

# Department of Computer Applications

## Bachelor of Computer Applications

### PROGRAM OUTCOMES (PO)

#### **PO1: Effective Communication Skills**

Graduates will demonstrate proficiency in both written and spoken communication, effectively utilizing formal communication techniques necessary for professional environments. They will be adept at conveying ideas clearly and confidently in English and other relevant languages.

#### **PO2: Critical Analysis and Interpretation**

Graduates will acquire and apply critical thinking skills to analyze diverse forms of information, including literary texts, financial statements, business operations, and legal frameworks. They will be capable of interpreting and evaluating data to make informed decisions in various contexts.

#### **PO3: Technological Proficiency**

Graduates will gain practical knowledge and skills in utilizing modern technology, including software applications, programming languages, and development tools. They will be able to manage and implement technological solutions for business, research, and professional practices.

#### **PO4: Quantitative and Analytical Skills**

Graduates will develop strong quantitative and analytical skills through the study of mathematics, statistics, and business mathematics. They will apply these skills to solve complex problems, conduct research, and make data-driven decisions in professional settings.

#### **PO5: Research and Problem-Solving**

Graduates will be equipped with comprehensive research skills, including problem definition, research design, data collection, and report formulation. They will be capable of conducting independent research and presenting their findings effectively.

#### **PO6: Financial Acumen**

Graduates will have a solid foundation in accounting, financial management, and taxation. They will be proficient in preparing and analyzing financial statements, understanding cost and management accounting, and making informed financial decisions.

**PO7: Management Knowledge and Application**

Graduates will comprehend and apply management principles and methodologies, including decision-making processes, modern management trends, and human resource management practices. They will be prepared to handle organizational leadership and entrepreneurial ventures.

**PO8: Legal and Ethical Awareness**

Graduates will possess a sound understanding of business laws, corporate laws, and intellectual property rights. They will navigate legal frameworks and appreciate ethical considerations in business practices, promoting social responsibility and sustainable practices.

**PO9: Cultural and Social Awareness**

Graduates will develop an appreciation for cultural diversity and social issues through the study of literature, history, and intercultural communication. They will be aware of contemporary issues such as environmental sustainability and human rights, integrating these principles into their professional conduct.

**PO10: Marketing and Entrepreneurship**

Graduates will gain insights into marketing management, brand building, consumer behavior, and entrepreneurial skills. They will be prepared to identify market opportunities, develop marketing strategies, and manage new business ventures.

**PO11: Scientific and Environmental Literacy**

Graduates will understand fundamental scientific principles and their applications, including environmental impacts and sustainability. They will be aware of biodiversity conservation, ecosystem functions, and sustainable agriculture practices.

**PO12: Interdisciplinary Competence**

Graduates will be adept at integrating knowledge from various disciplines, fostering a comprehensive understanding of complex issues. They will be equipped to approach problems from multiple perspectives and propose innovative solutions.

**PO13: Practical and Vocational Skills**

Graduates will acquire practical skills relevant to their field of study, including laboratory techniques, project management, and technical proficiency. They will be prepared for hands-on roles in industry, research, and self-employment opportunities.

**PO14: Socio-Cultural Consciousness and Ethical Responsibility**

Graduates will develop an awareness of major contemporary issues and ethical considerations. They will internalize values that promote social justice, ethical behavior, and global citizenship, responding positively to societal challenges.

# Program Specific Outcomes (PSO)

Program Specific Outcome (PSO)	Students will be able to.....	Mapped Program Outcomes (PO)
PSO 1: Proficiency in English Communication	demonstrate a strong foundation in English grammar, usage, and effective communication, enabling them to confidently use English in both written and spoken forms for formal communication.	PO 1
PSO 2: Mastery of C Programming for Problem Solving	exhibit the ability to apply basic concepts of the C programming language to solve computational problems. They will be adept at identifying, approaching, and implementing programming tasks using appropriate techniques and debugging methods.	PO 3, PO 5
PSO 3: Comprehensive Understanding of Computer Fundamentals	possess a thorough understanding of computer fundamentals, including data handling, memory management, and network communication, which are essential for advanced computer applications.	PO 3
PSO 4: Application of Discrete Mathematics in Computing	apply principles of propositional and predicate logic, set theory, and rules of inference to solve complex problems, demonstrating a strong foundation in discrete mathematics as applied to computer science.	PO 4

