APPENDIX -I

Computer Section
FACULTY OF SCIENCE

SYLLABUS

BACHELOR OF COMPUTER APPLICATIONS

(B.C.A.)

B.C.A. (First and Second Semester) 2023-2024

B.C.A. (Third and Fourth Semester) 2024-2025

B.C.A. (Fifth and Sixth Semester) 2025-2026

JAI NARAIN VYAS UNIVERSITY

JODHPUR

BACHELOR OF COMPUTER PPLICATIONS
TEACHING AND EXAMINATION SCHEME 2024
First semester

Course Type	Course Code	Course Title	L	P	H/W	Credits	Sessional Marks	EoSE Marks	M.M
DCC	CSA5001T	Fundamentals Of Computers	3		3	3	30	70	100
DCC	CSA5002T	Mathematics For Computing	4		4	4	30	70	100
DCC	CSA5003T	Programming With 'C'	4		4	4	30	70	100
DCC	CSA5004T	Digital Logic	3		3	3	30	70	100
DCC	CSA5001P	'C' Programming Laboratory		2	4	2	30	70	100
DCC	CSA5002P	Office Tools Laboratory		2	4	2	30	70	100
AECC	CSA5005T	Communication Skills	2		2	2	30	70	100
		Total				**20**	**210**	**490**	**700**

BACHELOR OF COMPUTER APPLICATIONS
TEACHING AND EXAMINATION SCHEME 2024
Second semester

Course Type	Course Code	Course Title	L	P	H/W	Credits	Sessional Marks	EoSE Marks	M.M
DCC	CSA5006T	Multimedia Tools	3		3	3	30	70	100
DCC	CSA5007T	Object Oriented programming with C++	4		4	4	30	70	100
DCC	CSA5008T	Data Structure And Algorithms	4		4	4	30	70	100
DCC	CSA5009T	System Analysis and Design	3		3	3	30	70	100
DCC	CSA5003P	Object Oriented programming with C++ laboratory		2	4	2	30	70	100
DCC	CSA5004P	Data Structure And Algorithms Laboratory		2	4	2	30	70	100
AECC	CSA5010T	Environmental Science	2		2	2	30	70	100
		Total				**20**	**210**	**490**	**700**

After II Semester - Exit option with Certificate in Computer Applications (with a minimum of 40 credits)

BCA- FIRST YEAR FIRST SEMESTER

CSA 5001T FUNDAMENTALS OF COMPUTERS

Brief history of development of computers, Computer system concepts, Computer system characteristics, Capabilities and limitations, Types of computers-Analog, Digital, Hybrid, General, Special Purpose, Micro, Mini, Mainframe, Super, Generations of computers, Personal Computer (PCs) - configurations, Pentium and Newer PCs specifications and main characteristics. Types of PCs- Desktop, Laptop, Notebook, Palmtop, Workstations etc. their characteristics. Basic components of a computer system - Control unit, ALU, Input/Output functions and characteristics, memory - RAM, ROM, EPROM, PROM and other types of memory.

Keyboard, Mouse, Trackball, Joystick, Digitizing tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-code Reader, Voice Recognition, Light pen, Touch Screen, Monitors - characteristics and types of monitor -Digital, Analog, Size, Resolution, Refresh Rate, Interlaced / Non Interlaced, Dot Pitch, Video Standard - VGA, SVGA, XGA etc, Printers - Daisy wheel, Dot Matrix, Inkjet, Laser, Line Printer, Plotter, Sound Card and Speakers, Storage fundamentals - Primary Vs Secondary Data Storage and Retrieval methods - Sequential, Direct and Index Sequential, Various Storage Devices - Magnetic Tape, Magnetic Disks, Cartridge Tape, Hard Disk Drives, Floppy Disks (Winchester Disk), Optical Disks, CD, VCD, CD-R, CD-RW, Zip Drive.

Types of Software - System software, Application software, System Software - Operating System, Utility Program, Programming languages, Assemblers, Compilers and Interpreter, Operating Systems - Functions, Types- Batch, Single, Multiprogramming, Multiprocessing, Programming languages- Machine, Assembly, High Level, 4GL, their merits and demerits, Application Software - Word-processing, Spreadsheet, Presentation Graphics, Data Base Management Software, characteristics, Uses and examples and area of applications of each of them, Virus working principles, Types of viruses, virus detection and prevention, viruses on network.
Physical structure of disk, drive name,

Filesystems-FAT, NTFS, File & directory structure and naming rules, booting process, Basic commands such as DIR, MD, CD, RD, COPY, DEL, REN, VOL, DATE, TIME, CLS, PATH, TYPE , Introduction to Linux, Linux directory structure, Linux basic commands

CSA 5002T MATHEMATICS FOR COMPUTING

Set, Relation and Functions: Sets, type of sets, Cartesian product of sets, Relations, type of relation, Domain and Range of a relation, Functions, Domain, co-domain and Range of a function, types of a function, composite of a function, Binary operations, type of binary operations

Trigonometry: Concept of Angles, measurement of angles in Degree and radian and their conversions, trigonometrical ratios of angles, trigonometrical ratios of sum of two angles, trigonometrical ratio of an angle 2A in term of angle A.

