

**BHUPAL NOBLES' UNIVERSITY,
UDAIPUR**

FACULTY OF SCIENCE

**DEPARTMENT OF
COMPUTER SCIENCE**

&

APPLICATION

COURSE CURRICULAM AND SYLLABII OF THREE YEAR DEGREE COURSE 2017-2020

Computer Science

COURSE CURRICULAM

First Year T.D.C. Science 2017-2018

Paper code	Paper	Nomenclature	Lecture per		Duration of exam	Max. Marks		Min. Marks
			Year	Week		Ext.	Int.	
COMP111	I	Computer Organization and Architecture	60 hrs	2 hrs	3 hrs	35	15	18
COMP112	II	Problem Solving through C Programming	60 hrs	2 hrs	3 hrs	35	15	18
COMP113	III	Data Base Management System	60 hrs	2 hrs	3 hrs	35	15	18
COMP114	IV	Computer Practical	120 hrs	4 hrs	5 hrs	75		27

Second Year T.D.C. Science 2018-2019

Paper code	Paper	Nomenclature	Lecture per		Duration of exam	Max. Marks		Min. Marks
			Year	Week		Ext.	Int.	
COMP221	I	Data Structure	60 hrs	2 hrs	3 hrs	35	15	18
COMP222	II	Object Oriented Programming Using C++	60 hrs	2 hrs	3 hrs	35	15	18
COMP223	III	Computer Oriented Numerical Methods	60 hrs	2 hrs	3 hrs	35	15	18
COMP224	IV	Computer Practical	120 hrs	4 hrs	5 hrs	75		27

Third Year T.D.C. Science 2019-2020

Paper code	Paper	Nomenclature	Lecture per		Duration of exam	Max. Marks		Min. Marks
			Year	Week		Ext.	Int.	
COMP331	I	Computer Networks	60 hrs	2 hrs	3 hrs	35	15	18
COMP332	II	Programming in Java	60 hrs	2 hrs	3 hrs	35	15	18
COMP333	III	Operating System	60 hrs	2 hrs	3 hrs	35	15	18
COMP334	IV	Computer Practical	120 hrs	4 hrs	5 hrs	75		27

B.Sc. (CS) I Year

COMP111: Computer Organization and Architecture

UNIT-I

Number Systems: Binary, octal, decimal, hexadecimal and BCD number systems. Representation of positive, negative integers and real numbers. Characters digital codes: ASCII and EBCDIC coding, binary arithmetic in 1's and 2's complement.

UNIT-II

Boolean Algebra: Logic gates, truth table, logic expression, rules and laws of Boolean algebra. Demorgan's theorems, simplification of Boolean expression using Karnaugh map

UNIT-III

Combinational Circuits: Adder, subtractor, comparator, decoder, encoder, multiplexer, demultiplexer. Flip Flops: Latches, edge-triggered flip flops, pulse triggered flip flop, R-S flip, JK master-slave flip flop, D flip flop, T flip flop.

UNIT-IV

Basic Computer Organization and Design: Computer registers, bus system, instruction set, instruction cycle, memory reference instruction, input-output instructions and interrupts, Pipeline :Arithmetic & Instruction .

UNIT-V

Central Processing Unit: Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control. Instruction formats, addressing modes. Memory Organization: RAM, ROM, Cache memory, Associative memory, Mapping.

Recommended Books:

1. Thomas L. Floyd, Digital Fundamentals, United Book Stall New Delhi.
2. Mano M.M., Digital Logic and Computer Design, Prentice Hall of India Private Limited New Delhi.

COMP112: Problem Solving through C Programming

UNIT-I

Algorithm & FlowChart : Definition and properties of algorithm, example of simple algorithms, Definition of Flow Chart flow chart symbols, Flow Chart Advantages & Disadvantages. Examples of Flow Chart, Introduction to program design, errors – syntax error, runtime error, logic error, testing, and documentation.

UNIT-II

Basics of C – Language: Constants – Integer, Real, Character; Variables and Keywords; Data types and size, Operators – arithmetic, relational, logical, increment and decrement, bitwise and assignment, Hierarchy of Operators and Operations, Associativity of Operators.