PSO 5: Statistical Analysis and Data Interpretation	be proficient in statistical concepts and methods, including data visualization, measures of central tendency, variability, and combinatorial concepts, essential for analyzing and interpreting data in real-world scenarios.	PO 4
PSO 6: Database Design and Management Skills	be skilled in designing, implementing, and managing databases, with the ability to select appropriate DBMS for business requirements, ensuring data integrity, security, and efficient retrieval of information.	PO 3, PO 13
PSO 7: Proficient Use of Software Development Tools and Techniques	demonstrate expertise in various software development tools and methodologies, including object-oriented programming with C++ and Java, web development with PHP, and mobile application development using Android, to create robust and efficient software solutions.	PO 3, PO 13

## Course Outcomes(CO)

Course	Course Outcome (CO)	Bloom's Taxonomy	Mapped PSO
Fine Tune Your English	CO1: To help the students to identify the basics of grammar, usage and effective communication.	Understanding	PSO1

	CO2: To enable the students to confidently use English in both written and spoken form.	Applying	PSO1
	CO3: To use English for formal communication effectively.	Applying	PSO1
Methodology of Programming and C Language	CO1: This course aims to enhance problem-solving through programming. It trains the students to learn basic concepts of the C-programming language.	Understanding	PSO2
	CO2: Make the students identify the situations where computational methods and computers would be useful.	Analyzing	PSO2
	CO3: Approach the programming tasks using techniques learned and choose the right one based on the requirements of the problem.	Applying	PSO2
	CO4: Write the program on a computer, edit, compile, debug, correct, recompile and run it.	Applying	PSO2
	CO5: Identify the tasks in which the numerical techniques learned are applicable and apply them to write programs.	Applying	PSO2
Computer Fundamentals and Digital Principles	CO1: Learning CFDP increases our basic skills and knowledge making us more advanced users than before.	Understanding	PSO3
	CO2: In the real world, it is necessary for everyone to know about the concepts of computer.	Understanding	PSO3
	CO3: We can understand the working of computers, data handling, memory management, and communication over networks.	Understanding	PSO3
Discrete Mathematics-I	CO1: Apply principles of propositional and predicate logic to construct and evaluate logical statements.	Applying	PSO4

	CO2: Demonstrate an understanding of logical connectives (AND, OR, NOT, IF-THEN) and their truth tables.	Understanding	PSO4
	CO3: Solve problems using rules of inference and logical equivalences.	Applying	PSO4
	CO4: Define and represent sets, subsets, and set operations (union, intersection, complement, etc.).	Remembering	PSO4
	CO5: Apply set theory to solve problems involving Venn diagrams and set relationships.	Applying	PSO4
Basic Statistics	CO1: Students will understand the basic concepts of statistics and probability theory.	Understanding	PSO5
	CO2: Students will learn how to present data visually using various graphical representations, such as bar charts, histograms, scatter plots, and box plots.	Applying	PSO5
	CO3: Students will study measures of central tendency, including mean, median, and mode.	Understanding	PSO5
	CO4: Students will learn about measures of variability, such as variance and standard deviation, and use these measures to quantify the spread or dispersion of data points in a dataset.	Understanding	PSO5
	CO5: Students will study combinatorial concepts, such as permutations and combinations, essential for solving probability problems.	Understanding	PSO5
Software Lab-I	CO1: Analyze a computational problem and develop an algorithm/flowchart to find its solution.	Analyzing	PSO2
	CO2: Develop C programs with logical, arithmetic, assignment operators, etc., with branching and looping statements.	Applying	PSO2

