DEPARTMENT OF COMPUTER APPLICATIONS

PROGRAMME: BCA

Programme Specific Outcomes (PSOs)

PSO	PSO Statement
	Upon completion of the Bachelor of Computer Applications Degree Programme, the graduates will be able to:
PSO1	Create applications and programmes that have the chance to change the world.
PSO2	Create a multifaceted career in the Global IT Industry with lucrative career prospects
PSO3	Foster creativity and innovative thinking by addressing design and developmental trade-offs in the IT industry for providing a real time solution
PSO4	Understand, analyse and develop computer programs in the areas related to algorithm, web design and networking for efficient design of computer based system.

CORE COURSES

Course Outcomes (COs)

Course	Details
Year/ Semester	I/I
Type	Core Course (Theory)
Code	CA1CRT01
Title	Computer Fundamentals and Digital Principles
Credits	4
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement
	Upon completion of this course, the students will be able to:
CO1	Define different types of computers, computer hardware and peripheral devices.
CO2	Summarize the ideas of Operating System and computer networks, its types.
CO3	Understand the basic structure of number system methods like binary, octal and hexadecimal and understand complements of number system and BCD numbers.
CO4	Explain Boolean algebra, its laws, and rules to simplify the Boolean expressions using K-Map.
CO5	Describe different types of flip-flops and concepts of registers.

Course	Details
Year/ Semester	I/I
Type	Core Course (Theory)
Code	CA1CRT02
Title	Methodology of Programming and C Language
Credits	3
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Learn Introduction to Programming
CO2	Understand the basic structure of C Character Set, Tokens, Data types and Operators
CO3	Summarize the Input and Output in C and Loop Controls
CO4	Define Arrays, Strings and Pointers
CO5	Describe different types of Storage classes, Functions, Recursion, Structure and Union, Pointers and Dynamic Memory Allocation

Course	Details
Year/ Semester	I / I
Type	Core Course
Code	CA1CRP01
Title	Software Lab I
Credits	2
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Construct printf() and scanf() functions
CO2	Develop decision statements, break, goto, continue, switch and loop control statements
CO3	Demonstrate Arrays and Strings
CO4	Construct Pointers and Functions
CO5	Demonstrate Structure and Union and Dynamic memory allocation

Course	Details
Year/ Semester	I/II
Type	Core Course
Code	CA2CRT03
Title	Data Base Management Systems
Credits	3
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Explain the characteristics of Database Approach
CO2	Describe the Entity- Relationship Modelling and Relational Model concepts
CO3	Explain DDL, DML and SQL Queries
CO4	Discuss Normalization and Indexing Structures for files
C05	Define Transaction Processing and Database Security

Course	Details
Year/ Semester	I / II
Type	Core Course (Theory)
Code	CA2CRT04
Title	Computer Organization and Architecture
Credits	3
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Explain the basics of instruction cycle and the registers used involved in it.
CO2	Compute the effective address in various instructions using addressing modes.
CO3	Compare and contrast different types of memory and memory mapping techniques
CO4	Describe parallel processing and architectural classification scheme
CO5	Solve problems using instruction pipelines and arithmetic pipelines

Course	Details
Year/ Semester	I/II
Type	Core Course (Theory)
Code	CA2CRT05
Title	Object Oriented Programming using C++
Credits	4
Hrs/ week	3
Total Hrs	54

CO No.	CO Statement
	Upon completion of this course, the students will be able to:
CO1	Understand the difference between object oriented programming and procedural oriented language and data types in C++.
CO2	Explain the basic ideas of specifying a class, memory allocation for objects .
CO3	Explain constructors, destructors and overloading.
CO4	Identify the concepts of inheritance and its types
CO5	Recognize the usage of pointers and explain the usage of Files

Course	Details
Year/ Semester	I / II
Type	Core Course (Practical)
Code	CA2CRP02
Title	Software Lab II
Credits	2
Hrs/ week	5
Total Hrs	90

| CO No. | CO Statement

Upon completion of this course, the students will be able to: |
|---|---|
| CO1 | Develop DDL Commands |
| CO2 | Construct basic SQL Queries, Complex Queries |
| CO3 | Demonstrate Managing Views and Data Control Commands |
| CO4 | Develop array of objects, operator overloading using friend function and member function. |
| CO5 | Demonstrate constructors, destructors, inheritance and its types |