UNIT-III

Control Structure: Decision Structure: - Simple if, if – else, if – else – if, nested if, switch case; Loop Control Structure:- while , do while and for and nested loops.; Use of break, goto and continue;

UNIT-IV

Array : Definition ,Creation and Use, multi – dimensional arrays . **Pointer** : Introduction to pointers, pointer to pointer, pointers and array. **Functions:** Function definition, declaration and prototypes, Call by Value and Call by Reference, Scope Rule of Functions.

UNIT-V

Storage Class – external, static, register; Recursive functions; Structures –definition, declaring and accessing elements of structure, array of structure, Union, Bit Fields. File Input/Output – Create, Open, Read, Write, Delete, Close.

Recommended Books:

1. Yashavant Kanetkar, Let us C
2. Balaguruswamy, Programming in C

COMP113: Database Management System

UNIT-I

Introduction : Purpose of the data base system, data abstraction, data model, data independence, data definition language, data manipulation language, data base administrator, data base users, overall structure.

UNIT-II

Relational Data Objects -Domains and Relations: Domains, relations, kinds of relations, relations and predicates, relational databases.

Relational Data Integrity - Candidate keys and related matters: Candidate keys. Primary and alternate keys. Foreign keys, foreign key rules, nulls. Candidate keys and nulls, foreign key and nulls.

UNIT-III

The SQL Language: Data definition, retrieval and update operations. Table expressions, conditional expressions,

Views: Introduction, what are views for, data definition, data manipulation, SQL support.

UNIT-IV

Hierarchical model : basic concepts, tree structure diagrams, data retrieval facility, update facility, virtual records, mapping hierarchical to files, hierarchical system.

UNIT-V

File and system structure : overall system structure, file organisation, logical and physical file organization, sequential and random, indexing and hashing, B-tree index files.

Suggested Book

1. Date C.J., Database Systems, Addison Wesley.
2. Korth, Database Systems Concepts, McGraw Hill.

COMP114: COMPUTER PRACTICAL

Practical list for C Programming

Write the algorithm and draw the flowchart (WADF) for the problems given below.

1. WADF to perform arithmetic operations (Addition, Subtraction, Multiplication, Division) on two numbers.
2. WADF to calculate gross salary of an employee [using formula: $\text{gross_sal} = \text{basic_sal} + \text{hra} + \text{da}$].
3. WADF to calculate area of circle.
4. WADF to evaluate marks of student for 3 subjects, calculate percentage and display their grades.

	Marks	grades
CASE -1:	90-100	A
CASE -2:	80-89	B
CASE -3:	65-79	C
CASE -4:	Otherwise	D

5. WADF to determine sum of odd series from 1 to N.
6. WADF to calculate factorial of a number.
7. WADF to print Fibonacci series up to N. [E.g. - 0 1 1 2 3 5.....]
8. WADF to identify whether given number is prime or not.
9. WADF to identify whether given number is even or odd.
10. WADF to print whether given year is leap year or not.
11. WADF to check number is palindrome or not [A palindrome number or numeral palindrome is a number that remains the same when its digits are reversed. Like 16461, for example, it is "symmetrical".].
12. WADF to check number entered is Armstrong number or not.[An Armstrong number is an n-digit number that is equal to the sum of the nth powers of its digits. Like 153]
13. WADF to find the sum of the digits of a number.

14. WADF to input 5 digit numbers and find the sum of the first and last digit.
15. WADF to convert Fahrenheit to centigrade.

DBMS List of Practicals

1. Introduction to SQL.

2. Execute the following queries using these commands:

create a table 'Emp' with attributes 'ename','ecity','salary','enumber','eaddress','deptname'.

Create another table 'Company' with attributes 'cname', 'ccity','empnumber'

3. Execute the following queries using these commands:

- Find the names of all employees who live in Delhi.
- Increase the salary of all employees by Rs. 5,000.
- Change the Company City to Gurgaon where the Company name is 'TCS'.

4. Execute the following queries using these commands:

- Find the names of all employees who live in 'Gurgaon' and whose salary is between Rs. 20,000 and Rs. 30,000.
- Find the company names where the company city is 'Delhi' and the number of employees is not between 5000 and 10,000.

5. To study the aggregate functions (sum, count, max, min, average) and execute the following queries using these commands:

- Find the sum and average of salaries of all employees in computer science department.
- Find the maximum and the minimum salary in the HR department.

