## DEPARTMENT OF COMPUTER SCIENCE

## PROGRAMME SPECIFIC OUTCOMES

### PROGRAMME:- BCA -BACHELOR OF COMPUTER APPLICATIONS

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| ❖ Demonstrate understanding of the principles and working of the hardware and Software aspects of computer systems. |
| ❖ Design, implements, test and evaluate a computer system, component or algorithm to meet desired needs and to solve a computational problem. |
| ❖ To enhance skills and adapt new computing technologies for attaining professional excellence and carrying research. <br> ❖ Ability to use approximately system design notations and apply system design engineering process in order to design, plan and implement software systems. |
| ❖ To pursue further studies to get specialization in Computer Science and Applications. |
| ❖ To pursue the career in corporate sector. <br> ❖ Preparing for a career in an information technology-oriented business or industry or for graduate study in computer science or other scientific or technical fields. |

### PROGRAMME:- BSc - MCs- MATHEMATICS, COMPUTER SCIENCE

- ➢ Find career opportunities
- ➢ Develop competence to write competitive examinations.
- ➢ Develop proficiency in the analysis of complex physical problems
- ➢ Use of mathematical or other appropriate techniques to solve problems
- ➢ Create a hypothesis and appreciate how it relates to broader theories.
- ➢ Demonstrate skills in the use of Computers
- ➢ Join as Entry level technical job role for an IT Industry
- ➢ Build small database ERP software/ web applications.

# PROGRAMME OUTCOMES

**PROGRAMME :** **BCA -BACHELOR OF COMPUTER APPLICATIONS**
**BSc -MCs- MATHEMATICS, COMPUTER SCIENCE**

- **Discipline knowledge:** Acquiring knowledge on basics of Computer Science and ability to apply to design principles in the development of solutions for problems of varying complexity
- **Problem Solving:** Improved reasoning with strong mathematical ability to Identify, formulate and analyze problems related to computer science and exhibiting a sound knowledge on data structures and algorithms.
- **Design and Development of Solutions:** Ability to design and development of algorithmic solutions to real world problems and acquiring a minimum knowledge on statistics and optimization problems. Establishing excellent skills in applying various design strategies for solving complex problems.
- **Programming a computer:** Exhibiting strong skills required to program a computer for various issues and problems of day-to-day applications with thorough knowledge on programming languages of various levels.
- **Application Systems Knowledge**: Possessing a sound knowledge on computer application software and ability to design and develop app for applicative problems.
- **Modern Tool Usage:** Identify, select and use a modern scientific and IT tool or technique for modeling, prediction, data analysis and solving problems in the area of Computer Science and making them mobile based application software.
- **Communication:** Must have a reasonably good communication knowledge both in oral and writing.
- **Project Management:** Practicing of existing projects and becoming independent to launch own project by identifying a gap in solutions.
- **Ethics on Profession, Environment and Society:** Exhibiting professional ethics to maintain the integrality in a working environment and also have concern on societal impacts due to computer-based solutions for problems.
- **Lifelong Learning:** Should become an independent learner. So, learn to learn ability.
- **Motivation to take up Higher Studies:** Inspiration to continue educations towards advanced studies on Computer Science.

# DEPARTMENTOF COMPUTER SCIENCE

## SEMESTER I:  FUNDAMENTALS OF COMPUTERS – CAC01 (DSC – 1)

- Introduction to computers, classification of computers, anatomy of computer, constituents and architecture, microcontrollers.
- Operating systems, functions of operating systems, classification of operating systems, kernel shell, basics of Unix, shell programming, booting.
- Databases, why databases are used, users, SQL, data types in  SQL, introduction of queries - select, alter, update, delete, truncate, using where, and or in not in.
- Internet basics, features, applications, services, internet service providers, domain name system,browsing, email, searching.
- Web Programming basics, introduction of HTML and CSS programming.

## SEMESTER I:  PROGRAMMING IN C – CAC02

- Confidently operate Desktop Computers to carry out computational tasks.
- · Understand working of Hardware and Software and the importance of operatingSystems.

