DEPARTMENT OF COMPUTER APPLICATIONS
PROGRAMME OUTCOMES AND COURSE OUTCOMES OF UNDER GRADUATE & POST GRADUATE PROGRAMME (2023 ONWARDS)

NAME OF THE PROGRAMME: BACHELOR OF COMPUTER APPLICATIONS– PROGRAMME OUTCOME	
PO1	**Disciplinary knowledge:** Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate Programme of study
PO2	**Communication Skills:** Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one's views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.
PO3	**Critical thinking:** Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development
PO4	**Problem solving:** Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's learning to real life situations.
PO5	**Analytical reasoning**: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.
PO6	**Research-related skills**: A sense of inquiry and capability for asking relevant/appropriate questions, problem arising, synthesizing and articulating; Ability to recognize cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and 4 draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation
PO7	**Cooperation/Team work:** Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team
PO8	**Scientific reasoning**: Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.
PO9	**Reflective thinking**: Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.
PO10	**Information/digital literacy:** Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.
PO11	**Self-directed learning**: Ability to work independently, identify appropriate resources

	required for a project, and manage a project through to completion.
PO12	**Multicultural competence:** Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.
PO13	**Moral and ethical awareness/reasoning**: Ability to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demon starting the ability to identify ethical issues related to one‟s work, avoid unethical behaviour such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.
PO14	**Leadership readiness/qualities:** Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way.
PO15	**Lifelong learning:** Ability to acquire knowledge and skills, including „learning how to learn‟, that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling.

NAME OF THE PROGRAMME: BACHELORE OF COMPUTER APPLICATIONS – COURSE OUTCOMES	
SEMESTER I	
Python Programming	1. Learn the basics of python, Do simple programs on python, Learn how to use an array. 2. Develop program using selection statement, Work with Looping and jump statements, Do programs on Loops and jump statements. 3. Concept of function, function arguments, Implementing the concept strings in various application, Significance of Modules, Work with functions, Strings and modules. 4. Work with List, tuples and dictionary, Write program using list, tuples and dictionary. 5. Usage of File handlings in python, Concept of reading and writing files, Do programs using files.
Fundamentals of Information Technology	1. Learn the basics of computer, Construct the structure of the required things in computer, learn how to use it. 2. Develop organizational structure using for the devices present currently under input or output unit. 3. Concept of storing data in computer using two header namely RAM and ROM with different types of ROM with advancement in storage basis. 4. Work with different software, Write program in the software and

	applications of software. 5. Usage of Operating system in information technology which really acts as a interpreter between software and hardware.
Structured Programming Language in C	1. Remember the program structure of C with its syntax and semantics 2. Understand the programming principles in C (data types, operators, branching and looping, arrays, functions, structures, pointers and files). 3. Apply the programming principles learnt in real-time problems 4. Analyze the various methods of solving a problem and choose the best method. 5. Code, debug and test the programs with appropriate test cases
SEMESTER-II	
Object Oriented Programming Concepts Using C++	1. Remember the program structure of C with its syntax and semantics 2. Understand the programming principles in C (data types, operators, branching and looping, arrays, functions, structures, pointers and files) 3. Apply the programming principles learnt in realtime problems 4. Analyze the various methods of solving a problem and choose the best method 5. Code, debug and test the programs with appropriate test cases
Introduction to HTML	1. Knows the basic concept in HTML Concept of resources in HTML 2. Knows Design concept. Concept of Meta Data Understand the concept of saves the files. 3. Understand the page formatting. Concept of list 4. Creating Links. Know the concept of creating link to email address 5. Concept of adding images Understand the table creation.
Understanding Internet	1. Knows the basic concept in internet 2. Know the concept of TCP/IP – Internet Technologies and Protocol. 3. Understand the concept of Internet connectivity. 4. Can be able to know about internet networks
SEMESTER III	

Data Structure and Algorithms	1. Understand the concept of Dynamic memory management, data types, algorithms, Big O notation 2. Understand basic data structures such as arrays, linked lists, stacks and queues 3. Understand basic data structures such as arrays, linked lists, stacks and queues. 4. Solve problem involving graphs, trees and heaps. 5. Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data.
Introduction to Data Science	1. Understand the basics in Data Science and Big data. 2. Understand overview and building process in Data Science 3. Understand various Algorithms in Data Science. 4. Understand Hadoop Framework in Data Science. 5. Case study in Data Science
Office Automation	1. Possess the knowledge on the basics of computers and its components. 2. Gain knowledge on Creating Documents, spreadsheet and presentation. 3. Learn the concepts of Database and implement the Query in Database. 4. Demonstrate the understanding of different automation tools. 5. Utilize the automation tools for documentation, calculation and presentation purpose.
Problem Solving Techniques	1. Study the basic knowledge of Computers. Analyze the programming languages. 2. Study the data types and arithmetic operations. Know about the algorithms. Develop program using flow chart and pseudocode. 3. Determine the various operators. Explain about the structures. Illustrate the concept of Loops 4. Study about Numeric data and character-based data. Analyze about Arrays. 5. Explain about DFD Illustrate program modules. Creating and reading Files
PHP Programming	1. Write PHP scripts to handle HTML forms 2. Write regular expressions including modifiers, operators, and meta characters. 3. Create PHP Program using the concept of array. 4. Create PHP programs that use various PHP library functions 5. Manipulate files and directories.
SEMESTER IV	
Java Programming	1. Understand the basic Object-oriented concepts. Implement the basic constructs of Core Java. 2. Implement inheritance, packages, interfaces and exception handling of Core Java. 3. Implement multi-threading and I/O Streams of Core Java. 4. Implement AWT and Event handling. 5. Use Swing to create GUI.

