<div align="center">**Sher Shah College , Sasaram**
Department of Computer Application (BCA)</div>

PROGRAM SPECIFIC OUTCOME (PSO)
After the completion of the course, the student will be able to:

- Apply their knowledge and skills to succeed in their career/ professional development and/or postgraduate education to pursue flexible career paths amidst future technological changes.
- Apply basic principles and practices of computing grounded in mathematics and science to successfully complete hardware and/or software related engineering projects to meet customer business objectives and/or productively engage in research.
- Demonstrate a sense of societal and ethical responsibility in their professional endeavors, and will remain informed and involved as full participants in profession and our society.
- Demonstrate strong communication skills and the ability to function effectively in multi disciplinary teams.
- Demonstrate strong bonding in team and display distinct leadership traits.
- Prepared for civil service as well as public service examination.

PROGRAM OUTCOME (PO)

- Students to have knowledge and expertise in at least one procedure-oriented and object-oriented programming language.
- Students to have a wide perspective on software development including web based applications as well as graphic applications.
- Students to have the familiarity with Database Management System.
- Students to have the ability to design and implement optimal databases using current technologies.
- Students will be able to design and analyze algorithms as per need by relating the data structure and algorithms.
- Students will be able to identify and describe the communication networks technologies in local area networks and the Internet and countermeasures for security threats.
- Students will be aware of the design principles of Operating Systems specializing on at least one popular Operating System.
- Students will have the concepts regarding the architecture and organization of a computer system.
- Development of good communication skills in both written and verbal.
- Students will understand contemporary issues and provide engineering solutions for solving social problems.
- Students will acquire skills and ability for life-long learning.

Course Outcomes:
Programming Fundamentals Using C

At the completion of the course, the student will attain the ability to:

CO1: Recognize the basics of Computer Programming Concepts using C Programming Language.

CO2: Explain the concept of C character set, identifiers and keywords, variable different data types, operators and programming constructs.

CO3: Apply the concept of advanced topics like Arrays, Functions, Pointers, Structures, Unions and Dynamic Memory Allocations and File Handling in various programmes.

CO4: Create and execute different programmes using Procedural programming method

Course Outcomes:
Computer System Architecture

At the completion of the course, the student will attain the ability to:

CO1: Recognizes and understand different Number systems, Logic Gates, Basics of Boolean Algebra.

CO2: Design Combinational and Sequential Circuits, flip – flops etc.

CO3: Describe the design and structure of Central Processing Unit and Memory.

CO4: Compare the design of Modern processors, Memories and I/Os.

SEMESTER – II
Course Outcomes:
Object Oriented Programming Using C++

At the completion of the course, the student will attain the ability to:

CO1: Recognize the theoretical concept of Object Oriented approach (class, objects, encapsulation, abstraction, polymorphism, Inheritance etc.)

CO2: Explain practical implementation of Object Oriented Programming using C++ and compare between Object Oriented Programming approach and procedural programming approach.

CO3: Apply the concept of Object Oriented Programming using C++ like class, objects, constructors & Destructors, Function Overloading, Operator Overloading, inheritance, friend class & friend functions, Virtual functions, File Handling etc.

CO4 : Create and execute different programmes using Object Oriented Programming method.

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Course Outcomes:
Discrete Structure

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At the completion of the course, the student will attain the ability to:

CO1: Define Sets and Relations, Functions, Recurrence Relation, Permutation and Combination, Hasse Diagram, Lattice.

CO2: Understand Prepositional Logic, Normal Forms, Basics of Inference Theory.

CO3: Describe and evaluate algorithmic principles and outline the basic structure proof techniques described.

CO4: Design solutions using Graphs and Trees for problem statements.

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SEMESTER – III
Data Structure
Course Outcomes:

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At the completion of the course, the student will attain the ability to:

CO1: Recognize the different types of data structures such as arrays, records, linked structures, stacks, queues, trees, and graphs used in Computer Science and their representation in memory, their algorithms and applications.

CO2: Compare and contrast the benefits of dynamic and static data structures implementations.

CO3: Differentiate between the benefits of alternative implementations of data structures with respect to performance.

