

Solapur University, Solapur
Faculty of Engineering and Technology
Program: Computer Science and Engineering
Program Educational Objectives

1. To provide students good knowledge of Mathematics, Science and Technology as well as the logical base of Computer Science that will be useful in solving complex engineering problems and develop lifelong learning ability.
2. To impart knowledge with good understanding of fundamentals of all subjects of Computer Science & Engineering, so that students are able to analyze, design and implement new projects from various application domains using various modern engineering tools.
3. To develop excellent logical thinking & programming skills to enable students to design, develop system and application level softwares within realistic constraints.
4. To make students good human beings who will have sense of social responsibility and respect over society & its heritage by creating good social environment for them as well as teach them professional and ethical standards .
5. To improve communication, presentation, team working skills and managerial skills leading to entrepreneurship and leadership.
6. To introduce students with new technology to meet the challenges of changing scenario in IT Sector and make them aware of contemporary issues at national & international level.

Programme Outcomes

- (a) An ability to apply knowledge of mathematics, science, and engineering,
- (b) An ability to design and conduct experiments, as well as to analyze and interpret data,
- (c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability,
- (d) An ability to function on multidisciplinary teams,
- (e) An ability to identify, formulate, and solve engineering problems,
- (f) An understanding of professional and ethical responsibility,
- (g) An ability to communicate effectively,
- (h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context,
- (i) A recognition of the need for, and an ability to engage in life-long learning,
- (j) A knowledge of contemporary issues, and
- (k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Program Specific Outcomes (PSOs)

1. Graduate has an ability to use technical skills necessary for design, maintenance, development and implementation of database systems and networking applications.
2. Graduate has an ability to provide IT Solutions and develop mobile applications in multidisciplinary areas using standard tools and techniques
3. Graduate has an ability to utilize and apply software engineering tools for design & realization of projects in various domains of Computer Science & Engineering

COMPUTER SCIENCE & ENGINEERING

S. E. CSE - I

CS211. APPLIED MATHEMATICS-I

At the end of course, students will be able to

1. Solve higher order linear differential equation with constant coefficient
2. Apply Laplace and inverse Laplace transforms for solving linear differential equations.
3. Express a function in terms of sine's and cosines components so as to model simple periodic functions.
4. Solve problems on Z transform and explain its properties
5. Find the relation between two variables for the given data using regression
6. Sketch and explain various probability distribution functions
7. Solve problems based on queuing theory.

CS212. DISCRETE MATHEMATICAL STRUCTURES

At the end of course, students will be able to

1. Solve problems on connectives, Tautological implications and equivalence of formulas.
2. Solve problems on set theory and set algebra.
3. Correlate the concept of relation and function.
4. Describe and utilize the concepts of algebraic system, groups.
5. Describe Boolean algebra and properties of Boolean algebra.

CS213. DATA COMMUNICATION

At the end of course, students will be able to

1. Get acquainted with Data Communication basics.
2. Describe the use of OSI reference model and TCP/IP
3. Correlate the concept of Data Link Layer functions
4. Describe and utilize different protocols used in Network Layer

Course Outcomes

CS214. DIGITAL TECHNIQUES

At the end of course, students will be able to

1. Apply the concepts of various number systems, Boolean algebra to solve relevant problems.
2. Design digital logic circuits.
3. Design and implement combinational logic circuits and sequential circuits.
4. Simulate different logic circuits using Hardware Description Language (HDL).

CS215. COMPUTER GRAPHICS

At the end of course, students will be able to

1. Know about computer graphics hardware and peripherals.
2. Implement 2D line and polygonal graphics and apply transformations.

CS216. ADVANCED C CONCEPTS

At the end of course, students will be able to

1. Define and demonstrate storage classes in C.
2. Develop recursive solutions for given problems.
3. Implement file concepts and pointer concepts.
4. Describe and implement searching algorithms – linear, binary searching and hashing technique.
5. Describe and implement sorting algorithms –bubble sort, insertion sort, quick sort and merge sort.

SECSE - II

CS221. APPLIED MATHEMATIC-II

At the end of course, students will be able to

1. Address the uncertainty.
2. Apply knowledge of basics of fuzzy set theory to solve the problems.
3. Demonstrate the fuzzification.
4. Implement knowledge of numerical methods to solve more complex problems in nature.

Course Outcomes

5. Evaluate a particular kind of problems arises in day to day life using simplex method and Assignment Problems.

CS222. THEORY OF COMPUTATION

At the end of course, students will be able to

1. Analyze and construct finite automata
2. Design and develop finite machine and find the output generated by the automata
3. Detect ambiguity in a system & overcome it.

CS223. MICROPROCESSORS

At the end of course, students will be able to

1. Understand the basic microprocessors architecture, its Functionality and interfacing with I/O devices
2. Understand the advanced processors and it's Interfacing with various devices.
3. Get acquainted with computer organization and advanced systems.