Network Security	1. Analyze and design classical encryption techniques and block ciphers. 2. Understand and analyze public-key cryptography, RSA and other public-key cryptosystems such as Diffie Hellman Key Exchange, ElGamal Cryptosystem, etc. 3. Understand key management and distribution schemes and design User Authentication. 4. Analyze and design hash and MAC algorithms, and digital signatures. 5. Know about Intruders and Intruder Detection mechanisms, Types of Malicious software.
Multimedia Systems	1. Understand the concepts, importance, application and the process of developing multimedia. 2. To have basic knowledge and understanding about image related processings. 3. To understand the framework of frames and bit images to animations 4. Speaks about the multimedia projects and stages of requirement in phases of project. 5. Understanding the concept of cost involved in multimedia planning, designing, and producing
Web Designing	1. Develop working knowledge of HTML 2. Ability to Develop and publish Web pages using Hypertext Markup Language (HTML). 3. Ability to optimize page styles and layout with Cascading Style Sheets (CSS). 4 Ability to develop a java script. 5. An ability to develop web application using Ajax.
Cyber Forensics	1. Understand the definition of computer forensics fundamentals 2. Evaluate the different types of computer forensics technology. 3. Analyze various computer forensics systems. 4. Apply the methods for data recovery, evidence collection and data seizure. 5. Gain your knowledge of duplication and preservation of digital evidence.
SEMESTER V	
Operating Systems	1. Define the fundamentals of OS and identify the concepts relevant to process , process life cycle, Scheduling Algorithms, Deadlock and Memory management. 2. know the critical analysis of process involving various algorithms, an exposure to threads and semaphores 3. Have a complete study about Deadlock and its impact over OS. Knowledge of handling Deadlock with respective algorithms and measures to retrieve from deadlock. 4. Have complete knowledge of Scheduling Algorithms and its types 5. understand memory organization and management.

Database Management System	1. Understand the various basic concepts of Data Base System. Difference between file system and DBMS and compare various data models. 2. Define the integrity constraints. Understand the basic concepts of Relational Data Model, EntityRelationship Model. 3. Design database schema considering normalization and relationships within database. Understand and construct database using Structured Query Language. Attain a good practical skill of managing and retrieving of data using Data Manipulation Language (DML). 4. Classify the different functions and various join operations and enhance the knowledge of handling multiple tables. 5. Learn to design Data base operations and implement using PL/SQL programs. Learn basics of PL/SQL and develop programs using Cursors, Exceptions.
Mobile Computing	1. To understand basic concepts of mobile computing. 2. To learn the basics of mobile telecommunication system 3. To comprehend wireless LAN and cellular systems. 4. To understand protocols at network and transport.
Artificial Intelligence	1. Understand the various concepts of AI Techniques. 2. Understand various Search Algorithm in AI. 3. Understand probabilistic reasoning and models in AI. 4. Understand Markov Decision Process. 5. Understand various type of Reinforcement learning Techniques.
Big Data Analytics	1. Work with big data tools and its analysis techniques. 2. Analyze data by utilizing clustering and classification algorithms. 3. Learn and apply different mining algorithms and recommendation systems for large volumes of data. 4. Perform analytics on data streams. 5. Learn NoSQL databases and management.
Computer Networks	1. To Understand the basics of Computer Network architecture, OSI and TCP/IP reference models. 2. To gain knowledge on Telephone systems using wireless network. 3. To understand the concept of MAC. 4. To analyze the characteristics of Routing and Congestion control algorithms. 5. To understand network security and define various protocols such as FTP, HTTP, Telnet, DNS.
Software Testing	1. Students learn to apply software testing knowledge and engineering methods. 2. Have an ability to identify the needs of software test automation, and define and develop a test tool to support test automation. 3. Have an ability understand and identify various software testing problems, and solve these problems by designing and selecting software test models, criteria, strategies, and methods. 4. Have basic understanding and knowledge of contemporary issues in

