Sinhgad Technical Education Society's
SINHGAD COLLEGE OF SCIENCE
Department of Computer Science
(Affiliated to University of Pune, ID No. PU/PN/SC/162/2001, **NAAC Accredited**: 'B' + **Grade.**)
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M.Sc. Computer Science (NEP-2023)

PROGRAM OBJECTIVE (PO)

PO1: The Programme seeks to instill in students a deep and comprehensive knowledge of core computer science disciplines, advanced computer science concepts, theories, and principles, including algorithms, data structures, programming languages, artificial intelligence, machine learning, cloud computing, advanced databases, full stack development, software project management, and design patterns.

PO2: Graduates should be equipped with the ability to analyze complex problems in computer science, design innovative solutions, and implement them effectively.

PO3: The program aims to develop students' research skills, enabling them to evaluate existing research, contribute to knowledge in the field, and apply critical thinking to solve computational problems.

PO4: The program aims to cultivate a passion for research, encouraging students to engage in original research projects that contribute to the advancement of computer science knowledge and address real-world problems.

PO5: Students are expected to gain proficiency in multiple programming languages and develop the ability to write efficient, reliable, and maintainable code.

PO6: Depending on the chosen track or concentration, students may develop expertise in areas.

PO7: Through hands-on projects, practical assignments, and exposure to state-of-the-art tools and technologies, we aim to develop the technical proficiency and problem-solving skills necessary for success in the professional world.

PO8: Graduates should be adept at presenting complex technical concepts clearly and effectively, both in written and oral forms, to various audiences.

PO9: Computer science professionals often work in multidisciplinary teams. Students should learn to collaborate effectively with team members, understand different perspectives, and contribute productively to achieve common goals.

PO10: The program places a strong emphasis on ethical considerations, responsible use of technology, and awareness of the societal impact of computing solutions. We aim to produce graduates who approach their work with integrity and a sense of social responsibility.

PO11: Acknowledging the dynamic nature of computer science, we aim to instill in our students a desire for continuous learning and professional development, empowering them to adapt and thrive in the face of technological advancements; prepared them to adapt to new technologies and methodologies throughout their careers.

PO12: Students will be encouraged to think creatively and innovatively, exploring new ideas and approaches to solve computational problems and advance the state of the art in the field.

PO13: The program includes On Job Training, internships, research work, research article and papers writing or a thesis that provides students with practical experience, applying their knowledge to real-world challenges.

PROGRAM SPECIFIC OBJECTIVE (PSO)

After successfully completing M. Sc. (Computer Science) Programme students will be

PSO1 Understand the concepts and application in the field of Computing Sciences like Web designing & development, mobile application development and Network & Communication technologies.

PSO2 Ability to test & analyze the quality of various sub-systems and to integrate them in order to evolve a larger computing system

PSO3 Developed in-house applications in terms of projects.

PSO4 To make them employable according to current demand of IT Industry and responsible citizen.

PSO5 Aware them to publish their work in reputed journals

F.Y. M.SC. (COMPUTER SCIENCE) SEM-I

CS-501-MJ: Advanced Operating System

CO1: Understand the Operating Systems Structure with example of Unix/Linux.

CO2: Learn the structure of files and directory in UNIX/LINUX OS.

CO3: Use various system calls related to file subsystem.

CO4: Learn the process control subsystem structure in UNIX/LINUX OS

CO5: Use various system calls related to process control subsystem.

CO6: Learn the concept of signal handling with practical implementation

CO7: Understand the memory management policies of UNIX/LINUX OS

CS-502-MJ: Artificial Intelligence

CO1: Understand the fundamental concepts of Artificial Intelligence.

CO2: Identify and apply appropriate search strategies for AI problem.

CO3: Identify knowledge and represent AI algorithms using various techniques.

CO4: Implement ideas to design and develop AI solutions for complex challenges.

CO5: Analyze the performance of AI models and interpret their results.

CO6: Implement ideas underlying modern logical inference systems.

CO7: Understand recent trends and future scope of AI

CS-503-MJ: Principles of Programming Language

CO1: Separate syntax from semantics

CO2: Compare programming language designs

CO3: Understand their strengths and weaknesses

CO4: Learn new languages more quickly

CO5: Understand basic language implementation techniques

CO6: Learn small programs in different programming Languages

CS-504-MJP: Lab Course on CS-501-MJ (Advanced Operating System)

CO1: Understand the Operating Systems Structure with example of Unix/Linux.

CO2: Learn the structure of files and directory in UNIX/LINUX OS.

CO3: Use various system calls related to file subsystem.

CO4: Learn the process control subsystem structure in UNIX/LINUX OS

CO5: Use various system calls related to process control subsystem.

CO6: Learn the concept of signal handling with practical implementation

CS-505-MJP: Lab Course on CS-502-MJ (Artificial Intelligence)

CO1: Understand the fundamental concepts of Artificial Intelligence.