CS224. DATA STRUCTURES

1. Understand different data structures and difference between them.
2. Implement different data structures by using various C language features.
3. Build real time applications using these data structures.

CS225. COMPUTER NETWORK

At the end of course, students will be able to

1. Demonstrate the purpose of different layers.
2. Write application layer protocols using services offered by the transport layer protocols such as UDP, TCP & SCTP.
3. Show the functioning of DHCP, DNS and e- mail system

Course Outcomes

CS226. OBJECT ORIENTED PROGRAMMING THROUGH C++

At the end of course, students will be able to

1. Comprehend and analyze simple C++ program.
2. apply principle of OOP concept to develop complex C++ program.



TE CSE - I

CS311. OPERATING SYSTEM

At the end of course, students will be able to

1. Recognize the role, Structure of OS, applications and relationship between them.
2. Analyze the features and functions provided by operating system module (such as Process control, CPU scheduling, mutual exclusion, deadlock, memory management, synchronization, etc.)

CS312. SYSTEM PROGRAMMING

At the end of course, students will be able to

1. Identify various language processors.
2. Design and implement prototypes of language processors.
3. Apply language processor development tools to create Language Processors.

CS313. COMPUTER NETWORKS

1. Demonstrate the purpose of different layers.
2. Write application layer protocols using services offered by the transport layer protocols such as UDP, TCP & SCTP.
3. Show the functioning of web based mail system and web services working mechanism.

CS314. DESIGN AND ANALYSIS OF ALGORITHM

At the end of course, students will be able to

1. Analyze the asymptotic performance of algorithms.
2. Demonstrate a familiarity with major algorithms.
3. Apply important algorithmic design paradigms and methods of analysis.
4. Synthesize efficient algorithms in common engineering design situations.

Course Outcomes

CS315. COMPUTER ORGANIZATION

At the end of course, students will be able to

1. Justify the principles of computer organization.
2. Identify performance of processor, design memory hierarchy and interface I/O devices.
3. Identify parallel architecture.

CS316. JAVA PROGRAMMING

At the end of course, students will be able to

1. Implement Object oriented programming paradigms using Java language.
2. Explore and use the Java APIs for implementing various functionalities of an Application.
3. Analyze platform independent application runtime environment and choose appropriate runtime environment to create GUI and Web applications using Java language.



Course Outcomes

T. E. CSE - II

CS321. COMPILER CONSTRUCTION

At the end of course, students will be able to

1. Apply techniques for the structure of compiler.
2. Use simulation software to justify compiler design.
3. Implement various phases of compiler.
4. Apply different optimization techniques in the design of compiler.
5. Analyze and compare various compilers to select optimum.

CS322. UNIX OPERATING SYSTEM

At the end of course, students will be able to

1. Illustrate File Structure, Process Management and Memory Management of Unix using UNIX Architecture.
2. Apply basic UNIX/Linux commands, system calls and SHELL Programming.
3. To compare between single user and multiuser system.

CS323. MOBILE COMPUTING

At the end of course, students will be able to

1. Apply the principles of mobile computing in the real time.
2. Analyze requirements of mobile compatible applications.
3. Put the basic knowledge gained, into practice in developing mobile based applications using Android.
4. Analyze various scenarios and environments, where NFC can be put into practice.

Course Outcomes

CS324. DATABASE ENGINEERING

At the end of course, students will be able to

1. Apply the basic concepts of relational data model, entity-relationship model, relational database design, relational algebra and database language SQL.
2. Design E-R diagrams to represent simple database for any real time application and formulate SQL queries on it.
3. Design a database, analyze it and improve the design by normalization.
4. Demonstrate knowledge of ACID properties of a transaction and several techniques of concurrency control.

CS325. SOFTWARE ENGINEERING

At the end of course, students will be able to

1. Develop the software project using appropriate phases.
2. To implement life cycle models in software development and for their projects.
3. To enhance the quality of product and should be able to apply testing of software.
4. Know the basics of software metrics and result assessment and basics of process improvement.

CS326. LAB – PROGRAMMING IN C#.NET

At the end of course, students will be able to

1. Use .NET Framework in building robust software applications using C# programming language.
2. Design and develop Object Oriented and GUI, Web application on Windows platform.

Course Outcomes

CS327. MINI PROJECT

At the end of course, students will be able to

1. Identify and define the problem.
2. Develop a sustainable product or offer a effective solution to industrial problem.
3. Present proposal within budgetary and time constraints with effective communication an d writing skills.
4. Develop leadership qualities.
5. Criticize and refine own solution or product.
6. Apply modern tools and simulation packages to develop product.
7. Develop a strong sense of social responsibility and accountability.