Course	Details
Year/ Semester	II /III
Type	Core Course
Code	CA3CRT06
Title	Computer Graphics
Credits	4
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Explain the basics of Computer Graphics, Raster Scan Systems, Random Scan Systems, Input Devices, Video Display Devices
CO2	Describe DDA Algorithm, Bresenham's Algorithm, Mid point Circle Algorithm
CO3	Define 2D Geometric Transformations and Two Dimensional Viewing
CO4	Discuss Three Dimensional Concepts
C05	Describe Computer Animation

Course	Details
Year/ Semester	II/III
Type	Core Course (Theory)
Code	CA3CRT07
Title	Microprocessor and PC Hardware
Credits	3
Hrs/ week	3
Total Hrs	54

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Describe the concept of Intel 8085 microprocessor
CO2	Explain Intel 8085 instruction set.
CO3	List the basic concepts of Motherboard.
CO4	List the basic concepts of hard disk.
CO5	Explain different types of memory and memory modules .

Course	Details
Year/ Semester	II / III
Type	Core Course (Theory)
Code	CA3CRT08
Title	Operating Systems
Credits	4
Hrs/ week	4
Total Hrs	72

| CO No. | CO Statement

Upon completion of this course, the students will be able to: |
|---|---|
| CO1 | Describe basic principles and modules of operating systems |
| CO2 | Compare and contrast various process scheduling algorithms and scheduling criteria |
| CO3 | Understand the concepts of synchronization and deadlock |
| CO4 | Summarize various memory management strategies and virtual memory management |
| CO5 | Explain storage management, file system concepts and implementing

file systems |

Course	Details
Year/ Semester	II / III
Type	Core Course (Theory)
Code	CA3CRT09
Title	Data structures using C++
Credits	3
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Understand various structures of data and the differences between them.
CO2	Explain basic concepts of searching and sorting and understand the organization and operations on stacks
CO3	Understand the basic operations and organization of linked lists and trees
CO4	Explain different types of secondary storage devices and their organization
CO5	Understand the basics of hashing and different collision avoidance mechanisms prevalently used.

Course	Details
Year/ Semester	II / III
Type	Core Course
Code	CA3CRP03
Title	Software Lab III
Credits	2
Hrs/ week	6
Total Hrs	108

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Demonstrate typical array operations such as insertion, deletion, searching, sorting and traversing etc.
CO2	Demonstrate the operations on stack and conversion of postfix and prefix expressions and other stack applications.
CO3	Demonstrate queues and different variations of queues.
CO4	Demonstrate the operations of various types of linked list.
CO5	Demonstrate the operations of trees along with different traversal methods and search techniques.

Course	Details
Year/ Semester	II / IV
Type	Core Course
Code	CA4CRT10
Title	Design and Analysis of Algorithms
Credits	4
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Explain the concepts of algorithm design techniques and various methods along with basic of performance analysis and time analysis
CO2	Understand the divide and conquer technique and various problems along with performance analysis.
CO3	Understand the greedy algorithm technique and various problems along with performance analysis.
CO4	Understand the dynamic programming technique and various problems along with performance analysis.
CO5	Understand the back tracking technique and various problems along with performance analysis.

Course	Details
Year/ Semester	II / IV
Type	Core Course
Code	CA4CRT11
Title	System Analysis and Software Engineering
Credits	4
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement
	Upon completion of this course, the students will be able to:
CO1	Explain the SDLC Life Cycle Activities
CO2	Understand the introduction to Software Engineering
CO3	Understand the Feasibility Study, DFD, Data Dictionaries and Project planning
CO4	Describe Software Design and Software Reliability
CO5	Define Software Testing

Course	Details
Year/ Semester	II / IV
Type	Core Course (Theory)
Code	CA4CRT12
Title	Linux Administration
Credits	4
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Understand basic concepts of Linux operating system, standard directories and commands
CO2	Distinguish between essential Linux commands, process scheduling and mathematical commands
CO3	Explain the basics of shell programming, conditional and looping statements
CO4	Discuss common administrative tasks and how to retrieve system information
CO5	Describe simple filter commands and understand various servers

Course	Details
Year/ Semester	II/IV
Type	Core Course (Theory)
Code	CA4CRT13
Title	Web Programming using PHP
Credits	3
Hrs/ week	3
Total Hrs	54

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Understand the fundamentals of web, HTML.
CO2	Create and format the contents of webpage with CSS .Create dynamic, Interactive WebPages using JavaScript
CO3	Understand PHP and its data types.
CO4	Explain PHP functions and error handling.
CO5	Develop knowledge of MySQL commands and use PHP to access a MySQL database