- Understand programming languages, number systems, peripheral devices, networking,multimedia and internet concepts.
- Read, understand and trace the execution of programs written in C language.
- Write the C code for a given problem.
- Perform input and output operations using programs in C
- Write programs that perform operations on arrays

## SEMESTER I: ACCOUNTANCY – CAC03 (B)

- Study and understand Accounting, systems of Book, Branches of accounting advantage and limitations
- Know the concept of accounting, financial accounting process and Journalization.
- Maintenance different account book and reconciliations.
- Preparations of different bills, and trial balance.
- Understand the basic concepts of Mathematical.
- Understand the basic concepts of Mathematical reasoning, set and functions.

## SEMESTER II-  DATA STRUCTURES USING C – CAC04

- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and used by algorithms.
- Describe common applications for arrays, records, linked structures, stacks, queues, trees and graphs.
- Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs.
- Demonstrate different methods for traversing trees.
- Compare alternative implementations of data structures with respect to performance.
- Describe the concept of recursion, give examples of its use
- Discuss the computational efficiency of the principal algorithms for sorting, searching, and

### SEMESTER II -  OJECT ORIENTED PROGRAMMING WITH JAVA – CAC05

- Understand the features of Java and the architecture of JVM
- Write, compile, and execute Java programs that may include basic data types and control flow constructs and how type casting is done.
- Identify classes, objects, members of a class and relationships among them needed for a specific problem and demonstrate the concepts of polymorphism and inheritance
- The students will be able to demonstrate programs based on interfaces and threads and explain the benefits of JAVA's Exceptional handling mechanism compared to other Programming Language
- Write, compile, execute Java programs that include GUIs and event driven programming and also programs based on files.

### SEMESTER III-OBJECT ORIENTED PROGRAMMING USING JAVA (DSC – 7)

- Understand the java support systems, java environment, java virtual machine.
- Learn to develop java program to solve various problems.
- Learn to develop java programs using decision statements, looping statements.
- Learn to develop java program to implement class, interfaces, inheritance,Multithreading, using various packages.
- Develop programs using Applets and the GUI components of JAVA.

### SEMESTER III- DATABASE MANAGEMENT SYSTEMS(DSC – 8)

- Explain the various database concepts and the need for database systems.
- Identify and define database objects, enforce integrity constraints on a database using DBMS.
- Demonstrate a Data model and Schemas in RDBMS.
- Identify entities and relationships and draw ER diagram for a given real-world problem.
- Convert an ER diagram to a database schema and deduce it to the desired normal form.
- Formulate queries in Relational Algebra, Structured Query Language (SQL) for database manipulation.
- Explain the transaction processing and concurrency control techniques.

### SEMESTER III-  C# AND .NET TECHNOLOGIES (DSC – 9)
- Describe Object Oriented Programming concepts like Inheritance and   Polymorphism in C# programming language.
- Interpret and Develop Interfaces for real-time applications.
- Build custom collections and generics in C#.

### SEMESTER III- COMPUTER NETWORKS(DSC-10)
- Explain the transmission technique of digital data between two or more computers and a computer network that allows computers to exchange data.
- Apply the basics of data communication and various types of computer networks in real world applications.

- Compare the different layers of protocols.
- Compare the key networking protocols and their hierarchical relationship in the conceptual model like TCP/IP and OSI.

## SEMESTER IV: PYTHON PROGRAMMING (DSC-11)

- Explain the basic concepts of Python Programming.
- Demonstrate proficiency in the handling of loops and creation of functions.
- Identify the methods to create and manipulate lists, tuples and dictionaries.
- Discover the commonly used operations involving file handling.
- Interpret the concepts of Object-Oriented Programming as used in Python.
- Develop the emerging applications of relevant fields using Python.

## SEMESTER IV: MULTIMEDIA ANIMATION (DSC-12)

- Write a well-designed, interactive Web site with respect to current standards and practices.
- Demonstrate in-depth knowledge of an industry-standard multimedia development tool and its associated scripting language.
- Determine the appropriate use of interactive versus standalone Web applications.