CS328. SELF LEARNING MODULE – II : HSS/TECHNICAL

A. Computer Modeling and Simulation

At the end of course, students will be able to

1. Learn Modeling and Simulation
2. Use API libraries for Network Simulator.
3. Perform a task completely on Network Simulator.

B. Network Setup and Management Tools

At the end of course, students will be able to

1. Compare between various components of network, select appropriate network topology and setup computer network.
2. Use the network management tools for monitoring the network performance.
3. Demonstrate different ways of network setup and use of network management tools.

C. Software Licensing and Practices

At the end of course, students will be able to

1. Present software licensing models and practices adopted in software development and distribution.
2. Analyze, compare and choose appropriate software licensing model and strategy for the software developed.

Course Outcomes

B. E. CSE - I

CS411. ADVANCED COMPUTER ARCHITECTURE

At the end of course, students will be able to

1. Enables information about computer performance, instruction set architecture design and implementation
2. Introduces uniprocess or implementation alternatives (single- cycle, multiple-cycle and pipelined implementations)

CS412. DISTRIBUTED SYSTEMS

At the end of course, students will be able to

1. Understand the basics of distributed systems and middleware.
2. Design and simulate distributed system software modules using various methods, strategies, and techniques presented in the course that fulfills requirements for desired properties.
3. Apply principles of distributed systems in a real world setting across multidisciplinary areas.
4. Apply knowledge of Hadoop Distributed File system, its architecture and working for active research at the forefront of these areas.

CS413. MODERN DATABASE SYSTEMS

At the end of course, students will be able to

1. Differentiate between Distributed & Parallel databases.
2. Implement object oriented databases, mining concepts.
3. Implement different query processing algorithms.
4. Tabulate SQL, NoSQL & New SQL with its applications.
5. Articulate technologies like Hadoop, MongoDB, Cassandra, Pig, Hive.

Course Outcomes

CS414. ELECTIVE-I

A. HUMAN COMPUTER INTERACTION

At the end of course, students will be able to

1. To develop good design for human machine interaction system
2. Analyze the user's need in interaction system
3. To design new interaction model to satisfy all types of customers
4. Evaluate the usability and effectiveness of various products
5. To know how to apply interaction techniques for systems

B. DIGITAL SIGNAL PROCESSING

At the end of course, students will be able to

1. Apply digital signal processing fundamentals.
2. Implement DFT
3. Design filters.

C. SOFTWARE TESTING & QUALITY ASSURANCE

At the end of course, students will be able to

1. Understand what a software bug is, how serious they can be, and why they occur.
2. Test software to meet quality objectives & requirements
3. Apply testing skills to common testing tasks
4. Perform the planning and documentation of test efforts
5. Understand software quality concepts, assurance & standards
6. Use testing tools to test software in order to improve test efficiency with automation

D. BUSINESS INTELLIGENCE

At the end of course, students will be able to

1. Gain an awareness of the basic issues in BI & Modeling techniques.
2. Compare and contrast emerging architectures for B. I.
3. Familiarize with the E-T-L techniques in B.I. and other advanced topics
4. Interpret B.I. applications

Course Outcomes

CS415. ELECTIVE – II

A. OBJECT ORIENTED MODELLING & DESIGN

At the end of course, students will be able to

1. List the objects of Unified Modeling Language for a given problem statement.
2. Explain the working understanding of the object oriented analysis and design.
3. Apply the knowledge of object oriented modeling and design to the given software development project.
4. Devise the real world problem using object oriented modeling technique.

B. WIRELESS AD-HOC NETWORKS

At the end of course, students will be able to

1. Understand the challenges in design of wireless ad hoc networks.
2. Understand and analyze proposed protocols at MAC and routing layers of ad hoc networks.
3. Understand and analyze attacks pertaining to network layer.
4. Describe current technology trends for the implementation and deployment of wireless ad-hoc / sensor networks.
5. Comprehend the various sensor network platforms, tools and applications.

C. INTELLIGENT SYSTEMS

At the end of course, students will be able to

1. Understand basic concepts of artificial intelligence.
2. Apply with new value added technologies to make it intelligent system.
3. Apply logic for practical implementation using AI languages like LISP,PROLOG etc.

Course Outcomes

D. MOBILE APPLICATION DEVELOPMENT

At the end of course, students will be able to

1. Familiarize with mobile apps development aspects.
2. Design & develop mobile apps, using Android as a development platform.
3. Perform testing, signing, packaging and distribution of mobile apps.

CS416. Lab I PROJECT PHASE I

At the end of course, students will be able to

1. Define a realistic problem statement.
2. Select & apply an appropriate technique to create a design.
3. Work in teams with good coordination.
4. Present their work through oral communication & writing skills.

CS417. Lab II PYTHON

At the end of course, students will be able to

1. Use fundamental library packages available in python
2. Design python application using procedures oriented and object oriented approach.
3. Develop database application in python.