	CO3: Develop a readable program in C with number and character arrays together with string handling functions.	Applying	PSO2
	CO4: Identify the tasks in which the numerical techniques learned are applicable and apply them to write programs.	Applying	PSO2
	CO5: Approach the programming tasks using techniques learned and choose the right one based on the requirements of the problem.	Applying	PSO2
Issues That Matter	CO1: To identify the major issues of contemporary significance.	Analyzing	PSO7
	CO2: To respond rationally and positively to the issues raised.	Applying	PSO7
	CO3: To internalize the values imparted through the selections.	Understanding	PSO7
Database Management Systems	CO1: Understand the basics and concepts of database systems.	Understanding	PSO6
	CO2: Design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.	Applying	PSO6
	CO3: Ability to use current techniques, skills, and tools necessary for computing practice.	Applying	PSO6
	CO4: Select an appropriate DBMS suitable for given business requirements.	Analyzing	PSO6
	CO5: Identify the contribution of database technology to society.	Evaluating	PSO6
Computer Organization and Architecture	CO1: Explain the concepts that underlie modern computer architecture, its evolution, functions, and organization.	Understanding	PSO3

	CO2: Identify the best organization of a computer for achieving the best performance when asked to make a selection from the current market.	Analyzing	PSO3
	CO3: Differentiate types of memory components in terms of their technology and usage.	Analyzing	PSO3
	CO4: Construct a series of computer instructions to perform low-level processor operations.	Applying	PSO3
	CO5: Demonstrate the flow of an instruction cycle.	Understanding	PSO3
Object Oriented Programming Using C++	CO1: Describe the advantages of a high-level language like C/C++, the programming process, and the compilation process.	Understanding	PSO7
	CO2: Describe and use software tools in the programming process.	Understanding	PSO7
	CO3: Apply good programming principles to the design and implementation of C/C++ programs.	Applying	PSO7
	CO4: Design, implement, debug, and test programs using the fundamental elements of C/C++.	Applying	PSO7
	CO5: Demonstrate an understanding of primitive data types, values, operators, and expressions in C/C++.	Understanding	PSO7
Software Lab-II	CO1: Able to identify the appropriate data structures and algorithms for solving real-world problems.	Analyzing	PSO7
	CO2: Able to implement various kinds of searching and sorting techniques.	Applying	PSO7
	CO3: To design, implement, debug, and test programs using the fundamental elements of C++.	Applying	PSO7
	CO4: Be able to write SQL statements that create Database objects.	Applying	PSO7



	CO5: Understand the structure and design of relational databases.	Understanding	PSO7
	CO6: Understand the major issues of database security and maintenance of data integrity.	Understanding	PSO7
Discrete Mathematics-II	CO1: Define and represent graphs, including directed and undirected graphs.	Remembering	PSO4
	CO2: Analyze and apply graph properties, such as connectivity, cycles, and planarity.	Analyzing	PSO4
	CO3: Utilize graph algorithms, such as Dijkstra's algorithm and Kruskal's algorithm.	Applying	PSO4
	CO4: Solve problems involving graph coloring, matching, and network flows.	Applying	PSO4
	CO5: Implement and analyze combinational and sequential logic circuits.	Applying	PSO4
Computer Graphics	CO1: Understands the core concepts and mathematical foundations of computer graphics.	Understanding	PSO3
	CO2: Have an overview of different modeling approaches and methods with detailed knowledge about basic shading and texture mapping techniques.	Understanding	PSO3
	CO3: Can use modeling software to create basic 3D scenes.	Applying	PSO3
	CO4: Able to design and develop interactive 3D programs using OpenGL.	Applying	PSO3
	CO5: Can develop software for modern graphics hardware.	Applying	PSO3
Microprocessor and PC Hardware	CO1: This paper makes students learn more about how processing works actually.	Understanding	PSO3
	CO2: Useful for students while handling microprocessor-based projects.	Applying	PSO3
	CO3: Provides an idea about assembly language programming.	Understanding	PSO3