CO2: Identify and apply appropriate search strategies for AI problem.

CO3: Identify knowledge and represent AI algorithms using various techniques.

CO4: Implement ideas to design and develop AI solutions for complex challenges.

CO5: Analyze the performance of AI models and interpret their results.

CO6: Implement ideas underlying modern logical inference systems.

CO7: Understand recent trends and future scope of AI.

CS-510-MJ: Advance Databases and Web Technologies

CO1: Students will get knowledge of advance database technology

CO2: Students will be able to choose appropriate database technology as per application

CO3: Students will learn to design responsive web application

CO4: Students could design and implement scalable web application

CS-511-MJP: Lab Course on CS-510-MJ (Advance Databases and Web Technologies)

CO1: Students will get knowledge of advance database technology

CO2: Students will be able to choose appropriate database technology as per application

CO3: Students will learn to design responsive web application

CO4: Students could design and implement scalable web application

CS-531-RM: Research Methodology

CO1: Understand of the fundamental concepts of research, including the research process, research questions, hypotheses, and variables.

CO2: Conduct a comprehensive literature review to identify relevant studies, synthesize existing knowledge, and identify research gaps.

CO3: Identify research problems, formulate research questions, and design appropriate methodologies to address these problems

CO4: Identify and select appropriate research designs, such as experimental, observational, survey, qualitative, or mixed-methods, based on the research objectives.

CO5: Apply appropriate data analysis methods, including statistical techniques or qualitative analysis, to draw meaningful conclusions from research data.

CO6: Develop a well-structured research proposal, outlining research questions, methodology, expected outcomes, and a rationale for the study.

CO7: Communicate research findings effectively through written reports, presentations, and academic papers.

CO8: Gain an appreciation for the importance of research in contributing to the advancement of knowledge in their field of study and broader society.

CO9: Understand the principles of research ethics and integrity and apply them in their research.

F.Y. M.SC. (COMPUTER SCIENCE) SEM-II

CS-551-MJ: Design and Analysis of Algorithms

CO1: Analyze worst-case running times of algorithms using asymptotic analysis.

CO2: Compare between different data structures. Pick an appropriate data structure for a design situation.

CO3: Ability to design algorithms using standard paradigms like: Greedy, Divide and Conquer, Dynamic Programming and Backtracking.

CO4: Able to Explain the major graph algorithms and Employ graphs to model engineering problems, when appropriate.

CO5: Able to Compare between different data structures and pick an appropriate data structure for a design situation.

CS-552-MJ: Mobile App Development Technologies

CO1: To provide students with a solid understanding of the mobile app development, Android operating system, its architecture, components, and the software development kit (SDK).

CO2: To teach students how to build Android applications from scratch, including UI design, handling user interactions, and integrating various features.

CO3: To learn about Android's UI components, layouts, and design principles to create visually appealing and user-friendly interfaces.

CO4: To know various methods of data storage in Android applications, such as using SQLite databases, shared preferences, and cloud-based solutions.

CO5: To empower students to independently design, develop, and deploy their Android applications using advanced android tools.

CO6: To understand how to utilize built-in sensors and hardware components on Android devices, such as GPS, accelerometer, Bluetooth, Wi-Fi, Media Player and Camera, in their applications.

CO7: To Get knowledge of Phone Gap Programming

CS-553-MJ: Software Project Management

CO1: Learn the skills that are required to ensure successful medium and large scale software projects.

CO2: Examine Requirements Elicitation, Project Management, Verification &Validation and Management of Large Software Engineering Projects.

CO3: Get knowledge to select and apply project management techniques for process modeling, planning, estimation, process metrics and risk management.

CO4: Understand the concepts, skills, tools, and techniques of software project management.

CS-554-MJP: Lab Course on CS-551-MJ (Design and Analysis of Algorithms)

CO1: Analyze worst-case running times of algorithms using asymptotic analysis.

CO2: Compare between different data structures. Pick an appropriate data structure for a design situation.

CO3: Ability to design algorithms using standard paradigms like: Greedy, Divide and Conquer, Dynamic Programming and Backtracking.

CO4: Able to Explain the major graph algorithms and Employ graphs to model engineering problems, when appropriate.

CO5: Able to Compare between different data structures and pick an appropriate data structure for a design situation.

CS-555-MJP: Lab Course on CS-552-MJ (Mobile App Development Technologies)

CO1: To teach students how to build Android applications from scratch, including UI design, handling user interactions, and integrating various features.

CO2: To learn about Android's UI components, layouts, and design principles to create visually appealing and user-friendly interfaces.

CO3: To empower students to independently design, develop, and deploy their Android applications using advanced android tools.

CS-560-MJ: Full Stack Development-I

CO1: Learn about the benefits of using MEAN stack and how to install and configure it

CO2: Learn advanced ES6 features in JavaScript and Typescript

CO3: Learn about Angular architecture, components, directives, pipes, forms, routing, and services.