B.E. CSE -II

CS421. MANAGEMENT INFORMATION SYSTEM

At the end of course, students will be able to

1. Understand information systems and their uses,
2. Use computerized management information systems,
3. In-depth analysis and decision making,
4. Apply modern project management techniques,
5. Aware of security issues related to information systems

Course Outcomes

CS422. INFORMATION AND CYBER SECURITY

At the end of course, students will be able to

1. Recognize common attack patterns, evaluate vulnerability of an information system and establish a plan for risk management.
2. Demonstrate how to detect and reduce threats in Web security, how to secure a wireless network.
3. Evaluate the authentication and encryption needs of an information system.
4. Explain the Public Key Infrastructure process.
5. Evaluate a company's security policies and procedures.

CS423. ELECTIVE – III

A. DATA WAREHOUSING AND MINING

At the end of course, students will be able to

1. Apply the concepts, strategies, and methodologies related to the design and construction of data mining applications
2. Comprehend several data pre-processing methods
3. Utilize data warehouses and OLAP for data mining and knowledge discovery activities
4. Determine an appropriate mining strategy for given large dataset
5. Apply appropriate mining techniques to extract unexpected patterns and new rules that are "hidden" in large databases.

B. IMAGE PROCESSING

At the end of course, students will be able to

1. Know the basic concepts in Image Processing.
2. Segment the various types of Images.
3. Represent the images in different forms
4. Develop algorithms for Pattern Recognition
5. Implement the features of Image processing in applications

Course Outcomes

C. INFORMATION RETRIEVAL

At the end of course, students will be able to

1. Implement text retrieval models like Boolean, vector and probabilistic and structured retrieval model.
2. Evaluate the performance of information retrieval systems.
3. Implement different querying patterns in retrieval models.
4. Implement different indexing structure like inverted index, hash files, suffix arrays for given collection of documents.
5. Implement different sequential searching algorithms and pattern matching algorithms.
6. Implement multimedia IR system and indexing on multimedia data.
7. Implement different ranking algorithms to find ranking of the documents.
8. Design and develop information retrieval systems.

D. CLOUD COMPUTING

At the end of course, students will be able to

1. Explain the concepts of Cloud Computing and the various deployment and service models of Cloud Computing, benefits and challenges of Cloud Computing
2. Describe the Public Cloud and its Models
3. Explain about the various Players of Public Cloud and their offerings, Virtual Public Cloud
4. Describe Private Cloud and its deployment models, Building blocks of Private Cloud
5. Explain about Hybrid Cloud
6. Describe the Security concerns of Cloud Computing, Multi-Cloud management System
7. Explain the various vendors of a secure Cloud model.



Course Outcomes

CS424. ELECTIVE – IV

A. STORAGE AREA NETWORK

At the end of course, students will be able to

1. Identify the need for performance evaluation and the metrics used in the context of Storage Network.
2. Deploy and maintain the data with the concepts of Storage Network Application, Management and Network Back-Up.

B. WEB 2.0 & RICH INTERNET APPLICATION

At the end of course, students will be able to

1. Develop Web 2.0 based Rich Internet applications
2. Demonstrate his ability to design Rich Internet Application using Client side and Server side frameworks.

C. ARTIFICIAL NEURAL NETWORK

At the end of course, students will be able to

1. Expose the students to the concepts of feed forward neural networks.
2. Provide adequate knowledge about feedback neural networks.
3. Teach about the concept of fuzziness involved in various systems. To provide adequate knowledge about fuzzy set theory.
4. Provide comprehensive knowledge of fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm.
5. Provide adequate knowledge of application of fuzzy logic control to real time systems.

D. BIG DATA ANALYTICS

At the end of course, students will be able to

1. Identify need for Big Data analysis
2. Analyze and identify Big data processing technology for analyzing the Big data.
3. Write Map Reduce programs to process Big Data by identifying the use case.

Course Outcomes

425. LAB I – WEB TECHNOLOGY

At the end of course, students will be able to

1. Design, develop and apply styling to a web based applications.
2. Analyze requirements of developing web applications and choose client or server side scripting technology.
3. Build efficient and scalable web APIs and applications.
4. Develop light weight browser based functionalities leveraging client side scripting frameworks.

426. LAB II – PROJECT PHASE II

At the end of course, students will be able to

1. Define a realistic problem statement.
2. Select & apply an appropriate technique to create a design.
3. Work in teams with good coordination.
4. Present their work through oral communication & writing skills.

CS427. LAB III – OPEN SOURCE TECHNOLOGY

At the end of course, students will be able to

1. Demonstrate skills in choosing a proper open source alternative to proprietary solutions.
2. Analyze IT needs and demonstrate his cognizance in deciding Open source technologies to be adopted.
3. Develop cost effective enterprise grade IT solutions leveraging Open source technologies.