## SEMESTER IV: OPERATING SYSTEM CONCEPTS (DSC-13)

- Explain the fundamentals of the operating system.
- Comprehend multithreaded programming, process management, process
- synchronization, memory management and storage management.
- Compare the performance of Scheduling Algorithms
- Identify the features of I/O and File handling methods.

## SEMESTER V-DESIGN AND ANALYSIS OF ALGORITHM

- Understand the fundamental concepts of algorithms and their complexity, including time and space complexity, worst-case and average-case analysis, and Big-O notation. BL (L1, L2)
- Design algorithms for solving various types of problems, such as Sorting, Searching, Graph traversal, Decrease-and-Conquer, Divide-and-Conquer and Greedy Techniques. BL (L1, L2, L3)
- Analyze and compare the time and space complexity of algorithms with other algorithmic techniques. BL (L1, L2,L3,L4)
- Evaluate the performance of Sorting, Searching, Graph traversal, Decrease-and-Conquer, Divide-and-Conquer and Greedy Techniques using empirical testing and benchmarking, and identify their limitations and potential improvements. BL (L1, L2, L3, L4)
- Apply various algorithm design to real-world problems and evaluate their effectiveness and efficiency in solving them. BL (L1, L2, L3).

## SEMESTER V- STATISTICAL COMPUTING & R PROGRAMMING

- . Explore fundamentals of statistical analysis in R envirеnment.
- Describe key terminologies, concepts and techniques employed in Statistical Analysis.

- Define Calculate, Implement Probability and Probability Distributions to solve a wide variety of problems.

- Conduct and interpret a variety of Hypothesis Tests to aid Decision Making.

- Understand, Analyse, and Interpret Correlation Probability and Regression to analyse the underlying relationships between different variables

## SEMESTER V- SOFTWARE ENGINEERING

- How to apply the software engineering lifecycle by demonstrating competence in communication, planning, analysis, design, construction, and deployment.

- An ability to work in one or more significant application domains.

- Work as an individual and as part of a multidisciplinary team to develop and deliver quality software.

- Demonstrate an understanding of and apply current theories, models, and techniques that provide a basis for the software lifecycle.

- Demonstrate an ability to use the techniques and tools necessary for engineering practice.

## SEMESTER V -CLOUD COMPUTING

- Explain the core concepts of the cloud computing paradigm such as how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.

- Apply the fundamental concepts in data centres to understand the trade-offs in power, efficiency and cost.

- Identify resource management fundamentals like resource abstraction, sharing and sandboxing and outline their role in managing infrastructure in cloud computing.

- Analyze various cloud programming models and apply them to solve problems on the cloud.

## SEMESTER V -DIGITAL MARKETING

- Understand the fundamental concepts and principles of digital marketing.
- Develop practical skills to implement various digital marketing strategies and techniques.
- Analyze and evaluate the effectiveness of digital marketing campaigns.
- Apply critical thinking and problem-solving skills to real-world digital marketing scenarios.
- Create comprehensive digital marketing plans and strategies.

## SEMESTER VI -ARTIFICIAL INTELLIGENCE AND APPLICATIONS

- Gain a historical perspective of AI and its foundations.
- Become familiar with basic principles and strategies of AI towards problem solving
- Understand and apply approaches of inference, perception, knowledge representation, and learning.
- Understand the various applications of AI.

## SEMESTER VI- PHP & MYSQL

- Design dynamic and interactive web pages and websites.

- Run PHP scripts on the server and retrieve results.

- Handle databases like MySQL using PHP in websites.

## SEMESTER VI- FUNDAMENTALS OF DATA SCIENCE

- Understand the concepts of data and pre-processing of data.

- Know simple pattern recognition methods

- Understand the basic concepts of Clustering and Classification

- Know the recent trends in Data Science.

