

Veer Bahadur Singh Purvanchal University, Jaunpur

Three Years Degree Course Syllabus for

B.Sc. (Computer Science)

Study & Evaluation Scheme

B.Sc. -I Year (CS) (W.E.F. Session 2018-19)

S. No.	Paper Code	Paper Name	Maximum Marks	Total Marks
Theory				
1.	BSC-101	Computer Fundamental & Programming In C	50	200
2.	BSC-102	Fundamental of IT	50	
3.	BSC-103	Computer Organization	50	
Practical				
4.	BSC-L11	MS Office & Programming In C Lab	50	

B.Sc. -II Year (CS) (W.E.F. Session 2019-20)

S.No.	P/Code	Paper Name	Maximum Marks	Total Marks
Theory				
1.	BSC-201	C++ Programming	50	200
2.	BSC-202	Operating System	50	
3.	BSC-203	Data Structure	50	
Practical				
4.	BSC-L21	C++ Lab	50	

B.Sc. -III Year (CS) (W.E.F. Session 2020-21)

S.No.	P/Code	Paper Name	Maximum Theory	Total Marks
Theory				
1.	BSC-301	Software Engineering	75	300
2.	BSC-302	Computer Network	75	
3.	BSC-303	Database Management System	75	
Practical				
4.	BSC-L31	DBMS Lab	75	

**Computer Fundamental & Programming in C
(BSC-101)**

MM-50

UNIT – I

Introduction

Algorithm, Flowcharts, Introduction of programming languages, History of C, Basic structure of C Programming, Executing C Program

Data Types

Constant, variables, Identifiers, Keywords, Tokens, Declaration of Variables, Assigning values to variables.

Operators

Arithmetic, Relational, Logical, Assignment, Increment, Decrement operators, Condition, Bit wise operators, Arithmetic expressions.

UNIT – II

Branching & Looping

Decision making with if, If-else, Switch Statement, GOTO statement, while loop, Do While loop, FOR Loop, Break and Continue statements.

Array

One dimensional array, two dimensional array, Multidimensional array, Initializing array.

UNIT – III

Function

Function declaration, calling a function, the form of C function, Return values and their type, No arguments, no return value, arguments but no return, recursion, nesting of function.

Pointers

Accessing address of a variable, declaring and initializing pointers, pointer expression, pointer and array, pointer and function, pointer and structure, pointer to pointer

UNIT – IV

Structure & Union

Structure definition, giving values to members, structure initialization, Array of structure, structure within structure, Size of structure, Union definition

UNIT – V

File Handling

Defining and opening file, closing a file, I/O operations on file. Random access to file, Error handling in file.

Books:

1. Programming in C: Gottfried
2. Programming in ANSI C: E. Balaguruswamy
3. Let us C : Y. Kanetkar

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MM-50

Fundamental of IT (BSC-102)

UNIT – I

Introduction

Definition of an Electronic Digital Computer, characteristics, capabilities and limitation of computer, Generation of computers, Types of computers, Classification of computers on size, Computer Hardware components and their functions, Characteristics and Applications of Computers.

UNIT – II

Operating system concepts

Introduction to OS, components of OS, Types of OS, multiprogramming, multitasking & time sharing, File & Directories & their use in different OS, DOS operating system, Window operating system, Unix operating system

Unit – III

Software & MS-Office:

Need, Types of software – System software, Application software, Utility programs, Introduction to programming languages, Assembler, Compiler and Interpreter, Programming languages – Assembly language, Machine level language, High level language. Application software.

MS Word, MS Excel, MS Power Point

UNIT – IV

Data Communication & networks:

Types of Network – LAN, MAN, WAN, Internet, Intranet, and Topologies of LAN – Ring, Bus, Star, Mesh and Tree.

UNIT – V

Tools for Program Development:

Algorithms, Flow charts – symbols, Rules for making flow chart, Types of flow chart, advantage and disadvantage, Pseudo codes, Programming techniques – Top Down, Bottom-up, Modular, Structured.

Text Books:

1. Computer & Languages: A. Arora & S. Bansal
2. Computer Fundamental: B. Ram
3. Information Technology: D. Cyganski & J.A. Orr
4. fundamentals of information technology: Leon & Leon

YEAR - I

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Computer Organization (BSC-103)

Unit – I

Number System

Introduction, Binary, Octal & Hexadecimal number system, Conversion form decimal to binary, octal & hexadecimal etc., Representation of numbers in computer and various character codes.

Unit – II

Logic Gates

Boolean algebra, Minterms, Maxterms, Simplification of Boolean functions, K-Map simplification, half adder, Full adder, Decoder, Encoder, Multiplexer, Demultiplexer, Binary counters, Flip-Flops.

Unit – III

Memory Organization

RAM, ROM, Auxiliary memory, Memory Hierarchy, Associative memory, Virtual memory, Cache memory, Memory management hardware.