CO4: Learn about the event loop, asynchronous programming, modules, packages, and streams.

CO5: Learn about the MVC pattern, routing, HTTP requests and responses, middleware, and error handling.

CO6: Create a full-stack MEAN stack application and deploy it to a production/local server.

CS-561-MJP: Lab Course on CS-560-MJ (Full Stack Development-I)

CO1: Describe appropriate uses for JavaScript and PHP

CO2: Discuss, create, and debug semantically correct basic examples of dynamic web pages

CO3: Construct individual components and entire applications using ReactJS

CO4: Build an interactive web page using ReactJS

CS-581-OJT: On Job Training (Internship)

CO1: Enhance the knowledge related to various tools and technologies used in industry

CO2: Improve the ability to solve complex problems independently and creatively

CO3: Effectively utilize critical thinking and analytical skills in tackling real world challenges

CO4: Effectively communicate and collaborate skills through interaction with team members and mentors.

CO5: Get an experience in working on projects or related working within industry

CO6: Develop the ability to document process, design, implementation and testing

CO7: Familiar with specific industry domain relevant to internship

CO8: Complete projects and tasks as per the predetermined objectives

S.Y. M.SC. (COMPUTER SCIENCE) SEM-III

CS-601-MJ: Software Architecture and Design Pattern

CO1: Understand the UML basics, RUP and basics of software architecture

CO2: Acknowledge the traits of patterns that make them helpful in solving real-world issues.

CO3: Able to use specific frameworks as per applications need.

CO4: Design java application using design pattern techniques.

CS-602-MJ: Machine Learning

CO1: To introduce knowledge of Machine Learning.

CO2: To demonstrate all categories of Machine learning algorithms along with implementation.

CO3: To compose real time application using machine learning algorithms.

CO4: Analyze the concept of neural networks for learning linear and non-linear activation functions.

CS-603-MJ: Internet of Things

CO1: Demonstrate basic concepts, principles and challenges in IoT.

CO2: Illustrate functioning of hardware devices and sensors used for IoT.

CO3: Analyze network communication aspects and protocols used in IoT.

CO4: Apply IoT for developing real life applications using Ardunio programming.

CO5: To develop IoT infrastructure for popular applications.

CS-604-MJP: Lab Course on CS-601-MJ and CS-603-MJ (Software Architecture & Design Pattern and Internet of Things)

CO1: Design java application using design pattern techniques.

CO2: Apply IoT for developing real life applications using Ardunio programming.

CO3: To develop IoT infrastructure for popular applications.

CS-605-MJP: Lab course on CS-602-MJ (Machine Learning)

CO1: To Get Hands on machine learning model.

CO2: Able to estimate Machine Learning models efficiency using suitable metrics.

CO3: Able to analysis and make decision for critical problems.

CO4: Able to handle structured, unstructured as well as semi-structured data.

CO5: Implement ideas to design and develop Deep learning solutions for complex problems.

CS-610-MJ: Full Stack Development-II

CO1: Learn In Depth understanding of Angular framework and State Management.

CO2: Learn using typescript effectively in Angular framework.

CO3: Learn in-depth knowledge of NodeJS and Express JS.

CO4: Learn advance concepts in MongoDB.

CO5: Learn best practices to be followed when creating industry grade applications.

CS-611-MJP: Lab course on CS-610-MJ (Full Stack Development-II)

CO1: Learn In Depth understanding of Angular framework and State Management.

CO2: Learn using typescript effectively in Angular framework.

CO3: Learn in-depth knowledge of NodeJS and Express JS.

CO4: Learn advance concepts in MongoDB.

CO5: Learn best practices to be followed when creating industry grade applications.

CS-631-RP: Research Work-I

CO1: Independently conduct research in a specific area of computer science

CO2: Apply appropriate research methodologies to address research problems.

CO3: Analyze and synthesize information gathered from literature reviews, experiments, or data analysis

CO4: Develop innovative solutions to research problems within the scope of computer science.

CO5: Effectively present research findings through written reports, oral presentations, or poster presentations.

CO6: Publish research work in reputable journals, present at conferences or in recognized project competitions.

S.Y. M.SC. (COMPUTER SCIENCE) SEM-IV

CS-651-MJP: Full Time Industrial Training (IT)

CO1: Apply theoretical concepts learned in the classroom to solve practical problems encountered in an industrial setting.

CO2: Demonstrate proficiency in using industry-standard tools, technologies, and methodologies relevant to their area of specialization.

CO3: Apply analytical and problem-solving skills to address challenges encountered during the industrial training

CO4: Collaborate effectively with team members to achieve project goals and objectives.

CO5: Manage time and resources efficiently to complete assigned tasks and projects within the stipulated timeframe.

CO6: Prepare a comprehensive report documenting their experience, including project details, learnings, and reflections.