Cartesian system of rectangular coordinates: The number plane, distance formula area of a triangle, section formulae, slopes of a line, locus and equation.

Straight line: To find equation of a straight line parallel to an axis: the point slope form, two-point form, intercept form, slope-intercept form, normal form, condition of concurrency for three straight lines, analytical proof of geometric theorems.

Circle and family of circles: Standard form of equation of a circle, its general form, condition of tangentancy.

Polynomial: standard form of polynomial, notation, degree of polynomial, type of polynomial (monomial, binomial, trinomial only), polynomial operations (Addition, subtraction, multiplication), solving polynomial (linear and Quadratic).

Quadratic equation: Solution of quadratic equations, symmetric functions of roots.

Matrix: Definition and type of matrices, operation on matrices i.e. addition, subtraction and multiplication of a matrix, Properties and applications, elementary transformation of a matrix, inverse of a matrix, normal form of a matrix, orthogonal matrices.
Determinants: Definition and expansion of determinants, determinant of a square matrix od order 2 and 3, minors and Cofactors, singular and non-singular matrix, Adjoint of matrix, Inverse of a matrix.

Permutation and Combinations: Factorial notations, Value of n_{P_r} and n_{C_r}

CSA 5003T PROGRAMMING WITH C

Program Concept, Programming aids: Algorithms, Flow Charts - Symbols, Rules for making Flow chart, Pseudocodes,

Introduction & features of C, Structure of C program, Variables, Expressions, Identifiers, Keywords, Data Types, Constants, Operator and expression Operator: Arithmetic, Logical, Relational, Conditional and Bit wise Operators, Precedence and Associativity of Operators, Type conversion in expression, Basic input/output and library functions Single character input/output i.e. getch(), getchar(). getche(), putchar(),Formatted input/output i.e. printf() and scanf(), Library functions

If statement, If.....Else statement, Nesting of If....Else Statement, else if ladder, The ?: operator, Switch statement, Compound statement, Loop controls, for, while, do-while loops, break, continue,
ARRAYS Single and Multi Dimensional arrays, Array declaration and initialization of arrays,
Strings : declaration, initialization, functions.
The need and form of C functions, User defined and library functions, Function arguments, Return values and nesting of function, Recursion, Calling of functions, Scope and life of variables - local and global variable, Storage class specified - auto, extern, static, register.

Defining structure, Declaration of structure variable, accessing structure members, Union,
working with text files reading a text file and writing to a file.
Understanding pointers, Declaration and initializing pointers, pointer expressions

CSA 5004T DIGITAL LOGIC

Data types and Number systems, Binary number system, Octal & Hexa-decimal number system,1's&2's complement, Binary Fixed-Point Representation,
Arithmetic operation on Binary numbers, Overflow & underflow, Floating Point Representation, Codes, ASCII, EBCDIC codes, Gray code, Excess-3&BCD

Logic Gates, AND, OR, NOT GATES and their Truth tables, NOR, NAND & XOR gates, Boolean Algebra, Basic Boolean Law's, Demorgan's theorem, MAP Simplification, Minimization techniques, K–Map- 2,3 variable, Sum of Product & Product of Sum
Combinational circuits: Half Adder & Full Adder, Half sub tractor, Full sub tractor, Multiplexer, Demultiplexer, Encoder, Decoder,

Idea about Arithmetic Circuits, Program Control, Instruction Sequencing, Auxiliary memory, Associative Memory, Virtual Memory,

Sequential circuits: Flip Flops: RS, D using NAND and NOR Gates, Gated Flip Flops (latches), J-K Flip Flop, T- Flip Flop, J – K Master Salve Flip Flop Registers: Sift Register, Buffer Register.