Unit – IV

Input-Output Organization

Peripheral devices, I/O interface, direct memory access, Type of commands, Modes of transfer, Asynchronous data transfer, Strobe control, Handshaking, DMA transfer, IOP

Unit – V

Processor Organization

Formats, Single Accumulator organization, General register organization, Stack organization, Addressing modes, data transfer and manipulation.

Text Book:

1. Computer System Architecture, M. Mano(PHI)
2. Computer Organization, Vravice, Zaky & Hamacher (TMH Publication)
3. Structured Computer Organization, Tannenbaum(PHI)
4. Computer Organization, Stallings(PHI)
5. Computer Organization, John P.Hayes (McGraw Hill)

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**C++ Programming
(BSC-201)**

UNIT-I

OOP Paradigm, Basic concepts, Benefits and its applications, Basics of C++, Concepts of structure and class, Private and public members, tokens, data types, dynamic initialization, reference variable, operators, dynamic memory allocation, manipulators, control structure.

UNIT-II

Introduction, main() function, prototyping, call and return by reference, inline function, default arguments, function overloading, friend functions, private member functions, various storage classes, static member functions.

UNIT-III

Introduction, parameterized constructors, multiple constructors in a class, constructors with default arguments, dynamic initialization of objects, copy constructor, destructors.

UNIT-IV

Introduction, definition, method of overloading, Overloading unary and binary operators, manipulation of strings using operators, rules for overloading operators.

UNIT-V

Inheritance: Definition, base and derived classes, type of inheritance and their implementation, virtual base classes, abstract class.

Dynamic Polymorphism: Introduction, pointers to object, this pointer, pointers to derived class, virtual functions, pure virtual functions.

Text Books:

1. Object oriented programming with C++: Balaguruswamy
2. Object oriented programming: Budd
3. Object oriented programming with C++: R. Lafore

Reference Books:

1. Programming with C++, by John Hubbard, AtulKahate.
2. Programming with C++ – Y. Kanetkar

**Operating System
(BSC-202)**

UNIT-I

Definition of operating system (OS), History of OS, Simple Batch Systems, Multi-programmed Batched Systems, Time-Sharing Systems, Personal Computer system, Distributed Systems and Real-Time Systems, Operating System, Structures-Command Interpreter System, Operating System Services, System Calls, System Programs.

UNIT-II

Process Management:

Process Concept, Process control Block, process Scheduling, CPU scheduling-Basic Concepts, CPU scheduling, Scheduling Criteria, Round Robin Scheduling, Real Time Scheduling.

UNIT-III

Definition Deadlock, Deadlock Characterizations, method for Handling Deadlocks, Deadlock prevention, Avoidance, Detection, recovery from Deadlock.

UNIT-IV

Memory Management:

Basic Concepts, Logical and Physical Address Space, Swapping, Contiguous Allocation, Paging Segmentation, Virtual Memory, Demand Paging, Paging Replacement, Thrashing and Demand Segmentation.

UNIT-V

I/O Management and Disk Scheduling: I/O devices, and I/O subsystems, I/O buffering, Disk storage and disk scheduling, RAID. File System: File concept, File organization and access mechanism, File directories, and File sharing, file system implementation issues, File system protection and security.

Text Books:

1. Operating System Concept: Silbershaz (Addision Education).
2. Operating Systems by P. Balakrishna Prasad [Scitech Publication].

Reference Books:

1. Operating Systems - H.M. Deitel - Addision Wesley.
2. Operating System: A.S.Godbole (TMH)
3. Modern Operating Systems: Tenenenbaum (Pearson Education)
4. Operating System: Peterson.

**Data Structure
(BSC-203)**

UNIT-I

Basic Concept of data structure, Need for Data Structures, Definitions Implementation of a Data Structure, Types of Data Structures.

UNIT-II

Introduction to Algorithm Analysis, Characteristics of an Algorithm, Performance Analysis Asymptotic Notations.

Introduction to linear data structure, Array as an Abstract Data Type, Array Representation Applications of Arrays, Sorting, Types of sorting.

UNIT-III

Introduction to List, Linked List Implementation, Types of Linked Lists, Operations on a Linked List, Singly Linked List, Doubly Linked List, Circular Linked List, Applications of Linked List Generalized Linked list.

UNIT-IV

Introduction to stack, Definition, Stack Representation, Applications of Stack, Simulating Recursion using Stack.

Introduction to Queue, Concept of a Queue, Operations on a Queue, Linear Queue, Circular Queue, Priority Queue, Doubly Ended Queue, Difference between Stack and Queue.

UNIT-V

Introduction to tree, Concept and Terminologies, Applications of Trees, Representation of Binary Trees, Tree Operations, Heap Sort ,Height Balanced Trees.

Introduction to graph, Concept and Terminologies, Graph Representation, Graph Traversals, Applications of Graphs

Text Books:

1. Classical Data Structures: D. Samanta. PHI, New Delhi.
2. Data Structure: Lipsctuz Schum Outline Series.

Reference Books:

1. Data structure Using C: Y. Kanetkar.
2. Data Structures Using C: Tennenbaum.
3. Data structures by Tremblay Sorenson.
4. Data structures by Bhagatsingh Naps

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**Software Engineering
(BSC-301)**

UNIT-I

Introduction to Software Engineering, Importance of Software, features of software, Software development life-cycle.

