M. Sc. COMPUTER SCIENCE BATCH 2023-2025

Vision

Our dream is to make the College an institution of excellence at the national level by imparting quality education of global standards to make students academically superior, socially committed, ethically strong, spiritually evolved and culturally rich citizens to contribute to the holistic development of the self and society.

Mission

Training students to become role models in academic arena by strengthening infrastructure, upgrading curriculum, developing faculty, augmenting extension services and imparting quality education through an enlightened management and committed faculty who ensure knowledge transfer, instill research aptitude and infuse ethical and cultural values to transform students into disciplined citizens in order to improve quality of life.

Program Educational Objectives (PEOs)	
The **M. Sc. Computer Science** program describe accomplishments that graduates are expected to attain within five to seven years after graduation	
PEO1	To provide students with a clear understanding of the course goals and to visualize their needs.
PEO2	Employed in the software sector and attempting to acquire and implement new ideas and concepts as the field progresses.
PEO3	To instill the value of continuous learning and the importance of research and development for the betterment of society and the country as a whole.
PEO4	Enhanced to cope with evolving technologies on the frontiers of computer science and incorporating Industry 5.0 Technologies into their careers based on industry requirements
PEO5	Practice ethics and human values in their profession.

Program Specific Outcomes (PSOs)	
After the successful completion of **M.Sc. Computer Science** program, the students are expected to	
PSO - 01	**Soft Skills:** Able to understand, analyze and develop computer programs in the areas related to various domains for efficient design of computer-based systems of varying complexity.
PSO - 02	**Enhancing Knowledge:** Acquire foundation for research into the theory, practice of programming and apply the knowledge gained during the course of the program from advanced computing and solve real life complex problems faced in society.

Program Outcomes (POs)	
On successful completion of the M.Sc. **Computer Science** program	
PO1	**Disciplinary Knowledge:** Develop core competence in computer science and to take up a career in the IT industry as well as to impart the analytical skills in research and development.
PO2	**Problem Analysis:** Ability to instill various thrust areas of computer science with sound knowledge of theory and hands-on practical skills.
PO3	**Design Thinking :** Graduate Attribute Title: Ability to design, implement and evaluate the principles of computer science and apply these in the multidisciplinary environments to manage project.
PO4	**Opportunity Level:** Ability to analyze the local, global needs of computing in par with IT industry and society.
PO5	**Skill Enhancement:** Develop innovative computing skills through information technology solutions.
PO6	**Digital Tool:** Review of the most up-to-date tools and mechanisms for tool handling.
PO7	**Team Work:** Work in accordance with ethical and professional standards.
PO8	**Decision Making:** Determine the viewpoint on business practices, risks, and constraints.
PO9	**Entrepreneurial Skills:** Develop responsibilities on entrepreneurial spirit roles.
PO10	**Problem Solving :** Ability to plan, conduct, and analyze experiments, as well as extrapolate results

23PCS101 - Design & Analysis of Computer Algorithms

CO Number	CO Statement
CO1	Remember and Understand the concepts of time and space complexity, worst case, average case and best case complexities and the big-O notation
CO2	Identify the key characteristics of a given problem and analyses the suitability of a specific algorithm design technique for the problem.
CO3	Apply important algorithmic design paradigms and methods of analysis.
CO4	Analyze major graph algorithms and to employ graphs to model engineering problems
CO5	Analyze worst-case running times of algorithms using various algorithms

23PCS102 - Data Mining using R Tool

Course Outcomes (CO)

CO1	Remember the basic concepts of data mining techniques
CO2	Understand the concept of data warehouse and its backend process
CO3	Apply various clustering and association finding algorithms for feature selection
CO4	Analyze the techniques of classification, decision tree and neural networks to execute and measure interesting patterns from different kinds of databases
CO5	Evaluate various mining techniques on complex data objects

23PCS103- Advanced Operating Systems

CO Number	CO Statement
CO1	Remember the basic concepts of Operating Systems and its applications.
CO2	Understand the advanced concepts in operating system, the concepts of distributed operating systems, the information about Linux operating system and iOS architecture, layers and its functions.
CO3	Apply different Operating Systems
CO4	Analyze deadlock situations, the reason for deadlock, recovery from deadlocks, how to avoid deadlocks, the need for Real time operating system and security issues.
CO5	Evaluate the use of Palm OS and Android in handheld devices.