	software testing, such as component-based software testing problems 5. Have an ability to use software testing methods and modern software testing tools for their testing projects.
Cryptography	1. Analyze the vulnerabilities in any computing system and hence be able to design a security solution. 2. Apply the different cryptographic operations of symmetric cryptographic algorithms. 3. Apply the different cryptographic operations of public key cryptography. 4. Apply the different cryptographic operations of public key cryptography 5. Understand various Security practices and System security standards
Project with Viva voce	1. Show leadership skills and learn time management. 2. identify various tools to be applied to a specific problem 3. evaluate the reports 4. take part in a team as well as manage it to deliver stunning outcomes 5. assess and develop the individual skills to present and organize projects.
SEMESTER VI	
Machine Learning	1. Appreciate the importance of visualization in the data analytics solution. 2. Apply structured thinking to unstructured problems 3. Understand a very broad collection of machine learning algorithms and problems 4. Learn algorithmic topics of machine learning and mathematically deep enough to introduce the required theor y 5. Develop an appreciation for what is involved in learning from data.
Data Analytics using R Programming	1. Work with big data tools and its analysis techniques. 2. Analyze data by utilizing clustering and classification algorithms. 3. Learn and apply different mining algorithms and recommendation systems for large volumes of data. 4. Perform analytics on data streams 5. Learn NoSQL databases and management.
Internet of Things and its applications	1. Work with big data tools and its analysis techniques. 2. Analyze data by utilizing clustering and classification algorithms. 3. Learn and apply different mining algorithms and recommendation systems for large volumes of data. 4. Perform analytics on data streams. 5. Learn NoSQL databases and management.
Software Project Management	1. Understand the principles and concepts of project management. 2. Knowledge gained to train software project managers 3. Apply software project management methodologies. 4. Able to create comprehensive project plans 5. Evaluate and mitigate risks associated with software development process
Enterprise Resource Planning	1. Understand the basic concepts of ERP. 2. Identify different technologies used in ERP 3. Understand and apply the concepts of ERP Manufacturing Perspective and ERP Modules

	4. Discuss the benefits of ERP 5. Apply different tools used in ERP
NATURAL LANGUAGE PROCESSING	1. Describe the fundamental concepts and techniques of natural language processing. Explain the advantages and disadvantages of different NLP technologies and their applicability in different business situations. 2. Distinguish among the various techniques, taking into account the assumptions, strengths, and weaknesses of each Use NLP technologies to explore and gain a broad understanding of text data. 3. Use appropriate descriptions, visualizations, and statistics to communicate the problems and their solutions. Use NLP methods to analyse sentiment of a text document. 4. Analyze large volume text data generated from a range of real-world applications. Use NLP methods to perform topic modelling. 5. Develop robotic process automation to manage business processes and to increase and monitor their efficiency and effectiveness. Determine the framework in which artificial intelligence and the Internet of things may function, including interactions with people, enterprise functions, and environments.
Cloud Computing	1. Understand the fundamental concepts and Technologies in Cloud Computing. 2. Able to understand various cloud service types and their uses and pitfalls. 3. Able to understand Cloud Architecture and Application design. 4 Understand the various aspects of application design, benchmarking and security in the Cloud. 5. Understand various Case Studies in Cloud Computing.
Robotics and its Applications	1. Describe the different physical forms of robot architectures. 2. Kinematically model simple manipulator and mobile robots. 3. Mathematically describe a kinematic robot system. 4. Analyze manipulation and navigation problems using knowledge of coordinate frames, kinematics, optimization, control, and uncertainty. 5. Program robotics algorithms related to kinematics, control, optimization, and uncertainty.
Open Source Technology	1. Acquire and understand the basic concepts in Java,application of OOPS concepts. 2. Acquire knowledge about operators and decision-making statements. 3. Identify the significance and application of Classes, arrays and interfaces and analyzing java arrays. 4. Understand about the applications of OOPS concepts and analyze overriding and packages through java programs. 5. Create window-based programming using applet and graphics programming.

NAME OF THE PROGRAMME: MASTER OF COMPUTER APPLICATIONS– PROGRAMME OUTCOME	
PO1	Problem Solving Skill Apply knowledge of Management theories and Human Resource practices to solve business problems through research in Global context.
PO2	Decision Making Skill Foster analytical and critical thinking abilities for data-based decision making.
PO3	Ethical Value Ability to incorporate quality, ethical and legal value-based perspectives to all organizational activities.
PO4	Communication Skill Ability to develop communication, managerial and interpersonal skills.
PO5	Individual and Team Leadership Skill Capability to lead themselves and the team to achieve organizational goals.
PO6	Employability Skill Inculcate contemporary business practices to enhance employability skills in the competitive environment.
PO7	Entrepreneurial Skill Equip with skills and competencies to become an entrepreneur.
PO8	Contribution to Society Succeed in career endeavors and contribute significantly to society.
PO9	Multicultural competence Possess knowledge of the values and beliefs of multiple cultures and a global perspective.
PO10	Moral and ethical awareness/reasoning Ability to embrace moral/ethical values in conducting one's life.