CSA 5001P C PROGRAMMING LABORATORY

1. Program to read radius of a circle and to find area and circumference
2. Program to read three numbers and find the biggest of three
3. Program to demonstrate user defined and built in library functions
4. Program to check for prime number
5. Program to print prime numbers
6. Program to read a number, find the sum of the digits, reverse the number and check it for palindrome
7. Program to read numbers from keyboard continuously till the user presses 999 and to find the sum of only positive numbers
8. Program to read percentage of marks and to display appropriate message (Demonstration of else-if ladder)
9. Program to find the roots of quadratic equation (demonstration of switch Case statement)
10. Program to read marks scored by n students and find the average of marks
11 Program to find the length of a string without using built in function
12. Program to demonstrate string functions.
13. Program to demonstrate pointers in C
14. Program to read a file and write to a file

CSA5002P OFFICE TOOLS LABORATORY

1. Write a paragraph in MS-Word and show the use of various tools.
2. Write an application & copy it to another document and differentiate between paste and paste special.
3. How to Insert a picture or chart in a document and reference it to another document?
4. Write a paragraph in MS-Word of 12 lines and Explain these Formatting tools:-
   - Columns.
   - Drop cap.
   - Paragraph.
   - Alignment.
   - Bullet and Numbering.
   - Tab Setting.
5. What is mail merge? How to use this facility? Describe it Step by Step.
6. Create a Student Table(Rno, Name, Fname, Class, Address, Phone)and insert 5 records in it and delete one record.
7. To study various charts and their implementations using a marksheet of 10 students.
8. Create a salary statement of an organization of 10 employees using if condition (S.no. , Name, Designation, Basic, Da, Hra, total, net salary)
9. Create a
10. Create a power point presentation to present your institution detail, create at least 7 slides with different animation effect.
11. Create a power point presentation on "destination India" using images from clipart.
12. Create a power point presentation on "youth icon of India" and show the following
13. Custom Animation.
14. Compare and Merge Presentations.
15. Slide Design.

CSA 5005T COMMUNICATION SKILLS

Theory of Communication: What are Communication, Types of Communication, Process of Communication, and Feedback, Barriers of communication, importance and Purpose of communication, Verbal and non-Verbal communication, Formal and Informal communication.

Non-Verbal Communication: Personal Appearance, Gestures, Postures, Face Expression, Eye Contact ,Body Language, Tips for improving Non-Verbal Communication.

Motivation: Concept of Motivation, Types of Motivation, People Skills, General Awareness

Reading and Listening skills, Writing and speaking skills: Note making, Letter writing, writing formal letters, Memo, circulars Agenda , E-mail, Fluency Enhancement, Group Discussion, Role Play, Anchoring , Effective writing

PRESENTATION SKILLS : Techniques of Presentation, Planning a Presentation, Preparing a Presentation, Methods of preparing Presentation, Delivering the Presentation, Removal of stage fear, Tools of Presentation (Transparencies, Slides & Audio-Visual Tools) ,

Oral presentation skills - Preparation of Formal Speech, Meetings, Interviews, Group Discussion, Debate, Elocution, Extempore, Public speaking

BCA- FIRST YEAR SECOND SEMESTER

CSA 5006T MULTIMEDIA TOOLS

Identifying Multimedia elements – Text, Images, Sound, Animation and Video, Making simple multimedia with PowerPoint. Text – Concepts of plain & formatted text, RTF & HTML texts, using common text preparation tools, Conversion to and from of various text formats, using standard software, Object Linking and Embedding concept, Basics of font design, overview of some fonts editing and designing tools, Understanding & using various text effects.

Images – importance of graphics in multimedia, Vector and Raster graphics, image capturing methods – scanner, digital camera etc. various attributes of Images – size, color, depth etc, Various Image file format – BMP, PIC, JPG, PNG and TIF format – their features and limitations, processing images with common software tools such as Photoshop, Paint Shop pro, Corel draw etc..

Sound: Sound and it Attributes, Mono V/s Stereo sound, Sound Depth, Channels, Capturing and Editing sound on PC, Overview and using some sound recording, editing software. Overview of various sound file formats on PC – WAV, MP3, MP4

Animation: Basics of animation, Principle and use of animation in multimedia, Effect of resolutions, pixel depth, Images size on quality and storage. Overview of 2-D and 3-D animation techniques and software Animation on the Web, creating simple animations for the Web using GIF Animator and Flash.

Video: Basics of Video –Introduction to graphics accelerator cards, DirectX, Interlacing and non-interlacing, Brief note on various video standards – NTSC, HDTV, Introduction to video capturing Media & instrument – Videodisk, DVCAM, Camcorder,
Introduction to digital video compression techniques and various file formats – AVI, MPEG,
Multimedia on the Web: Text in the web, Audio on the Web – Real Audio and MP3/MP4, Video on the Web – Streaming video,

CSA5007T OBJECT ORIENTED PROGRAMMING WITH C++

Basic concept of Object Oriented Programming, concept of class, object, inheritance, encapsulation, polymorphism.

Structure of C++ program, token and identifier, data types, operator, type conversion and type cast operators. Console I/O cin and cout. Control statements, if, loops, break, continue, goto.

Functions- Declaration, definition, parameter passing, reference variable, overloaded functions, inline functions, default arguments, return by reference.

Classes and objects, class definition, object declaration, constructors and destructors, dynamic initilization of objects, copy constructors.

