

**GOVT. DIGVIJAY AUTONOMOUS P.G. COLLEGE,  
RAJNANDGAON (C.G.)**



**TEACHING PLAN 2023-24**

**DEPARTMENT OF COMPUTER SCIENCE**

TEACHING PLAN  
SESSION : 2023-24  
ROHINEE SAMRIT  
DEPARTMENT OF COMPUTER SCIENCE

CLASS : BCA-III SEM  
SUBJECT : PROGRAMMING IN C++

Unit	Lecture	Contents/Topic
I JULY- AUGUST	15	Overview of OOP: object oriented paradigms, Benefits and Application of OOP. Overview of C++: History of C++, Data Type: Built in data type, User defined DT, Derived DT, Constants & Variables : Symboic constant, Dynamic Initialization of variable, Refrence Variable, Operator in C++, Control Structure(if, if_else, while, do_while, for, break, continue, switch, goto statement).
II AUGUST- SEPTEMBER	15	Structure definition, defining a structure variable, Accessing structure member, Enumeration data type. Function: Function declaration, calling function, function definition, passing argument to function, passing constant, passing value, reference argument, structure as argument, default argument, Returning values from function, return statement, returning structure variable, return by reference, overloaded function, Inline function.
III OCTOBER- NOVEMBER	15	Object, Classes & Inheritance: defining the class& its member, inline function, nesting of member function, object as function argument, memory allocation, Constructor & destructor: Null, Default, parameterized, copy, constructor with default argument, class destructor.
IV NOVEMBER- DECEMBER	15	Introduction of pointers, "&" and "*" operator, pointer to object, this pointer, Pointer to derived class, Inheritance, Types of Inheritance, function overriding, Access Specifiers : Public, private, protected. Polymorphism: Dynamic and static polymorphism, Friend function, Friend class, Overloading binary operators using friend function.

CLASS : B.Sc.- I SEM (SEC)  
SUBJECT : INFORMATION TECHNOLOGY

**Syllabus**

September	UNIT-1	History of computer, Generation of computer, Major components of digital Computers, Computer I/O devices .
October	UNIT- II	<b>Number System</b> : Decimal, Binary, Octal , Hexa Decimal , 1's & 2's Compliment , Codes – Grey, BCD , ASCII, EBCDIC.
November	UNIT - III	Primary and Secondary Memory, Cache memory. Memory hierarchy, Computer Hardware, Software and firmware, Application and System Software, Open Source Software.
December	UNIT- IV	Introduction Word Processing, Advantages of word Processing, header & footer, finding text setting up printer. Mail Merge, Table handling.

CLASS : BCA-III YEAR

SUBJECT : COMPUTER SYSTEM ARCHITECTURE

JULY-AUGUST

**UNIT I**

Data Representation - Data Types, Number System, Fixed Point Representation - 1's, 2's complement, Binary Fixed point representation, Arithmetic operation on Binary operation Overflow & Underflow, Codes, ASCII, EBCDIC codes. Grey codes, Excess-3, BCD codes Error detection & correcting codes.

SEPTEMBER-OCTOBER

**UNIT II**

Digital Logic Circuits - Logic Gates AND, OR, NOT, Gates & their truth tables, NOR, NAND XOR Gates, Boolean algebra, Basic Boolean Law, DeMorgan's theorem, Map Simplification minimizing technique, K Map, Sum of products, Product of sums, Combinational & sequent circuits Half adder & Full adder, Full Subtractor, Flip Flop - RS, D, JK & T Flip Flop, Shift register, RAM & ROM.

NOVEMBER-DECEMBER

**UNIT III**

CPU organization, ALU & control circuit, Idea about arithmetic circuits, Program control Instruction sequencing, Introduction to Microprocessor, System buses, Registers, Program counter, Block diagram of a Macro computer system, Microprocessor control signals, Interfacing devices, Introduction to Motherboard, SMPS

JANUARY-FEBRUARY

**UNIT IV**

Input output organization, I/O Interface, Properties of simple I/O devices and their Controller isolated versus Memory mapped I/O, Modes of Data transfer, Synchronous & Asynchronous Transfer, Handshaking, Asynchronous serial transfer, I/O processor

FEBRUARY-MARCH

**UNIT V**

Auxiliary memory - Magnetic drum, Disk & Tape, Semiconductor memories, Memory hierarchy, Associative memory, Virtual memory, address space & memory space, Address mapping, Page table, Page replacement, cache memory, Hit ratio, Mapping Techniques, Writing cache.

