Shivaji University, Kolhapur

Department of Technology

Vision
To be a leader in engineering and technology education, a research centre of global standards to provide valuable resources for industry and society through development of competent technical human resources.
Mission
1. To develop technocrats of national & international stature committed to the task of nation building.   2. To organize teaching learning programs to facilitate the development of competent and committed professionals for practice, research and academics.   3. To undertake collaborative research projects that offer opportunities for consistent interaction with industries.

Name of Programme: M.Tech. (Computer Science and Technology)

Program Outcomes
1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. Design solutions for complex engineering problems and design system components or

processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes

1. Provide effective and efficient knowledge of technology and free open source software (FOSS)through IIT Bombay Spoken Tutorial Project

2. To create the awareness of foreign language among students to meet global needs and look for opportunities in multinational companies.

3. Provide platform to students to develop a new and innovative project which will improve local industry needs.

Course Outcomes

Part-I Semester-I

68053	Research Methodology	1. To understand some basic concepts of research and its methodologies 2. To select and define appropriate research problem and parameters 3. To prepare a project proposal (to undertake a project) 4. To organize and conduct research (advanced project) in a more appropriate manner 5. To write a research report and thesis
68054	Mathematical Foundation of Computer Science	1. Apply the concepts learned in fundamental courses such as Discrete Mathematics, in a theoretical setting; in particular, the application of proof techniques. 2. To demonstrate abstract models of computing, including deterministic (DFA), non-deterministic (NFA) and their power to recognize the languages. 3. To construct pushdown automata and the equivalent context free grammars. 4. To Design abstract models of computing machine through Turing Machine and its types. 5. Recognize whether a problem is decidable or undecidable 6. To demonstrate the understanding of key notions, such as, computability, decidability, and complexity through problem solving.
68055	Design and Analysis of Algorithms	1. Apply the algorithms and design techniques to solve problems; analyze the complexities of various problems in different domains. Students will able to compare two algorithms in terms of time and space complexity. 2. Study and Solve Problem using Dynamic Programming and Greedy Method Algorithms 3. Study and Summarize concept of Lower Bound, NP Hard and NP Complete Problems 4. Solve problems using PRAM Algorithms. Analyse Parallel Algorithms 5. Understand Computational Models and techniques for MESH and Hypercube Algorithms with practical applications and the resource requirements of each

68056	Artificial Neural Network (ANN)	1. To solve complicated problems using biological neuron system & calculate equation of terminal network. 2. To design and implement neural network systems. 3. To describe the relation between real brains and simple artificial neural network models. 4. To explain and contrast the most common architectures and learning algorithms for Multi-Layer Perceptrons, Radial-Basis Function Networks and Kohonen Self-Organising Maps.
68057	Advance Database Systems	1. To develop knowledge and understanding of the underlying principles of Relational Database Management System in detail. 2. To be familiar with new data management applications and build capacity to learn DBMS advanced features. 3. To develop your competence in enhancing database models using distributed databases. 4. To build up your capacity to implement and maintain an object database management system. 5. To learn Master transaction processing, concurrency control and crash recovery. 6. To learn Master query processing and optimization, advanced indexing and data organization for DBMS. 7. To be familiar with security issues and performance measure in DBMS like Oracle/IBM DB2
68060	Advanced Operating Systems	1. Gain knowledge in issues for constructing the distributed systems. 2. Examine how the message oriented communication can be done in distributed systems to achieve the synchronous and asynchronous communication. 3. Compare client and data centric consistency models to improve performance and scalability in terms of memory 4. Implement the suitable clock synchronisation algorithms to manage resource in a distributed operating system environment. 5. Analyze issues dealing with recovery failure and able to implement distributed file system in network file system.
68063	Seminar -I	1. To demonstrate the ability to perform close and critical readings. 2. To demonstrate the ability to consider critically the motives and methods of scholarship and the relationship between them. 3. To demonstrate the ability to distinguish opinions