B.Sc. (CS) II Year

COMP221: Data Structures

UNIT-I

Linear Structure: Arrays, records, stack, operation on stack, implementation of stack as an array, application of stack, queue, operations on queue, implementation of queue as an array, application of queue.

UNIT-II

Linked Structure: List representation, operations on linked list - get node and free node operation, linear linked list, circular linked list, doubly linked list, implementing the list operations- inserting, deleting, traversing and searching.

UNIT-III

Tree Structure: Definitions and concepts, Binary search tree- inserting, deleting and searching, implementing the insert, search and delete algorithms, tree traversals- pretraversal, intraversal and post traversal

UNIT-IV

Graph Structure: Graph representation - Adjacency matrix, adjacency list, adjacency multilist representation, orthogonal representation. Graph traversals – breadth first traversal and depth first traversal, shortest path, transitive closure.

UNIT-V

Searching and sorting: Searching - sequential searching, binary searching, hashing. Sorting - selection sort, bubble sort, heap sort, quick sort, merge sort, and insertion sort, efficiency considerations.

Recommended Books:

Horowitz E Sartaj Sahni, Fundamentals of Data Structure, Galgotia Publication Private Limited., New Delhi.

COMP222: Object Oriented Programming using C++

Unit I

Principles of Object Oriented Programming (OOP): Object oriented programming paradigm, basic concepts of object oriented programming, benefits of OOP.

Beginning with C++: What is C++? Applications of C++. A simple C++ program. , structure of C++ program.

Unit II

Functions in C++: The main function, function prototyping, call by reference, return by reference, inline functions, default arguments, const argument, function overloading, friend and virtual functions.

Unit III

Classes and Objects: Specifying a class, defining member functions. A C++ program with class, making an outside function inline, nesting of member functions, private member functions, arrays within a class, memory allocation for objects. Static data members, static member functions. Arrays of objects, objects as a function argument, friendly functions, returning objects, const member functions

Unit IV

Constructors and Destructors: Constructors, parameterized constructors, multiple constructors in a class, constructors with default arguments, dynamic initialization of objects, copy constructor, dynamic constructors, constructing two-dimensional arrays, destructors.

Inheritance: Extending Classes: Defining derived classes, single inheritance, making a private member, inheritable, multi level inheritance, multiple inheritance, hierarchical inheritance, and hybrid inheritance. Virtual base classes, abstract classes, constructors in derived classes, member classes, nesting of classes.

Unit V

Pointers, Virtual Functions and Polymorphism: Compile time Polymorphism, Run time polymorphism , Pointers to objects, this pointer, pointers to derived classes, virtual functions, pure virtual functions.

Suggested Book

1. Balaguruswamy E., Object Oriented Programming with C++, Tata Mc-Graw Hill New Delhi.

COMP223: Computer Oriented Numerical Methods

Unit I

Computer Arithmetic : Floating point representation of numbers, arithmetic operations with normalized floating point numbers and their consequences ,error in number representation, pitfalls in computing. Iterative Methods : bisection method, false position, Newton Raphson method, omparison of iterative methods

Unit II

Solution of simultaneous linear equations : Gauss elimination method, pivoting ill conditioned equations, refinement of solution, Gauss Seidel iterative method, comparison of direct and iterative methods.

Unit III

Solution of ordinary differential equations : Euler's method, Taylor series method, , Runge-Kutta methods, predictor-corrector methods

Unit IV

Interpolation and approximation : Langrange's interpolation, Polynomial interpolation, difference table, , linear regression,polynomial fitting and other curve fitting techniques, approximation of function by Taylor series and Chebyshev series.

Unit V

Numerical differentiation and integration: Differentiation formulae based on polynomial fits, pitfalls in differentiation. Integration : trapezoidal, Simpson rules, Guassian quardature.

Suggested Books

1. Rajaraman V., Computer Oreinted Numerical Methods, Peentice Hall of India Private Limited.
2. Krishnamurhy , Computer based numerical algorithms, East West Press.