23PCS2104- Advanced Java Programming

CO Number	CO Statement
CO1	Recollect different classes, constructors and methods of Swing components
CO2	Get an idea to construct an enterprise application using Java Beans
CO3	Develop RMI programs for real world applications and establishing DATABASE Connectivity using Java.
CO4	Analyze session tracking using Session objects and Cookies
CO5	Validate server side java programs using Servlets and JSP

23PCS105- Programming Lab I: Design & Analysis of Algorithms

CO1	Understand problems by applying appropriate algorithms.
CO2	Analyze the efficiency of various algorithms.
CO3	Apply various data structure techniques to solve problems.
CO4	Solve a program in many ways using different techniques.
CO5	Identify and evaluate complex problems using principles of mathematics and engineering science.

23PCS1E1- Elective I: Software Project Management

CO Number	CO Statement
CO1	Remember the model from the conventional software product to the modern.
CO2	Understand various estimation levels of cost and effort.
CO3	Deploy various artifacts sets for better understanding of software development.
CO4	Analyze and design the software architecture.
CO5	Validate appropriate project management approach through an evaluation of the business context and scope of the project.

23PCS1E2 - Elective – I: Software Engineering and Testing

CO Number	CO Statement
CO1	Recollect basic software process models to ensure that software designs, development and maintenance meet or exceed applicable standards.
CO2	Understand concepts of software management activities, requirement gathering, design, analysis and maintenance.
CO3	Apply advanced software projects in designing, testing, cost estimation and risk management.
CO4	Analyze and implement the design by types of testing, scenarios, process, methodologies and architecture for automation, using testing tools and solve challenges in testing.
CO5	Access verification and validation, integrate functional and non-functional testing, to perform regression testing, framework for test tools, testing an application using WinRunner tool.

23PCS1E3- Elective I: Object Oriented Analysis and Design with UML

CO1	Remember and Understand OOAD concepts and various UML diagrams
CO2	Identify the classes and responsibilities of the problem domain
CO3	Apply the concepts of architectural design for deploying the code for software.
CO4	Analyze the systems, various components and collaborate them interchangeably.
CO5	Ability to Construct projects using UML diagrams

23PCS206- Android Programming

CO Number	CO Statement
CO1	Remember the basics of Android operating system and the structure of Android application.
CO2	Understand the various components and layout managers used for user interface design.
CO3	Apply the packages and classes to create a SQLite database.
CO4	Analyze the functions of various sensors.
CO5	Evaluate the run time security during the deployment of an application.

23PCS207- Cloud Computing

CO Number	CO Statement
CO1	Understand the concepts of Cloud computing Paradigms.
CO2	Collaborate Cloud Service Architecture and its Service models
CO3	Analyze the Virtualization Concepts
CO4	Analyze intensive computation in Cloud Computing
CO5	Explore applications and management of Cloud Computing

23PCS208- Big Data Analytics

CO1	Remember how to collect, manage, store, query, and analyze various forms of big data
CO2	Understand the foundations of Hadoop and Hadoop Distributed File System. Design of HDFS and file-based data structures along with virtualization concept.
CO3	Analyze the working of Map Reduce and YARN for job scheduling.
CO4	Analyze un-modeled, multi-structured data using Hadoop, MapReduce
CO5	Compute basic summary statistics and data analysis using Pig Programming

23PCS209- Advanced Database Management System

CO1	Remember and Understand the design and creation of tables in databases.
CO2	Understand Relational data model and design theory with different indexing structures and physical databases.
CO3	Remember and Apply advanced SQL, Sub-queries, embedded and dynamic SQL.PL/SQL concepts with triggers.
CO4	Analyze the history of NoSql with features, DB design, Applying consistency methods, Evaluating keys.
CO5	Ability to understand features of Document database, Hybrid NoSql.