	CO4: Describe how the CPU processes data and instructions and controls the operation of all other devices.	Understanding	PSO3
	CO5: Identify the names, distinguishing features, and units for measuring different kinds of memory and storage devices.	Remembering	PSO3
Operating Systems	CO1: High-level understanding of what an operating system is and the role it plays.	Understanding	PSO3
	CO2: Knowledge of the services provided by operating systems.	Understanding	PSO3
	CO3: Understanding of how an operating system functions as a middle layer between the hardware of a computer and the user programs.	Understanding	PSO3
	CO4: Understanding of the structure of operating systems, applications, and the relationship between them.	Understanding	PSO3
	CO5: Exposure to some details of major OS concepts.	Understanding	PSO3
Data Structure Using C++	CO1: Data structures play a vital role in the computer world and are used to store, organize, and manipulate data.	Understanding	PSO3
	CO2: Learning about data structures is essential if you're looking to get into programming or improve your skills as a programmer.	Understanding	PSO3
	CO3: Learn different algorithms analysis techniques.	Applying	PSO3
	CO4: Apply data structures and algorithms in real-time applications.	Applying	PSO3
	CO5: Full-stack developers/web developers are the highest-paid professionals in the current IT/tech industry. To become a full-stack developer, you need to have complete knowledge of Data Structure Algorithm.	Understanding	PSO3

Software Lab-III	CO1: Analyze the asymptotic performance of algorithms.	Analyzing	PSO7
	CO2: Demonstrate a familiarity with major algorithms and data structures.	Understanding	PSO7
	CO3: Synthesize efficient algorithms in common engineering design situations.	Creating	PSO7
	CO4: Apply important algorithmic design paradigms and methods of analysis.	Applying	PSO7
	CO5: Write rigorous correctness proofs for algorithms.	Creating	PSO7
Advanced Statistical Methods	CO1: Students will study various theoretical probability distributions, such as the normal distribution, binomial distribution, Poisson distribution, exponential distribution, and others.	Understanding	PSO5
	CO2: Students will learn about sampling distributions, which involve the distribution of sample statistics (e.g., sample mean or sample proportion) from multiple random samples. They will understand the central limit theorem and its implications for large sample sizes.	Understanding	PSO5
	CO3: Students will explore methods for point estimation and interval estimation of population parameters.	Understanding	PSO5
	CO4: Students will study the process of hypothesis testing, including formulating null and alternative hypotheses, selecting appropriate test statistics, setting significance levels, and making decisions based on test results.	Understanding	PSO5
	CO5: Students will be introduced to ANOVA, a technique used to compare means across multiple groups. They will learn about one-way ANOVA and two-way ANOVA, and how to interpret the results.	Applying	PSO5

Design and Analysis of Algorithms	CO1: Make students develop problem-solving skills using various concepts followed by an introduction to algorithm writing and analysis of iterative and recursive algorithms.	Applying	PSO7
	CO2: This paper ensures the students learn about the problem-solving techniques such as brute force technique, divide and conquer technique, decrease and conquer strategy, greedy approach, dynamic programming, branch and bound approach, and backtracking.	Applying	PSO7
	CO3: Interpret the performance of algorithms using analysis techniques.	Analyzing	PSO7
	CO4: Examine the fundamental algorithmic strategies.	Analyzing	PSO7
	CO5: Implement Graphs and trees algorithms. Interpret the tractable or intractable problem.	Applying	PSO7
System Analysis and Software Engineering	CO1: Define and explain Information systems and their types. Clearly distinguish the different phases in SDLC.	Understanding	PSO7
	CO2: Develop knowledge about the basic concepts of Software engineering and its different models.	Understanding	PSO7
	CO3: Identify computing requirements for a problem and translate it to a suitable logical model and calculate factors like cost, size, etc.	Applying	PSO7
	CO4: Explain the concepts of Software design according to standards and develop design documents.	Understanding	PSO7
	CO5: Develop different testing strategies for a given software design.	Applying	PSO7
Linux Administration	CO1: Use Linux commands to manage files and file systems.	Applying	PSO7
	CO2: Create and execute BASH scripts.	Applying	PSO7