COMP224: Computer Practical

Data Structures Practical List

1. Write a program to linear search an element from a list.
2. Write a program to binary search an element from a list.
3. WAP using to sort a list of elements. using Insertion sort
4. WAP using to sort a list of elements. using Bubble sort
5. Implement Linked List. Include functions for insertion, deletion and search of a number, reverse the list and concatenate two linked lists (include a function and also overload operator +).
6. Implement Doubly Linked List. Include functions for insertion, deletion and search of a number, reverse the list.
7. Implement Circular Linked List. Include functions for insertion, deletion and search of a number, reverse the list.
8. Perform Stack operations using Linked List implementation.
9. Perform Stack operations using Array implementation.
10. Perform Queues operations using Circular Array implementation. Use Templates.
11. WAP to calculate factorial and to compute the factors of a given no. using recursion
12. WAP to display fibonacci series using recursion,

Object Oriented Programming in C++

1. WAP to print the sum and product of digits of an integer.
2. WAP to reverse a number.
3. WAP to compute the sum of the first n terms of the following series $S = 1 + 1/2 + 1/3 + 1/4 + \dots$
4. WAP to compute the sum of the first n terms of the following series $S = 1 - 2 + 3 - 4 + 5 \dots$
5. Write a function that checks whether a given string is Palindrome or not.
6. Write a function to find whether a given no. is prime or not. WAP to compute the factors of a given number.
7. Write a macro that swaps two numbers. WAP to use it.
8. WAP to print a triangle of stars as follows (take number of lines from user):
*

9. WAP to perform following actions on an array entered by the user:

- i. Print the even-valued elements
 - ii. Print the odd-valued elements
 - iii. Calculate and print the sum and average of the elements of array
11. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
12. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.

Computer Oriented Numerical Methods Practical

1. Find the roots of the equation by bisection method.
2. Find the roots of the equation by Newton's method.
3. Solution of differential equation by Runge Kutta method
4. To find integral of a function using
 - (a) Trapezoidal method
 - (b) Simpson method
5. To interpolate a function using Lagrange's interpolation method

B.Sc. (CS) III Year

COMP331: Computer Networks

UNIT-I

Basic Concepts: Components of data communication, Topology, Parallel & Serial Transmission, transmission mode, and categories of networks. OSI and TCP/IP Models: Layers and their functions, comparison of models.

UNIT-II

Digital Transmission: Interfaces and Modems: DTE-DCE Interface, modems, cable modems. Transmission Media: Guided and unguided, Attenuation, distortion, noise, throughput, propagation speed and time, wavelength, Multiplexing, error detection and correction, WDM, TDM, FDM, circuit switching, packet switching and message switching.

UNIT-III

Data Link control protocols: Line discipline, flow control, error control, synchronous and asynchronous protocols overview. ISDN: Services, ISDN, Layers, and broadband ISDN. CSMA, CSMA/ CD, Token passing LAN.

UNIT-IV

Devices: Repeaters, bridges, gateways, routers, The Network Layer, Design Issues, Network Layer Addressing and Routing concepts (Forwarding Function, Filtering Function); Routing Methods (Static and dynamic routing, Distributed routing, Hierarchical Routing).

UNIT- V

Network Security: Security Requirement, Data encryption strategies, authentication protocols, Firewalls.

Basic Applications: Telnet, FTP, NFS, SMTP, SNMP and HTTP.

Recommended Books:

1. A.S. Tanenbaum, Computer Networks, 4th Ed., Pearson Education Asia, 2003.
2. Behrouz A. Forouzan, Data Communication and Networking, 2nd Ed., Tata McGraw Hill.
3. D. E. Comer, Internetworking with TCP/IP, Pearson Education Asia, 2001.
4. William Stallings, Data and Computer Communications, 7th Ed., Pearson education Asia, 2002

COMP332: Programming In Java

UNIT I

Introduction to Java, Java Program Structure, Java Tokens, Java Virtual Machine, Constants, Variables, and Data Types, Scope of Variables, Symbolic Constants, Type Casting.

Operators and Expressions: Arithmetic Operators, Relational Operators, Logical Operators, Assignment Operators, Increment and Decrement Operators, Conditional Operators, Bitwise Operators, Special Operators, Arithmetic Expressions, Evolution of Expressions, Operator Precedence and Associativity, Defining and using Array.