Operator overloading, unary, binary operator, data and type conversions, conversion among objects, basic types and different classes.

Derived classes and base classes, protected access specifier, derived class constructors, abstract base class, inheritance – public and private inheritance, multiple inheritance, member function, constructor, ambiguity in inheritance.

Pointers, addresses, pointers and strings, memory management using new and delete operator.

Virtual functions, friend function, static function, dynamic binding.

File handling, File Operation functions and attributes.

Introduction to streams, templates and exception handling.

CSA 5008T DATA STRUCTURES AND ALGORITHMS

Elementary data Structures: Arrays, STACKS: Definition, implementation, operations on stack, application of stacks, evaluation of arithmetic expression and recursion, Prefix fix and post fix notations, evaluation of post fix expression using stacks, parenthesis matching using stck

Queues: Queue data structure, implementation, operations on queues- insertion, deletion, Circular queue, applications

Linked lists: Singly linked list, Inserting and deleting element, searching in a list, Circularly linked list, Doubly linked list Application of linked list:

Trees: Concepts and terminology, tree representation using linked list, Binary tree, Linear and linked representation of binary tree, Tree traversal, In order, Preorder and post order traversal.

Graphs: Representation, Adjacency matrix, Graph traversal, Breadth first search and Depth first search traversal.

Searching and Sorting: Sequential searching, binary searching, Bubble, Selection and Insertion sort, quick sort and merge sort, Hashing

CSA 5009T System Analysis and Design

System Development Life Cycle: Various phases of system development, Considerations for system planning and control for system success.

Initial Investigation: Determining users requirements and analysis, fact finding process and techniques.
Feasibility study: Determination of feasibility study, Technical, Operational & Economic Feasibilities, System performance constraints, and identification of system objectives, feasibility report.

Cost/Benefit Analysis: Data analysis, cost and benefit analysis of a new system. Categories determination and system proposal.

Tools of structured Analysis: Logical and Physical models, context, diagram, data dictionary, data diagram, form driven methodology, IPO and HIPO charts, Gantt charts, system model, pseudo codes, Flow charts- system flow chart, run flow charts etc., decision tree, decision tables, data validation,
Input/ Output and Form Design: Input and output form design methodologies, menu, screen design, layout consideration.

Management standards, Documentation standards – User Manual, system development manual, programming manual, programming specifications, operator manual.
System testing & quality: System testing and quality assurance, steps in system implementation and software maintenance.
System security: Data Security, Disaster/ recovery and ethics in system development, threat and risk analysis.

CSA 5003P OBJECT ORIENTED PROGRAMMING WITH C++ LABORATORY

1. Write a program to read your name and display the name and its length
2. Write a program to implement a point class having p(x,y). Perform following
   - Swap the value of two point objects
   - Pass a point object to a function and modify the value and return the object.
3. Write a program to create a time class. Perform the addition of time in hour and minute format.
4. Write a program to add two complex numbers using operator overloading.
5. Write a program for string addition and string comparison using operator overloading (use + & == operators).
6. Write a program that reads a text file and create a file that is identical to it except that every consecutive sequence of blank spaces is replaced by a single space.
7. Create a data file that will store the marks obtained by students in three subjects. Read the created file , find total of each student and create a new file with marks obtained in three subjects and total.
8. Write a program containing an exception. Use try and catch to handle the exception.

9. Write a program to implement Inheritance of various types

CSA 5004P DATA STRUCTURE AND ALGORITHMS LABORATORY

1. Design and implement Stack and its operations using arrays
2. Design and implement Queue and its operations using arrays
3. Design and implement linked list and its operations
4. Write a program to create a tree using linked list
5. Write a program to represent a graph using adjacency matrix
6. Write a program to implement linear search
7. Write a program to implement binary search
8. Write a program to implement Selection sort
9. Write a program to implement Insertion sort

CSA 5010T ENVIRONMENTAL SCIENCE

The multidisciplinary nature of environmental studies, Definition, scope and importance, Need for public awareness.

Natural Resources: Renewal and non-renewable resources, Natural Resources and associated problems.
Forest Resources: Use and over – exploration, deforestation, mining and their effects on forest and tribal people.
Water Resources: Use and over-utilization of surface and groundwater, floods and drought.
Food Resources: World food problem, effects of modern agriculture, fertilizer & pesticide problems.
Land Resources: Land degradation, soil erosion and desertification.

Ecosystem: Structure and function of an ecosystem. Energy flow in the ecosystem, food chains, food webs and ecological pyramids.

Structure and function of following ecosystem - Desert ecosystem and Aquatic ecosystem

Biodiversity and its conservation: Introduction, Definition, Value of Biodiversity, Threats to biodiversity, Important endangered and endemic species of India.

Environmental Pollution: Definition, causes, effects and control measures of : Air pollution, water pollution and soil pollution.