	CO3: Explain the structure of the Linux operating system.	Understanding	PSO7
	CO4: Establish user accounts and permissions.	Applying	PSO7
	CO5: Configure basic Linux network services.	Applying	PSO7
Web Programming Using PHP	CO1: PHP is an open-source, server-side programming language that can be used to create websites and applications.	Understanding	PSO7
	CO2: PHP syntax is easily understood and learned, whether you're building from scratch or leveraging existing frameworks or add-ons.	Understanding	PSO7
	CO3: PHP is a server-side language, and the programs and applications built on it will run on web servers.	Applying	PSO7
	CO4: It's open-source and free of cost. It can be downloaded anywhere and is readily available to use for events or web applications.	Understanding	PSO7
	CO5: Applications can easily be loaded which are based on PHP and connected to the database.	Applying	PSO7
Software Lab-IV	CO1: Analyze the construction of a web page and relate how PHP and HTML combine to produce the web page.	Analyzing	PSO7
	CO2: Compare and contrast PHP variable types, and relate the advantages and disadvantages of PHP variables with local or global scope.	Analyzing	PSO7
	CO3: Formulate, design, and create PHP control structures, including selection and iterative structures.	Creating	PSO7
	CO4: Create and execute BASH scripts.	Creating	PSO7
	CO5: Establish user accounts and permission.	Applying	PSO7

Computer Networks	CO1: Describe the general principles of data communication.	Understanding	PSO3
	CO2: Describe how computer networks are organized with the concept of a layered approach.	Understanding	PSO3
	CO3: Describe how signals are used to transfer data between nodes.	Understanding	PSO3
	CO4: Implement a simple LAN with hubs, bridges, and switches.	Applying	PSO3
	CO5: Describe how packets in the Internet are delivered.	Understanding	PSO3
IT for Environment	CO1: Define and explain the natural resources and their impact on our environment.	Understanding	PSO7
	CO2: Develop knowledge about biodiversity, global and local environment issues, and environmental acts.	Understanding	PSO7
	CO3: Identify the impact of the internet and the different online learning possibilities.	Analyzing	PSO7
	CO4: Develop knowledge on the Impact of IT in society and the concept of green computing.	Understanding	PSO7
	CO5: Develop awareness of human rights.	Understanding	PSO7
Java Programming Using Linux	CO1: Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.	Applying	PSO7
	CO2: Read and make elementary modifications to Java programs that solve real-world problems.	Applying	PSO7
	CO3: Validate input in a Java program.	Evaluating	PSO7
	CO4: Identify and fix defects and common security issues in code.	Evaluating	PSO7
	CO5: Document a Java program using Javadoc.	Creating	PSO7

Software Lab-V	CO1: Use an integrated development environment to write, compile, run, and test simple object-oriented Java programs.	Applying	PSO7
	CO2: Read and make elementary modifications to Java programs that solve real-world problems.	Applying	PSO7
	CO3: Validate input in a Java program.	Evaluating	PSO7
	CO4: Identify and fix defects and common security issues in code.	Evaluating	PSO7
	CO5: Document a Java program using Javadoc.	Creating	PSO7
Informatics and Cyber Ethics	CO1: Introduce students to the various relevant aspects of the Internet, web designing, and cyber laws.	Understanding	PSO7
	CO2: Students learn the reality of how ethics play a huge part in digital companies all over the world.	Understanding	PSO7
	CO3: Discuss various privacy issues, computer and health issues, and the importance of cyber ethics.	Understanding	PSO7
	CO4: Learn about various technical cybersecurity skills.	Understanding	PSO7
	CO5: Learn about various cyber crimes.	Understanding	PSO7
Software Development Lab-I	CO1: Learning how to build a website that contains many pages.	Applying	PSO7
	CO2: Create a PHP script with the combination of HTML and CSS style.	Creating	PSO7
	CO3: Retrieval and insertion of information from/to the database using PHP and MySQL.	Applying	PSO7
	CO4: Develop a new perspective of the <a href="http://www">www</a> .	Applying	PSO7