NAME OF THE PROGRAMME: MASTERS OF COMPUTER APPLICATIONS – COURSE OUTCOMES	
Linux and Shell Programming	1. To understand, apply and analyze the concepts and methodology of Linux shell programming. 2. To comprehend, impart and apply fundamentals of control structure and script controls 3 .To understand, analyses and evaluate the functions, graphical desktop interface and editors 4 .To collaborate, apply and review the concepts and methodology of

	regular expression and advanced gawk. 5. To comprehend, use and illustrate the advance concepts such as alternate shell script, data connectivity and bash scripting using python.
Python Programming	1 . Comprehend the programming skills in python and develop applications using conditional branches and loop. 2. Create python applications with strings and functions. 3. Understand and implement the Object Oriented Programming paradigm with the concept of objects and classes, Inheritance and polymorphism. 4. Evaluate the use of Python packages to perform numerical computations and data visualization. 5. Design interactive web applications using Django.
II SEMESTER	
Data Structures and Algorithms	1. Understand various ADT concepts 2. Familiar with implementation of ADT models with Python language and understand how to develop ADT for the various real-time problems. 3. Apply with proper ADT models with problem understanding 4. Apply and analyze right models based on the problem domain 5. Evaluate modern data structures with Python language
Internet of Things	1. Comprehend the IoT evolution with its architecture and sensors 2. Understand the networking concepts for communication and underlying IoT protocols. 3. Assess the embedded technologies and develop prototypes for the IoT products. 4. Evaluate the use of Application Programming Interface and design an API for IoT in real time. 5. Recognize the ethics of business models and perform security analysis.
Cyber Security	1. Understand, describe, analyze and examine the basics of Cyber security concepts and its implementation in India. 2. Comprehend and demonstrate the security tips in browsers, WLAN, social networks, Email security and Smart phone. Apply the investigations in postmortem and Forensics. 3. Understand, apply and evaluate the various investigation roles and Wi

	Fi protecting mechanisms. 4. Understand, illustrate and evaluate the method of seize the digital information and evidences forensics data and evaluate the forensics reports. 5. Comprehend, apply and appraise the methods digital forensics with cybercrime prevention techniques
Blockchain Technologies	1. Understand, apply and examine the characteristics of blockchain, bitcoin and consensus algorithm in centralized and decentralized methods. 2. Comprehend and demonstrate the application of hashing and public key cryptography in protecting the blockchain. 3. Understand and analyse the elements of trust in a Blockchain: validation, verification, and consensus. 4. Comprehend and evaluate the alternate coin, Ethereum and smart contract. 5. Grasp and apply the knowledge of Tools and languages for applications
III SEMESTER	
Advanced Java Programming	1. Understand the Object-Oriented Program including classes and methods; inheritance and exception handling. 2. Complete comprehension of String functions and I/O Streams 3. Creation of graphical representation using Applet 4. Application of Servlets for designing Web based applications 5. Usage of JDBC connectivity and implementation of the concept to get desired results from database
Web Technologies	1. Design dynamic web pages using Javascript, Jquery and Angular Java script 2. Develop Web pages using HTML, CSS and XML 3. Create web application using PHP and MySQL 4. To design dynamic web pages using Angular javascript 5. Develop interactive web pages using Jquery
Advanced Machine Learning Techniques	1. To understand, impart and analyze the concepts and of Machine Learning Techniques and types of data. 2. To comprehend, apply and evaluate the classification techniques for

	real-world applications. 3. To understand, use and perform evaluation of Regression methods. 4. To recognize, implement and analyse the unsupervised techniques for real-world applications 5. To understand, identify, implement and review the deep learning techniques for real-time applications
IV SEMESTER	
High Performance Computing	1. Understand of the HPC and ccNUMA concepts 2. Design and develop a parallel programming with modern C, C++ and new version of FORTRAN. 3. Apply with parallel computing. 4. Develop an efficient OpenMP programming 5. Evaluate an efficient MPI programming
Big Data Analytics	1. To understand, illustrate and evaluate the concepts and techniques of Data Science, Big Data Analytics and its tools. 2. To collaborate, apply and review the computing for big data in Hadoop, and NoSQL environment. 3. To comprehend, implement and review the concepts of data science and big data analytics projects using MapReduce, and MongoDB. 4. To understand, use and analyze the concepts of big data analytics projects using HIVE database. 5. To illustrate, develop and review the concepts of PIG database in Hadoop environment.