Decision Making and Branching: Simple if Statement, The if... else Statement, Nesting of if ... else Statements, The else if Ladder, The switch Statement, The ?: Operator. Decision Making and Looping: Introduction, The while Statement, The do Statement, The for Statement, Jumps in Loops, Labelled Loops.

UNIT II

Classes, Objects and Methods: Introduction, Defining a Class, Adding Variables, Adding Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Inheritance: Extending Class, Overriding Methods, final Variables and Methods, Final Classes, Finalizer Methods, Abstract Methods and Classes, Visibility Control.

UNIT III

Interfaces: Multiple Inheritance: Introduction, Defining Interfaces, Extending Interfaces, implementing Interfaces, Accessing Interface Variables.

Packages: Defining Package, Creating Packages, Accessing Packages, Using a Package, Adding a Class to a Package.

UNIT IV

Multithreaded Programming: Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization.

Exceptions: Introduction, Syntax of Exception Handling Code, Multiple Catch Statements, Using finally Statement, Throwing Our Own Exceptions

UNIT V

Applet Programming: Introduction, How Applets Differ from Application, Building Applet Code, Applet Life Cycle, Creating an Executable Applet, Applet Tag, Adding Applet to HTML File, Running the Applet, Passing Parameters to Applets.

Text Book:

1. E. Balagurusamy, Programming with Java, A Primer Second Edition, Tata McGraw Hill, New Delhi.

Reference Books:

1. H.M.Deitel & P.J.Deitel- JA V A- How to Program, 5th Edn, Pearson Education, New Delhi-2004.

2. P.Naughton and H. Schildt-JAVA: The Complete Reference, TMH, New Delhi 2005.

3. D.Jana- Java and Object Oriented Programming Paradigm, PHI, New Delhi-2005.

COMP333: Operating System

UNIT-I

Introduction:

Introduction to Operating system. Types of operating systems :Batch System,Multiprogramming, TimeSharing, Distributed, Clustered ,Real time. Operating System Services ,Operating System Structure.

UNIT-II

Processes:

The Process concept, Process Life Cycle, Interprocess Communication ,Process control Block. Process Scheduling.

Process Synchronization: Critical-Section Problem - Synchronization Hardware - Semaphores, Critical Region - Monitors.

UNIT-III

Deadlocks: Characterization- Methods for Handling Deadlocks - Deadlock Prevention - Avoidance - Detection - Recovery.

CPU Scheduling: CPU Schedulers - Scheduling Criteria - Scheduling Algorithms.

UNIT-IV

Memory Management: Swapping, Contiguous Allocation - Internal & External Fragmentation. Non Contiguous Allocation: Paging, Demand Paging and Segmentation Schemes. Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing

UNIT-V

Linux:

Linux History, Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File Systems, Input and Output, Inter process Communication, Network Structure, Security Summary.

Reference Books:

1. Silberschatz and Galvin, "Operating System Concepts", John Wiley & Sons, 7 thEd. 2005
2. Deitel. H.M .. "An Introduction to Operating Systems". Addison Wesley Publishing Company 1984.
3. Milenkovic, M., "Operating Systems· Concepts and Design". McGraw Hill International Edition Computer Science series 1992.
4. Peterson, J.L .. Abraham Silberschatz. "Operating System Concepts". Addison Wesley Publishing Company. 1989.
5. Tanenbaum, A.S., "Modem Operating Systems", Prentice Hall of India Pvt. Ltd. 1995.

COMP334: Computer Practical

Practical List Java

1. Write a Java Program find the Area of circle.
2. Write a Java Program that will display Factorial of the given number.
3. Write a Java Program that will display the sum of $1+1/2+1/3+\dots+1/n$.
4. Write a Java Program that will display Prime nos.
5. Write a Java Program to sort the elements of an array in ascending order.
7. Write a Java Program which will read a string and rewrite it in the alphabetical order eg. The word "STRING" should be written a "GINRST".
8. Write a java program which show the application of constructors.
9. Write a java program which show the use of methods overloading.
10. Write a java program which show the use of static members.
11. Write a java program which show the nesting of methods.
12. Write a java program which explaining the concept of single inheritance.
13. Write a java program which show the application of constructors.
14. Write a java program which show the method overriding.
15. Write a java program which implement interface.