		and beliefs from researched claims and evidence and recognize that kinds of evidence will vary from subject to subject. For instance, some fields call for quantitative support while others work more commonly with quoted, textual evidence. 4. To ask disciplinarily appropriate questions of the material and recognize when lines of inquiry fall outside of disciplinary boundaries. 5. To evaluate, credit, and synthesize sources
68064	Mathematical Foundation of Computer Science Lab	1. Apply the concepts learned in fundamental courses such as Discrete Mathematics, in a theoretical setting; in particular, the application of proof techniques. 2. To demonstrate abstract models of computing, including deterministic (DFA), non-deterministic (NFA) and their power to recognize the languages. 3. To construct pushdown automata and the equivalent context free grammars. 4. To Design abstract models of computing machine through Turing Machine and its types. 5. Recognize whether a problem is decidable or undecidable 6. To demonstrate the understanding of key notions, such as, computability, decidability, and complexity through problem solving.
68065	Design and Analysis of Algorithms Lab	1. Apply the algorithms and design techniques to solve problems; analyze the complexities of various problems in different domains. Students will able to compare two algorithms in terms of time and space complexity. 2. Study and Solve Problem using Dynamic Programming and Greedy Method Algorithms 3. Study and Summarize concept of Lower Bound, NP Hard and NP Complete Problems 4. Solve problems using PRAM Algorithms. Analyse Parallel Algorithms 5. Understand Computational Models and techniques for MESH and Hypercube Algorithms with practical applications and the resource requirements of each
68066	Artificial Neural Network (ANN) Lab	1. To solve complicated problems using biological neuron system & calculate equation of terminal network. 2. To design and implement neural network systems. 3. To describe the relation between real brains and simple artificial neural network models. 4. To explain and contrast the most common

		architectures and learning algorithms for Multi-Layer Perceptrons, Radial-Basis Function Networks and Kohonen Self-Organising Maps.
Part-I Semester-II		
68235	Parallel computer architecture	1. Summarize and analyze the most important parallel architectures in order to distinguish their main differences. 2. Students will able know and analyze how modern computer systems are designed, including details about pipeline, memory organization, virtual and physical memory, asynchronous memory technology. 3. Students will conversant with Advanced Microprocessor Techniques. They also able to compare and analyse different microprocessor technologies. 4. Students will know concept of System Interconnects and will able to describe design of Storage system 5. Study, Understand, different Parallel Programming Models, solve problems with the help of Parallel Programming Language. Study standard High Performance Systems.
68236	Computer Vision and Image Processing	1. Review the fundamental concepts of a digital image processing system and Analyze images in the frequency domain using various transforms. 2. Evaluate the techniques for Image enhancement used in digital image processing. 3. Design and Implement algorithms for Image restoration and Image compression. 4. Design and Implement algorithms for Image analysis and computer vision. 5. Implement basic methods of computer vision related to multi-scale representation, edge detection and object recognition. 6. To apply computer vision and image processing techniques to solve problems in research and industrial applications, such as character recognition,

		face recognition.
68237	Computer Security	1. Explain basic concepts, principles, and mechanisms in network security and determining suitable mechanism such as encrypt, transmit and decrypt messages 2. Understanding cryptographic techniques which can be used for securing the computer network 3. Learn the use of authentication mechanisms by analyzing the possible threats 4. Applying network security mechanisms to address the vulnerabilities in various computing environments 5. Discuss the various issues concerning the security of web environment 6. Describe the basic mechanism involving attacks through the use of virus, worms and intruders along with understanding the countermeasure to detect and prevent attack
68239	Business Intelligence	1. Apply theoretical concepts of the course materials to the decision-making and BI processes and technologies in order to prepare students for making appropriate managerial decisions in future real-life situations. 2. Explain the foundations, definitions, and capabilities of DSS, data analytics and BI 3. Undertake systematic investigation/research related to the decision support and BI systems and technologies for today's dynamic business environment. 4. Develop professional attitudes in students in relation to the team work, interpersonal communication, and business ethics. 5. Demonstrate the impact of business reporting, information visualization, and dashboards 6. Identify the major ethical and legal issues of analytics.
68241	Geographical Information	1. Comprehend fundamental concepts and practices of geographic information systems and advances in geospatial information science and technology.