23PCS210- Programming Lab II: Android Programming

CO1	Use various controls and layout managers for user interface design.
CO2	Analyze the different methods to build user interface for an application.
CO3	Apply the packages and classes to create a SQLite database.
CO4	Analyze the functions of various sensors.
CO5	Evaluate the deployment of applications on mobile devices.

23PCS2E1- Elective II: Advanced Networks

CO1	Recollect OSI and TCP/IP layers and their tasks. Interpret and explain physical, logical and port addresses.
CO2	Comprehend Standard Ethernet and Mapping techniques.
CO3	Deploy Logical addressing and discuss the format of IPv4 and IPv6 addresses
CO4	Analyze the problems and solutions associated with delivery and forwarding of packets
CO5	Present knowledge on Mobile IP and Client-Server interactions

23PCS2E2- Elective II: Wireless Networks

CO1	Learn state-of-the-art wireless technologies and the fundamental principles of Electromagnetic wave propagation and the parameters that dictate its performance.
CO2	Understand the medium access control protocols and address physical layer issues
CO3	Evaluate key routing protocols for sensor networks and main design issues.
CO4	Sensor management, sensor network middleware, operating systems.
CO5	Analyze low-power devices equipped with sensing, computation, and wireless communication capabilities.

23PCS2E3- ELECTIVE – II: Mobile Computing

CO Number	CO Statement
CO1	Remember the principles and theories of mobile computing technologies
CO2	Understand the possible future of mobile computing technologies and applications
CO3	Apply QoS over wireless channels for mobile and wireless LAN.
CO4	Analyze security, energy efficiency, mobility, scalability, and their unique characteristics in wireless networks.
CO5	Demonstrate basic skills for cellular networks design.

23PCS2N1- Non-Major Elective I: Web Designing Lab

CO1	Apply critical thinking skills
CO2	Analyze and write a well formed / valid XML document
CO3	Access and analyze website performance by interpreting analytics to measure site traffic, SEO, engagement, and activity on social media
CO4	Access XSL transformation, sorting..
CO5	Design and create websites

23PCS2N2-Non-Major Elective I:Advanced Internet Technologies

CO1	Understand the fundamentals of Internet and the Web concepts.
CO2	Analyze and apply the online information resources.
CO3	Inspect and utilize the appropriate Google Apps for education effectively.
CO4	Analyze the concepts of World wide web
CO5	Developing Web forms

23PCS2VA1-Foundations and Applications of Blockchain Technology and Cryptocurrency

CO1	Remember the basics of cryptography.
CO2	Understand emerging abstract models for Blockchain technology.
CO3	Design, build, and deploy a distributed application.
CO4	Analyze the differences between proof-of-work and proof-of-stake consensus.
CO5	Evaluate security, privacy, and efficiency of a Blockchain system.

23PCS2VA2- VAC II: Digital Entrepreneurship

CO1	Remember the principles of digital business design.
CO2	Understand the basics of a content management system, and how it can be used as the foundation for an internet business presence.
CO3	Launch a business-quality online presence, using widely available services and software.
CO4	Analyze the usability and customer experience through web.
CO5	Evaluate and monitor the progress of digital business through web analytics.

Head of the Department

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Vision

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PG DEPARTMENT OF COMPUTER SCIENCE

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PEO3	To instill the value of continuous learning and the importance of research and development for the betterment of society and the country as a whole.
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Program Outcomes:

PO1	Develop core competence in computer science and to take up a career in the IT industry as well as to impart the analytical skills in research and development.
PO2	Ability to instill various thrust areas of computer science with sound knowledge of theory and hands-on practical skills.
PO3	Ability to design, implement and evaluate the principles of computer science and apply these in the multidisciplinary environments to manage project.
PO4	Ability to analyze the local, global needs of computing in par with IT industry and society.
PO5	Develop innovative computing skills through information technology solutions
PO6	Review of the most up-to-date tools and mechanisms for tool handling
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22PCS311- Internet of Things