Course	Details
Year/ Semester	II / IV
Type	Core Course (Practical)
Code	CA4CRP04
Title	Software Lab IV
Credits	2
Hrs/ week	6
Total Hrs	108

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Develop shell scripts using various Linux commands
CO2	Demonstrate the use of file system commands and process related commands
CO3	Learn to design a static website using HTML and CSS
CO4	Learn to create PHP programs and difference between GET and POST methods
CO5	Learn to create web application using server-side PHP and database connectivity using MySQL

Course	Details
Year/ Semester	III / V
Type	Core Course
Code	CA5CRT14
Title	Computer Networks
Credits	4
Hrs/ week	3
Total Hrs	54

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Explain how computer networks actually work and understand the things that goes behind the scenes of data communication.
CO2	Understand the various network models and analyze the association between models and protocols to enable a smooth communication over heterogeneous computer configurations.
CO3	Understand different transmission medias used in data communication systems and the basic technical terminologies related to them.
CO4	Understand wireless and wired standards used in data communication and the analyse various network connecting devices
CO5	Understand the network security, common threats, firewalls, and cryptography

Course	Details
Year/ Semester	III / V
Type	Core Course
Code	CA5CRT15
Title	IT & Environment
Credits	4
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Understand the basics of environmental studies and various types of natural resources and problems faced threatening their existence.
CO2	Understand the serious threats of environmental pollution and the various social issues related to it.
CO3	Understand the advantages of internet and the introduce various ways in which internet can be used for betterment of society. Briefly discusses the academic software's which are useful for educational purpose
CO4	Describe the various ways IT influences and impacts society and behaviour of the collective and discuss the threats posed by Electronic waste
CO5	Understand basics of human rights, working of United nations and various laws that protect the human rights and conserve the natural resources.

Course	Details
Year/ Semester	III / V
Type	Core Course (Theory)
Code	CA5CRT16
Title	Java Programming using Linux
Credits	3
Hrs/ week	3
Total Hrs	52

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Describe object-oriented programming concepts, features of Java and Java tokens
CO2	Explain the concepts of class, methods and types of inheritance
CO3	Demonstrate the use of arrays, strings, packages and exception handling techniques
CO4	Discuss the concepts of event handling, swing components and layout managers
CO5	Summarize applet fundamentals and JDBC architecture

Course	Details
Year/ Semester	III / V
Type	Core Course (Practical)
Code	CA5CRP05
Title	Software Lab V
Credits	2
Hrs/ week	5
Total Hrs	90

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Develop Java programs using applet and swing components
CO2	Demonstrate the use of JDBC connection
CO3	Construct programs related to method overloading, method overriding
CO4	Construct programs related to different types of inheritance and "super" keyword
CO4	Demonstrate the concepts of exception handling, multithreading, interfaces and packages

Course	Details
Year/ Semester	III/V
Type	Mini Project
Code	CA5CRP06
Title	Software Development Lab I (Mini Project)
Credits	2

CO No	CO statement Upon completion of this course the students will be able to:
CO1	Develop practical ability .
CO2	Develop and design a system based on Software Engineering.
CO3	Understand ability and knowledge about practical tools and techniques.
CO4	Demonstrate the application of their programming and research skills .
CO5	State the findings of the study and its implications for present/future enhancements.
CO6	Design and evaluate system inputs and outputs .

Course	Details
Year/ Semester	III / VI
Type	Core Course (Theory)
Code	CA6CRT17
Title	Cloud Computing
Credits	4
Hrs/ week	4
Total Hrs	74

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Describe cloud computing concepts, computing platforms and technologies
CO2	Explain the concepts of virtualization and Technology Examples
CO3	Discuss the Cloud Computing Architecture, Types of Clouds
CO4	Discuss the concepts of Aneka clouds and data intensive computing
CO5	Summarize about various cloud platforms in industry and cloud Applications

Course	Details
Year/ Semester	III/VI
Type	Core Course (Theory)
Code	CA6CRT18
Title	Mobile Application Development-Android
Credits	4
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Understand about the architecture and features of Android
CO2	Explain the Android user interface and different views.
CO3	Describe activity ,broadcast and multimedia.
CO4	Summarize the use of SQLite Database in Android
CO5	Compare JSON and XML and understand google play services.