CO4: Analyse the computational efficiency of the principal algorithms for sorting, searching, and hashing

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Course Outcomes
Operating System

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At the completion of the course, the student will attain the ability to:

CO1: State the Role of System Software (Operating System) in Computers.

CO2: Describe the important Computer System resources and the Role of OS in their management policies and algorithms

CO3: Analyse different types of Operating Systems (DOS, Windows, UNIX).

CO4: Create and execute Shell Scripts in Linux.

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Course Outcomes:
Computer Networks

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At the completion of the course, the student will attain the ability to:

CO1: Recognise the structure of Data Communications System and its components and basics of Networking.

CO2: Explain the concepts of Network models (OSI and the TCP - IP Reference models), their functions of OSI Layers and different Protocols used in these Model.

CO3: Illustrate various Networking devices and their functions, Multiplexing, Switching Techniques, IP Addressing.

CO4: Compare different Transmission media, Flow control and Error Detection Techniques.

SEMESTER – IV
Design and Analysis of Algorithms
Course Outcomes:

After the completion of the course, the student will attain the ability to:

CO1: State Major algorithms and data structures commonly used in different areas of Computer applications

CO2: Analyze the asymptotic performance of algorithms and write rigorous correctness proofs for algorithms.

CO3: Implement important algorithmic design paradigms and methods of analysis for different algorithms.

CO4: Apply efficient algorithms in common design situations.

Course Outcomes:
Software Engineering

After the completion of the course, the student will attain the ability to:

CO1: Illustrate the basics of software – its characteristics, SRS and its components.

CO2: Classify the fundamentals of different software process models & techniques to construct larger, and more complex software systems

CO3: Apply software engineering concepts to design, develop and maintain the software.

CO4: Implement Software Testing for good Software Quality Assurance.

Course Outcomes
Database Management System

After the completion of the course, the student will attain the ability to:

CO1: Recognize the fundamental concept of Relational Database Management System using relational data model, entity-relationship model, relational database design and relational algebra.

CO2: Design ER-Models to represent simple database application scenarios and convert them into relational tables.

CO3: Implement Normalization for the optimization of Database Design

CO4: Use MS-Access package as Database Management software.

CO3: Execute SQL commands as a tool for Database Management.

CO4: Design and Execute queries for information storage and retrieval using SQL.

SEMESTER–V
Course Outcomes
JAVA Programming

After the completion of the course, the student will attain the ability to:

CO1: Describe the fundamental concepts and features of Java Programming language.

CO2: Implement Object Oriented Programming Concepts (class, constructor, overloading, inheritance, overriding) in java.

CO3: Implement concepts of Multithreading and Exception Handling in Java.

CO4: Create and Use Packages and Interfaces in a Java program and Develop Graphical User Interface applications and Web based applications in Java by importing applet, AWT

Course Outcomes
Theory of Computation

After the completion of the course, the student will attain the ability to:

CO1: Define the basic concepts and applications of Theory of Computation.

CO2: Mathematical foundations, algorithmic principles and computer science theory to model and design Computer-based systems.

CO3: Apply computational mathematics in the field of Computer Applications.

CO4: Recognises and comprehend formal reasoning about languages

Course Outcomes
Oracle

After the completion of the course, the student will attain the ability to:

CO1: Define relational database concepts and design.

CO2: Implement design principles including the E-R method and Normalization approach for logical design of databases.

CO3: Formulate and Execute various SQL queries for information storage and retrieval.

CO4: Design and Execute PL/SQL blocks using Procedures, Functions, Packages and Triggers, Views, Cursors etc.

Course Outcomes
Artificial Intelligence

After the completion of the course, the student will attain the ability to:

CO1:   Recognize the concept of AI and its applications in diverse fields.

CO2:   Describe the key components of the Artificial Intelligence field.

CO3:   Outline the concepts of Natural Language processing and Knowledge representation,

CO4:   Classify Types of Learning and identify Expert Systems Architecture.

Course Outcomes:
Project

After the completion of the course, the student will attain the ability to:

CO1:   Formulate projects with clearly identified scope and requirements.

CO2:   Understand the practical implementation of Software Development Life Cycle.

CO3:   Implement programming theories, concepts and principles & use latest computing tools for Software Development.

CO4:   Develop team building capacity and work ethics for successful project development and management.