CO1	Remember the basics of IoT and IIoT
CO2	Understand IoT reference layer and various protocols of IoT
CO3	Deploy cloud in the context of IoT
CO4	Design IoT applications in different domain and be able to analyze their performance
CO5	Implement basic IOT Applications on Embedded Platforms

22PCS312- Network Security & Cryptography

CO1	Remember the basics of network security and cryptography
CO2	Understand the symmetric key cryptography and Mathematics of symmetric key cryptography
CO3	Apply the mathematics of asymmetric key cryptography
CO4	Analyze differential message authentication and integrity
CO5	Evaluate various security practice and system security

22PCS313- Python Programming

CO1	Remember the principles of structured programming recognize and construct common programming idioms: variables, loop, branch, subroutine, and input/output.
CO2	Understand the common programming idioms: variables, loop, branch, subroutine, and input/output
CO3	Deploy the concepts of lists, tuples, dictionaries, standard libraries, modular programming and the design of user interfaces
CO4	Ability to analyze and solve the problems using advanced facilities of the Python language
CO5	Apply the functions and python libraries to analyze and solve various data analytics problems

22PCS314- Digital Image Processing

CO1	Get broad exposure and understanding of various applications of image processing in industry, medicine, and defense and other applications.
CO2	To be familiar with basic concepts of two-dimensional signal acquisition, sampling, and quantization.
CO3	To implement the fundamental image enhancement algorithms such as histogram modification, contrast manipulation, and edge detection.
CO4	To analyze programming skills in image compression, segmentation and restoration techniques.
CO5	To access digital images and process using MATLAB.

22PCS315- Programming Lab III: Internet of Things

CO1	Implement IoT to different applications
CO2	Analyze the revolution of Internet in Mobile Devices, Cloud & Sensor Networks
CO3	Design IoT applications in different domain and be able to analyze their performance
CO4	Discover and demonstrate the promise of the Internet of Things
CO5	Design an IoT device to work with a Cloud Computing infrastructure.

2PCS316- Programming Lab IV: Digital Image Processing using MATLAB

CO1	Implement the fundamental image enhancement algorithms such as histogram modification, contrast manipulation, and edge detection.
CO2	Analyze and visualize data using MATLAB effectively
CO3	Apply a top-down, modular, and systematic approach to design, write, test, and debug sequential MATLAB programs to achieve computational objectives
CO4	Analyze programming skills in image compression, segmentation and restoration techniques.
CO5	Apply numeric techniques and computer simulations to solve real time problems.

22PCS3E1- Elective III: Artificial Intelligence & Machine Learning

CO1	Learn about the artificial intelligence problem and the characteristics of the problem space.
CO2	Identifies the Heuristics search techniques and issues in representing the knowledge and comprehend the statistical reasoning
CO3	Understand the problem solving using predicates and infer the knowledge using rules
CO4	Design a learning model appropriate to the application and recognize the characteristics of machine learning techniques that are useful to solve real-world problems
CO5	Design and implement various machine learning algorithms in a range of real-world applications

22PCS3E2- Elective III: Data Science

CO1	Understand the data science concepts and infer the knowledge about data science process
CO2	Illustrate the basics of natural language processing and apply feature engineering concept for text representation
CO3	Analyze text classification an devaluatethe classification model in real word application
CO4	Learn and apply different text analytics techniques to retrieve information from text
CO5	Understand the basic concept of speech recognition and analyze the phonetic in speech

22PCS3E3- Elective III: Robotic Process Automation for Business

CO1	Remember the benefits and ethics of RPA
CO2	Understand the Automation cycle and its techniques
CO3	Apply the of design inferences and information processing of RPA
CO4	Implement & Apply RPA in Business Scenarios
CO5	Analyze on Robots & leveraging automation

22PCS4P2- Project Work and Viva -Voce

CO1	Understand and formulate a real world problem and develop its requirements
CO2	Analyze the problem requirements
CO3	Design solution for a set of requirements
CO4	Apply test cases and validate the conformance of the developed prototype against the original requirements of the problem
CO5	Responsible member and possibly a leader of a team in developing software solutions