CLASS : M.Sc.(CS)-I SEM

SUBJECT : COMPUTER SYSTEM ARCHITECTURE

JULY-AUGUST

**UNIT - I : Representation of Information**

Number system, Integer & Floating point representation Character code (ASCII, EBCDIC), Error Detect and Correct code, Basic Building Blocks, Boolean Algebra, MAP Simplification, Combination Blocks, Gates, Multiplexers, Decoders, etc Sequential building block, flip-flop, registers, counters, ALU, RAM etc.

AUGUST-SEPTEMBER

**UNIT - II : Register transfer language and micro operations**

Concepts of bus, data movement along registers, a language to represent conditional data transfer, data movement from its memory, arithmetic and logical operations along with register transfer timing in register transfer

OCTOBER

**UNIT - III : Basic Computer Organization and Design**

Instruction code, Computer Instructions, Timing and Control, Execution of Instruction, Input and Output Interrupt, Design of Computer.

NOVEMBER

**UNIT - IV : Computer Software**

Programming Language, Assembly Language, Assembler, Program Loops, Input /Output Programming, System Software. Central Processor Organization: - Processor Bus Organization, Arithmetic Logic Unit, Stack Organization, Instruction Formats, Addressing modes, Data transfer and Manipulation, Program Control, Microprocessor Organization, Parallel Processing.

NOVEMBER-DECEMBER

**UNIT - V : Input-Output & Memory Organization**

Input-Output Organization : Peripheral Devices, Input/Output Interface, Asynchronous Data Transfer, Direct Memory Access (DMA), Priority Interrupt, Input-Output Processor, Multiprocessor System Organization, and Data Communication Processor.

Memory Organization : Auxiliary Memory, Micro Computer Memory, Memory Hierarchy, Associative Memory, Virtual Memory, Cache Memory, Memory Management Hardware.



CLASS : M.Sc.(CS)-III SEM  
SUBJECT : COMPUTER GRAPHICS

JULY-AUGUST

**Unit-I**

Introduction of computer Graphics and its applications, Overview of Graphics systems, Video display devices, Raster scan display, Raster scan systems, video controller, Raster scan display processor, Random scan display, random scan systems, color CRT monitor, Flat panel display, Interactive input devices, Logical classification of input devices, Keyboard, mouse, Trackball and spaceball, Joysticks, Image scanner, Light pens, Graphics software, Coordinates representations, Graphics functions.

AUGUST-SEPTEMBER

**Unit-II**

Line drawing algorithms, DDA, Bresenham's, Circle generating, Mid-point circle algorithm, Ellipse generating, Polynomials, Scan-line polygon fill, Boundary fill.

OCTOBER

**Unit-III**

Basic transformation's, Translation, Rotation, Scaling, Matrix representation's & homogeneous coordinates, Composite transformation's, Reflection, Two dimensional viewing, Two dimensional clipping, Line, Polygon, Curve, Text. 3D-transformation,.

NOVEMBER

**Unit-IV**

Projection, Viewing, Clipping, Spline representation, Cubic spline, Bezier curve, Bezier surfaces, Beta spline, B-spline surfaces, B-spline curve, Hidden surfaces, Hidden lines, Z-buffer.

NOVEMBER-DECEMBER

**Unit-V**

Fractal's geometry Fractal generation procedure, Classification of Fractal, Fractal dimension, Fractal construction methods. Color models, XYZ, RGB, YIQ, CMY & HSV, Shading algorithms, Shading model, Illumination model, Gouraud shading, Phong shading.

CLASS : BCA-II SEM  
SUBJECT : DIGITAL ELECTRONICS

JANUARY

**Unit - I**

**Number systems** : Binary number system, Octal & Hexa-decimal number system. Conversion of Number System,  $r$ 's &  $(r-1)$ 's, Binary arithmetic Operations, complement weighted & unweighted codes (BCD, Excess-3, Gray code).

