length, copy, compare, concatenate etc. Understanding utility of structures, declaring, initializing and using simple structures, Manipulating individual members of structures.

SUGGESTED READINGS

1. Yashwant Kanetker, Let us C, BPB

CS-22 OPERATING SYSTEM

Maximum Marks: 50

Time: 3 hours

External: 40

Internal: 10

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Course Objectives: The objectives are to study

1. Describe the important computer system resources and the functions.
2. To study the process management and scheduling.
3. To understand the concepts and implementation Memory management policies and virtual memory.
4. To study the need for special purpose operating system with the advent of new emerging technologies

Learning Outcomes: After studying this course the students

1. Describe the important computer system resources and the functions.
2. To understand the concepts and implementation Memory management policies and virtual memory.

UNIT – I

Introduction, What is an Operating System, Simple Batch Systems, Multiprogrammed Batches systems, Time-Sharing Systems, Personal-computer systems, Parallel systems, Distributed Systems, Real-Time Systems Memory Management: Background, Logical versus Physical Address space, swapping, Contiguous allocation, Paging, Segmentation Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations

UNIT – II

Processes: Process Concept, Process Scheduling, Operation on Processes CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, MultipleProcessor Scheduling, Process Synchronization: Background, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization

UNIT -III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock Device Management: Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Input or Output Devices, Storage Devices, Buffering, Secondary Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Reliability.

UNIT -IV

Information Management: Introduction, A Simple File System, General Model of a File System, Symbolic File System, Basic File System, Access Control Verification, Logical File System, Physical File System File-System Interface: File Concept, Access Methods, Directory Structure, Protection, Consistency Semantics File-System Implementation: File System Structure, Allocation Methods, Free-Space Management

Recommended Books:

1. Silberschatz and Galvin, "Operating System Concepts", Pearson, 5th Ed., 2001
2. Madnick E., Donovan J., "Operating Systems", Tata McGraw Hill, 2001