Course	Details
Year/ Semester	III / VI
Type	Elective Course
Code	CA6ELT03
Title	Soft Computing Techniques
Credits	4
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Understand basic concepts of soft computing techniques and neural networks.
CO2	Understand the learning process involved in training of neural networks and the mathematical concepts and theorems.
CO3	Understand and analyze the basic concepts of fuzzy systems and difference between fuzzy and classical set theory.
CO4	Evaluate and analyse the applications and the basic mathematical concepts and theorems related to fuzzy systems
CO5	Understand the purpose and methods of genetic algorithms and the various applications.

Course	Details
Year/ Semester	III / VI
Type	Core Course
Code	CA6CRP07
Title	SOFTWARE LAB VI & SEMINAR
Credits	2
Hrs/ week	6
Total Hrs	36

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Creating Android Apps using SQLite
CO2	Understand the installation and configuration of Eclipse and Development Tools
CO3	Develop the habit of researching various topics and analysing them to form a critical judgement about a topic.
CO4	Present themselves with confidence to a wider audience and develop public presentation skills.

Course	Details
Year/ Semester	III/VI
Type	Main Project
Code	CA6CRP08
Title	Software Development Lab II(Main Project)
Credits	3

CO No	CO statement Upon completion of this course the students will be able to:
CO1	Develop quality software solutions .
CO2	Evaluate System Requirements.
CO3	Understand and gain the knowledge of the principles of SoftwareEngineering Practices.
CO4	Develop the ability to assess the implications of work performed.
CO5	Perform coding for the project.
CO6	To decide the future scope and enhancement of the system .

COMPLEMENTARY COURSES

Course	Details
Year/ Semester	I/I
Type	Complementary
Code	MM1CMT03
Title	Discrete Mathematics (I)
Credits	4
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Define propositional calculus. Explain what makes up a correct mathematical argument and introduce tools to construct these argument and proof. Proof plays essential roles when we verify that computer programs the correct output for all possible input value
CO2	Summarize the basic set theory, function, sequences and sums.
CO3	Define basic concepts of number theory used throughout computer science ,applications to computer arithmetic ,cryptology, secret messages, modular arithmetic for generating pseudorandom number, assigning computer memory locations to files and encrypting and decrypting messages.
CO4	Summarize relation and its properties.

Course	Details
Year/ Semester	I/I
Type	Complementary
Code	ST1CMT31
Title	Basic Statistics and Introductory Probability
Credits	3
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Show Graphical representation of the data. Explain Measures of Central Tendency and Measures of Dispersion Range.
CO2	Define bivariate data and correlation and regression of two variable
CO3	Use probability concept, random experiment and related terms and theorems.
CO4	Explain random variables and its functions and properties

Course	Details
Year/ Semester	I/II
Type	Complementary
Code	MM2CMT03
Title	Discrete Mathematics (II)
Credits	4
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Explain graphs and graph model, graph terminology and special types of graphs, representing graphs and graph isomorphism, connectivity and Euler and Hamilton paths
CO2	Describe tree, travel traversal, Application of trees, Spanning tree.
CO3	Explain Boolean Function, logic gates.
CO4	Discuss about Matrices and its examples of type of matrices, methods of finding rank of matrices, solutions of linear equations and Cayley Hamilton theorem and applications

Course	Details
Year/ Semester	II/III
Type	Complementary
Code	ST3CMT32
Title	Advanced Statistical Methods
Credits	4
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Discuss about Theoretical Distribution, Different type of Discrete Distribution and its mean, variance mgf., Different type of continuous Distribution and its mean , variance, mgf.
CO2	Discuss about Sampling Distribution , statistic ,parameter ,standard error ,mean and variance of sampling distribution from normal distribution ,some form of sampling distribution.
CO3	Explain estimation of parameter, properties of parameters, methods of estimation
CO4	Describe Testing of hypotheses, type of error, large sample test.

Course	Details
Year/ Semester	II/IV
Type	Complementary
Code	MM4CMT03
Title	Operation Research
Credits	4
Hrs/ week	4
Total Hrs	72

CO No.	CO Statement Upon completion of this course, the students will be able to:
CO1	Discuss about operation research, its origin, nature, phases, model, uses and limitations
CO2	Explain Linear Programming Problem, its meaning, concepts, notions, uses and application, mathematical formulation and interpret solution.
CO3	Formulate transportation problem and Assignment problem
CO4	Explain Game theory, formulate and find solution.