	CO5: Learn what makes a website good or bad.	Understanding	PSO7
	CO6: Discover how to apply objective rules to subjective matters.	Analyzing	PSO7
	CO7: Create a site specification document.	Creating	PSO7
Cloud Computing	CO1: To understand the necessary theoretical background for computing and storage cloud environments.	Understanding	PSO7
	CO2: To know the methodologies and technologies for the development of applications that will be deployed and offered through cloud computing environments.	Applying	PSO7
	CO3: To be able to realize cloud infrastructures by using IaaS software, while also developing cloud applications by utilizing PaaS software.	Applying	PSO7
	CO4: Analyze different types of cloud services – Delivery models, Deployment models.	Analyzing	PSO7
	CO5: Apply cloud native application development for containerization and container orchestration.	Applying	PSO7
	CO6: Implement different solution approaches in Cloud – containers in public cloud, setting up private cloud, and convert monolithic applications to containers.	Creating	PSO7
	Mobile Application Using Android	CO1: Describe characteristics of the Android operating system.	Understanding
CO2: Describe components of Android applications.		Understanding	PSO7
CO3: Design user interfaces using various widgets, dialog boxes, and menus.		Creating	PSO7
CO4: Define interaction among various activities/applications using intents, broadcasting, and services.		Applying	PSO7



	CO5: Develop Android applications that require database handling.	Creating	PSO7
Data Mining	CO1: Pre-process the data and perform cleaning and transformation.	Applying	PSO5
	CO2: Apply a suitable classification algorithm to train the classifier and evaluate its performance.	Applying	PSO5
	CO3: Apply an appropriate clustering algorithm to cluster data and evaluate clustering quality.	Applying	PSO5
	CO4: Discuss classification algorithms and learn how data is grouped using clustering techniques.	Understanding	PSO5
	CO5: Implement practical and theoretical understanding of the technologies for data mining.	Applying	PSO5
Seminar	CO1: Seminars are introduced to provide an open platform to students for presentations and discussions on the latest topics of current-day interest in the areas of Computer Science.	Understanding	PSO7
	CO2: It is very beneficial to students since they enable them to evaluate, stay up to date on current technologies, their concepts, and build their network.	Understanding	PSO7
	CO3: Encourages students to expand their knowledge and stay with current technological advancements.	Understanding	PSO7
	CO4: Improves documentation and presentation skills.	Applying	PSO7
	CO5: Sharing ideas and views on tackling the problem.	Evaluating	PSO7
Software Development Lab-II	CO1: Analyze, design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.	Analyzing	PSO7

	CO2: Problem-Solving. Identify problems and formulate solutions for systems and organizations while reconciling conflicting objectives and finding compromises.	Creating	PSO7
	CO3: Work effectively as part of a team to develop and deliver quality software artifacts.	Applying	PSO7
	CO4: Design solutions using approaches that integrate ethical, social, legal, and economic responsibilities.	Creating	PSO7
	CO5: Evaluate and use appropriate methods and professional standards in computing practice.	Evaluating	PSO7
Viva Voce	CO1: The student should be able to demonstrate a comprehensive understanding of the course material, theories, concepts, and principles covered during the course.	Understanding	PSO7
	CO2: The viva often assesses the student's ability to think critically about the subject matter, analyze information, and provide well-reasoned arguments.	Analyzing	PSO7
	CO3: The student's communication skills are evaluated in a viva, including their ability to articulate complex ideas clearly and effectively.	Applying	PSO7
	CO4: The viva might include questions that test the student's problem-solving skills and their ability to apply theoretical knowledge to practical scenarios.	Applying	PSO7
	CO5: The viva might assess whether the student possesses an in-depth understanding of specific topics within the course and can delve into advanced or specialized areas.	Evaluating	PSO7