FEBRUARY

**Unit - II**

**Logic Gates**: AND, OR, NOT GATES and their Truth tables. NOR, NAND & XOR gates.  
**Boolean algebra**: AND, OR, Inversion, Basic Boolean Law's, Demorgan's theorem. Minimization techniques: K -Map, Sum of Product & Product of Sum.

MARCH

**Unit III**

**Combinational circuits**: Multiplexers, Demultiplexers, Decoders & Encoders. Half Adder, Full Adder, Half Subtractor, Full Subtractor.

APRIL

**Unit -IV**

**Sequential Circuits**: Flip Flop, Types of Flip Flop: R-S, D, J-K, T, Master Slave, and State Realization of one Flip Flop Using Other Flip Flop, Registers, Counters.

CLASS : B.Sc.-II SEM (SEC)  
SUBJECT : INFORMATION TECHNOLOGY

### Syllabus

#### JANUARY - MARCH

Word Processing, Working with Word processor , header & footer, Mail Merge, Table handling. Introduction to Spreadsheet, Working on spreadsheet, graph and chart creation. Introduction to Presentation: Creating a presentation, slide format, Applying Transitions. Presentation animations and linking, Slide show setting .

CLASS : M.Sc.(CS)-II SEM  
SUBJECT : ADVANCED COMPUTER NETWORKS

#### JANUARY UNIT - I

**Introduction to Computer Networking** : The Concept of Networking, Data Communication, Required network elements, The role of Standards Organization. Line Configuration, Various Topologies, Transmission Mode, Categories of Networks- LAN, MAN, WAN. The benefits of a Computer Networks.

**The OSI and TCP/IP Reference Model** : The Concept of Layered Architecture, Design Issues for the Layers. Interfaces and services, Detailed Functions of the Layers. Comparison between OSI and TCP/IP Reference model.

#### FEBRUARY UNIT - II

**Transmission of Digital Data** : Shannon's and Nyquist theorems for maximum data rate of a channel. Transmission media- Co-axial, UTP, Fiber optic and wireless. Analog and digital data Transmission- parallel and serial transmission. DTE-DCE interface using RS-232C. Study of modems- 56k and Cable Modem. **M.SC. COMPUTER SCIENCE 2022-23**. Modem standards.

**Multiplexing and Switching** : The Concept of Multiplexing- FDM, TDM, WDM. The Concept of Switching- Circuiting, Message switching, Packet switching.

#### FEBRUARY-MARCH UNIT - III

**Data Link Layer and Routing Algorithms** : Line Discipline, Flow Control- stop and wait, sliding window, Go back N, Error Control- ARQ stop and wait, sliding window ARQ. HDLC, SLIP, PPP. Multiple access protocols- ALOHA, Slotted ALOHA, CSMA/CD. IEEE standards for LAN's and MAN's. The IP protocol, and its header. IP address classes and subnetmask.

**The concept of ICMP, ARP, RARP, RSVP, CIDR and Ipv6** : Routing algorithms- shorted path first, Distance Vector, Link State. Congestion Control-The leaky bucket and Token bucket Algorithms.

#### MARCH-APRIL UNIT - IV

**Transport Layer** : The Concept of client and Server in terms of Socket addressing in Transport layer. Two way and three-way handshaking. TCP header. Network Performance Issues. The Concept of Domain Name System, Various Resource Records. Architecture and services of E-mail (RFC-822 and MIME). The Concept of World Wide Web- server side and client side.

**ATM** : The concept of ATM, ATM Adoption layers- AAL1, AAL2, AAL3/4, AAL5, Comparison of AAL protocols. Cell formats for UNI and NNI. Service Categories, Quality of service, Congestion Control in ATM.