## SEMESTER VI- WEB CONTENT MANAGEMENT SYSTEM

- Understand content development basics;
- Gain Knowledge of tools for multimedia content development for audio/ video, graphics, animations, presentations, screen casting
- Host websites and develop content for social media platforms such as wiki and blog
- Understand e-publications and virtual reality
- Use of e-learning platform Moodle and CMS applications Drupal and Joomla

# DEPARTMENT OF COMPUTER SCIENCE

## COURSE OUTCOMES -BSc

### SEMESTER I :COMPUTER FUNDAMENTALS AND PROGRAMMING IN C (DSC – 1)

- Confidently operate computers to carry out computational tasks.
- Understand working of Hardware and Software and the importance of operating systems
- Understand programming languages, number systems, peripheral devices, networking,
  multimedia and internet concepts
- Read, understand and trace the execution of programs written in C language
- Write the C code for a given problem
- Perform input and output operations using programs in C
- Write programs that perform operations on arrays, strings, structures, unions and functions

### SEMESTER II: DATA STRUCTURES USING C – (DSC-2)

- Describe how arrays, records, linked structures, stacks, queues, trees, and graphs  are represented in memory and used by algorithms
- Describe common applications for arrays, records, linked structures, stacks, queues, trees,and graphs
- Write programs that use arrays, records, linked structures, stacks, queues, trees, and graphs
- Demonstrate different methods for traversing trees
- Compare alternative implementations of data structures with respect to performance
- Describe the concept of recursion, give examples of its use
- Discuss the computational efficiency of the principal algorithms for sorting and searching

### SEMESTER III:  OBJECT ORIENTED PROGRAMING IN JAVA (DSC – 3 C)

- Explain the object-oriented concepts and JAVA.
- Write JAVA programs using OOP concepts like Abstraction, Encapsulation, inheritance and Polymorphism
- Implement Classes and multithreading using JAVA.
- Demonstrate the basic principles of creating Java applications with GUI

### SEMESTER IV: D A T A B A S E   M A N A G E M E N T   S Y S T E M (DSC-34C)

- Explain the various database concepts and the need for database systems.
- Identify and define database objects, enforce integrity constraints on a database using DBMS.
- Demonstrate a Data model and Schemas in RDBMS.
- Identify entities and relationships and draw ER diagram for a given real-world problem.

- Convert an ER diagram to a database schema and deduce it to the desired normal form.
- Formulate queries in Relational Algebra, Structured Query Language (SQL) for database manipulation.
- Explain the transaction processing and concurrency control techniques
.

## SEMESTER V: PROGRAMMING IN PYTHON

- Setup python to develop simple applications
- Understand the basic concepts in Python Programming
- Learn how to write, debug and execute Python programs
- Understand and demonstrate the use of advanced data types such as tuples, dictionaries and lists, Tuples and Sets
- Design solutions for problems using object-oriented concepts in Python
- Use and apply the different Python Libraries for GUI Interface, Data Analysis and Data Visualization.
- Extend the knowledge of python programming to build successful career in software development.

## SEMESTER V- COMPUTER NETWORKS

- Define various data communication components in networking.
- Describe networking with reference to different types of models and topologies
- Understand the need for Network and various layers of OSI and TCP/IP reference model.
- Explain various Data Communications media.
- Describe the physical layer functions and components
- Identify the different types of network topologies and Switching methods.
- Describe various Data link Layer Protocols.
- Identify the different types of network devices and their functions within a network.
- Analyze and Interpret various Data Kink Layer and Transport Layer protocols.
- Explain different application layer protocols.

## SEMESTER VI: WEB TECHNOLOGIES

- Understand basics of web technology
- Recognize the different Client-side Technologies and tools like, HTML, CSS, JavaScript
- Learn Java Servlets and JDBC
- Web Technology for Mobiles and Understand web security

## SEMESTER VI: Statistical Computing & R Programming

- Explore fundamentals of statistical analysis in R environment.
- Describe key terminologies, concepts and techniques employed in Statistical Analysis.
- Define Calculate, Implement Probability and Probability Distributions to solve a wide variety of problems
- Conduct and interpret a variety of Hypothesis Tests to aid Decision Making.
- Understand, Analyse, and Interpret Correlation Probability and Regression to analyse the underlying relationships between different variables.