UNIT-II

Software process, Water Fall Model, Incremental Model, Prototyping Spiral Model, Role of Management in Software development, Role of matrices and measurement, Problem analysis, Requirement specification, Monitoring and Control.

UNIT-III

Design principles, Problem partitioning, Abstraction, Top-down and Bottom-up design, Structured approach, Functional versus Object oriented approach, Design specification and Verification, Monitoring and Control, Cohesiveness, Coupling, Fourth generation techniques, Functional independence, Software architecture.

UNIT-III

Top-down and Bottom-up programming, Structured programming, Information hiding, Programming style and internal documentation.

Testing: Testing principles, Levels of testing, Functional testing, Structural testing, Test plane, Test case specification, Reliability assessment, Software testing strategies, Verification and validation, Unit testing, Integration testing, Alpha and Beta testing, system testing and debugging.

UNIT-IV

The Management spectrum – (The people, the product, the process, the project), Cost estimation, project scheduling, Staffing, Software Configuration management, Structured Vs Unstructured maintenance.

Text Book:

1. Pressman, "Software Engineering: A practitioner's approach", TMH
2. Pankaj Jalote, "Software Engineering", Narosa
3. Ghezzi, Carlo and Others, "Fundamental of Software Engineering", PHI.

Reference Books:

1. K.K. Aggarwal & Yogesh Singh "Software engineering", 2nd Ed., New Age International 2005.
2. I. Sommerville, "Software Engineering", Addison Wesley, 2002.
3. James Peter, W. Pedrycz, "Software Engineering: An Engineering Approach" John Wiley & Sons.

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B.sc – III Year

MM-75

**Computer Network
(BSC-302)**

UNIT-I

Introduction Concepts: Goals and Applications of Networks, Network structure and architecture, The OSI reference model, services, Network Topology Design - Delay Analysis, Back Bone Design, Local Access Network Design, Physical Layer Transmission Media, Switching methods, ISDN, Terminal Handling.

UNIT-II

Medium Access sub layer: Medium Access sub layer - Channel Allocations, LAN protocols - ALOHA protocols - Overview of IEEE standards - FDDI. Data Link Layer - Elementary Data Link Protocols, Sliding Window protocols, Error Handling.

UNIT-III

Network Layer: Network Layer - Point - to Pont Networks, routing, Congestion control Internetworking -TCP / IP, IP packet, IP address, IPv6

UNIT-IV

Transport Layer: Transport Layer - Design issues, connection management, session Layer- Design issues, remote procedure call. Presentation Layer-Design issues, Data compression techniques, cryptography - TCP - Window Management.

UNIT-V

Application Layer: Application Layer: File Transfer, Access and Management, Electronic mail, Virtual Terminals, Other application. Example Networks - Internet and Public Networks.

Text Books:

1. Forouzen, "Data Communication and Networking", TMH
2. A.S. Tanenbaum, Computer Networks, Pearson Education
3. W. Stallings, Data and Computer Communication, Macmillan Press

Reference Books:

1. Anuranjan Misra, "Computer Networks", Acme Learning
2. G. Shanmugarathinam, "Essential of TCP/ IP", Firewall Media

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**Database Management System
(BSC-303)**

UNIT-I

An overview of database management system, database system Vs file system, Database system concepts and architecture, data models schema and instances, data independence and data base language and interfaces, Data definitions language, DML, Overall Database Structure

UNIT-II

ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model.

UNIT-III

Relational data Model and Language: Relational data model concepts, integrity constraints: entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra

UNIT-IV

Introduction to SQL: Characteristics of SQL. Advantage of SQL. SQL data types and literals. Types of SQL commands. SQL operators and their procedure. Tables, Queries and sub queries. Aggregate functions. Insert, update and delete operations. Joins, Unions, Intersection, Minus.

UNIT-V

Data Base Design & Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependences, loss less join decompositions.

Modern Trends in Database Management: Introduction to Internet Database, Geographical Databases, Data Mining, Data Warehousing.

Text Books:

1. Data Base System Concepts by a Silbers Chatz by Henry Korthand S. Sudarshan, Mcgraw-Hill Ltd. New Delhi, 3rd Edition.
2. Introduction to Data Base Management by NAVEEN PRAKASH [Tata McGraw Hill Ltd.].
3. Elmasri, Navathe, "Fudamentals of Database Systems", Addison Wesley

Reference Books:

1. Bipin C. Desai, An Introduction to Database Systems, Galgotia Publications.
2. Raghuram Ramakrishnan & Johannes Gerhrke, "Data Base Management Systems", McGraw Hill International Edition, 2000.
3. Muzumdar, Introduction to Database Management Systems, TMH.