#### APRIL

#### UNIT - V

**Comparative study of Networking Technologies** : X.25, Frame Relay, ATM, SONET, SMDS, ISDN.  
**Network Security** : The importance of Security in Networking, traditional cryptography, Data Encryption

CLASS : M.Sc.(CS)-II SEM  
SUBJECT : PYTHON PROGRAMMING

#### **Unit I JANUARY**

Introduction to Python :- Structure of a Python Program, Elements of Python. Python Interpreter ,Installing Python, basic syntax, interactive shell, editing saving and running a script; The concept of data types, variables, assignments; immutable variables; numerical types, operators(Arithmetic Operator, Relational Operator, Logical or Boolean Operator, Assignment Operator, Ternary Operator, Bitwise Operator, Increment or Decrement Operator) and expressions; comments in the program,

#### **Unit II FEBRUARY**

Creating Python Programs: Input and Output Statements, Control Statements (Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass). Function : Defining a function, calling a function, types of function, Function Arguments, Anonymous Functions, global and local variables, Recursion , Strings and Text Files: - Manipulating files and directories, os and sys modules, text files: reading/writing text and numbers from/to a file, creating and deleting a formatted file (csv or tab-separated).

#### **Unit III MARCH-APRIL**

Lists, Tuples and Dictionaries :Basic list operators, replacing, inserting and removing an element, searching and sorting lists, Accessing tuples, Operations, Working Functions and Methods, dictionary literals, Adding and Removing keys, accessing and replacing values, traversing dictionaries. Package-Introduction, importing from package, json, Exception handling - try,else, finally, raise keyword.

#### **Unit IV APRIL**

Data science using python, Data Frame-Creating Data Frame from an Excel Spreadsheet, Creating Data Frame from .csv file, Creating Data Frame from python Dictionary, Creating Data Frame from python List of Tuples, Operations on Data Frames. Data visualization-Bar Graph ,Histogram ,Creating a pie chart ,creating line graph

#### **Unit V APRIL-MAY**

NumPY Introduction, creating NumPY arrays, indexing and slicing in NumPy. Pandas Introduction, installation of panda, data frame, series, range data, slice data,drop a column, concatenation. GUI Programming: Introduction to GUI library, Advantages, Layout management, Events and binding Drawing on canvas(line, oval, rectangle etc) widget such as Frame, Label, Button, Checkbutton, Entry, Listbox, Radiobutton, Text, Spinbox Tkinter introduction, Tkinter and Python Programming, Tk Widgets widget such as Frame, Label, Button, Checkbutton, Entry, Listbox, Radiobutton, Text, Spinbox



CLASS : M.Sc.(CS)-IV SEM

SUBJECT : DATA MINING

#### JANUARY

##### **UNIT – I : Introduction & Data Warehousing and OLAP Technology for Data Mining –**

What is data mining?, Data Mining: On what kind of data?, Data mining functionality, Are all the patterns interesting?, Classification of data mining systems, What is a data warehouse?, A multi-dimensional data model, Data warehouse architecture, Data warehouse implementation, Further development of data cube technology, From data warehousing to data mining. Concept of Transaction, Transactional database, Distributed Database, Commit Protocols.

#### FEBRUARY

##### **UNIT - II : Data Preprocessing, Data Mining Primitive, Languages and System Architecture –**

Why preprocess the data?, Data cleaning ,Data integration and transformation, Data reduction, Discrimination and concept hierarchy generation, Data Mining Primitive, Data Mining Query Language, Architecture of data mining system.

#### FEBRUARY-MARCH

##### **UNIT - III : Mining Association Rules in Large Databases-**

Association rule mining, Mining single-dimensional Boolean association rules from transactional databases, Mining multilevel association rules from transactional databases, Mining multidimensional association rules from transactional databases and data warehouse, From association mining to correlation analysis, Constraint-based association mining.

#### APRIL-MAY

##### **UNIT - IV : Classification and Prediction & Cluster Analysis –**

What is classification? What is prediction? Issues regarding classification and prediction, Classification by decision tree induction, Bayesian Classification, Classification by back propagation, Classification based on concepts from association rule mining, Other Classification Methods ,Prediction, Classification accuracy, What is Cluster Analysis?, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.

#### MAY-JUNE

##### **UNIT - V:**

**Introduction to Python Programming and Application :** History of Python Programming Language, Installing Python , Python IDLE, Variables, Input &, Output statement , Operators, Conditional Statement, Looping Statement, Python For Data Analysis Numpy: Introduction to numpy Creating arrays Using arrays and Scalars Indexing Arrays Array Transposition Universal Array Function Array Processing Array Input and Output .