	Systems	2.Demonstrate GIS modeling skills. 3.Examining computer methods for handling spatial data. 4.Examining managements of errors in GIS. 5.Design and implementing a GIS project.
68244	Seminar – II	1. Students will demonstrate the ability to perform close and critical readings. 2. Students will demonstrate the ability to consider critically the motives and methods of scholarship and the relationship between them. 3. Students will demonstrate the ability to distinguish opinions and beliefs from researched claims and evidence and recognize that kinds of evidence will vary from subject to subject. For instance, some fields call for quantitative support while others work more commonly with quoted, textual evidence. 4.Students will demonstrate the ability to ask disciplinarily appropriate questions of the material and recognize when lines of inquiry fall outside of disciplinary boundaries. 5.Students will demonstrate the ability to evaluate, credit, and synthesize sources.
68245	Parallel computer architecture Lab	1. Summarize and analyze the most important parallel architectures in order to distinguish their main differences. 2. Students will able know and analyze how modern computer systems are designed, including details about pipeline, memory organization, virtual and physical memory, asynchronous memory technology. 3. Students will conversant with Advanced Microprocessor Techniques. They also able to compare and analyse different microprocessor technologies. 4. Students will know concept of System Interconnects and will able to describe design of Storage system 5. Study, Understand, different Parallel Programming Models, solve problems with the help of Parallel Programming Language. Study standard High Performance Systems.
68246	Computer Vision and Image	1. Review the fundamental concepts of a digital image

	Processing Lab	processing system and Analyze images in the frequency domain using various transforms.
		2. Evaluate the techniques for Image enhancement used in digital image processing.
		3. Design and Implement algorithms for Image restoration and Image compression.
		4. Design and Implement algorithms for Image analysis and computer vision.
		5. Implement basic methods of computer vision related to multi-scale representation, edge detection and object recognition.
		6. To apply computer vision and image processing techniques to solve problems in research and industrial applications, such as character recognition, face recognition.
68247	Computer Security Lab	1. Explain basic concepts, principles, and mechanisms in network security and determining suitable mechanism such as encrypt, transmit and decrypt messages
		2. Understanding cryptographic techniques which can be used for securing the computer network
		3. Learn the use of authentication mechanisms by analyzing the possible threats
		4. Applying network security mechanisms to address the vulnerabilities in various computing environments
		5. Discuss the various issues concerning the security of web environment
		6. Describe the basic mechanism involving attacks through the use of virus, worms and intruders along with understanding the countermeasure to detect and

		prevent attack

Part-II Semester-III

70772	Industrial Training	1. Generate a report based on the experiences and projects carried out with theability to apply knowledge of Mathematics, Science, and Engineering Fundamentals. 2. Integrate classroom theory with workplace practice 3. To get familiarity with Industrial working process. 4. Develop new or advanced skills 5. Getting knowledge from product design to dispatch. 6. Develop significant commitment in the students' profession/specialization
70773	Dissertation phase I	1. Obtain information from a variety of sources, evaluate it critically and discriminate between useful and less useful information 2. Recognise the importance of planning and preparation required to undertake a research project. 3. Develop a thorough understanding of the chosen subject area. 4. Ability to practically apply various technological concepts for the work. 5. Ability to communicate effectively and professionally. 6. Ability to solve critical practical oriented real time problems.

Part-II semester-IV

70798	Dissertation phase II	1. Obtain information from a variety of sources, evaluate it critically and discriminate between useful and less useful information 2. Recognise the importance of planning and preparation required to undertake a research project. 3. Develop a thorough understanding of the chosen subject area. 4. Ability to practically apply various technological concepts for the work. 5. Ability to communicate effectively and professionally. 6. Ability to solve critical practical oriented real time problems.