



Society for Computer Technology and Research's
Pune Institute of Computer Technology
 Department of Computer Engineering

Course Outcomes

Second Year (2019 Pattern) Semester I

210241: Discrete Mathematics	
Students will be able to	
210241.1	Formulate problems precisely, solve the problems, apply formal proof techniques, and explain the reasoning clearly.
210241.2	Design and analyze relevant real world engineering problems by applying set theory, and propositional logic and to construct proofs using mathematical induction.
210241.3	Analyze relations, construct, and use functions and apply these concepts to solve problems.
210241.4	Apply and calculate permutations and combinations for problem solving.
210241.5	Model and solve problems like Travelling Salesperson, Minimum Spanning Tree, Shortest Path problems, Transport networks and Huffman coding using appropriate algorithms of Tree and Graph.
210241.6	Apply abstract algebra in coding theory by evaluating the algebraic structures using properties of binary operations.
210242: Fundamental of Data Structure	
Students will be able to	
210242.1	Write algorithms to solve the programming problems, and compare the time and space complexity of worst case, best case and average case.
210242.2	Demonstrate use of linear data structures- Array and Linked lists to store and process structured data.
210242.3	Demonstrate and analyze the performance of Linear search, Binary search, Fibonacci search, and Index sequential search, bubble sort, selection sort, insertion sort, Bucket sort, Shell sort.
210242.4	Illustrate, analyze and apply the algorithmic strategy to solve problems such as multiplication of large number, knapsack problem, sorting methods (quick sort and merge sort)
210242.5	Compare static and dynamic data structure implementations and choose suitable method to solve programming problems.
210242.6	Illustrate and apply principles of stack and queue Data Structures to solve expression conversion, evaluation, and job scheduling problem.
210243: Object Oriented Programming	
Students will be able to	
210243.1	Illustrate and apply object oriented programming paradigm for problem solving
210243.2	Apply OOP concepts inheritance and polymorphism to design programs
210243.3	Develop the application using file handling and exception handling in C++
210243.4	Apply C++ Standard Template Library in program design.



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210244: Computer Graphics	
Students will be able to	
210244.1	Understand the basics of computer graphics and demonstrate the line and circle algorithms.
210244.2	Illustrate the concept of windowing, clipping and apply various algorithms to clip and fill polygons
210244.3	Demonstrate and solve 2D, 3D transformations, Parallel & perspective projections.
210244.4	Illustrate the concepts of light, color, shading, and apply Z-buffer, Painter's & Warnock's algorithm to remove hidden surfaces
210244.5	Implement the B-Spline/Bezier curves, fractals, Hilbert Curve/Triadic curve.
210244.6	Design animation sequences using segments and compare gaming platforms.
210245: Digital Electronics and Logic Design	
Students will be able to	
210245.1	Design and interpret the truth table of combinational circuits.
210245.2	Design and interpret the truth table of sequential circuits.
210245.3	Illustrate and design simple real-world application like counting floors, digital clock etc using Algorithmic State Machine and Programmable logic devices.
210245.4	Differentiate and choose appropriate logic families IC packages as per the given design specifications.
210245.5	Explain organization and architecture of computer system.
210246: Data Structure Laboratory	
Students will be able to	
210246.1	Apply primitive algorithms like insert, delete, display, and search on linear data structure to solve problems based on one dimensional and two dimensional arrays.
210246.2	Demonstrate the implementation of the sequential searches, divide & conquer searches and sorts, exchange sorts, insertion sorts and demonstrate the comparison between them on the basis of time and space complexity.
210246.3	Analyze the given problem containing list to select appropriate linked list variant by comparing the advantages and disadvantages of each and solve the



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	problem.
210246.4	Apply Stack and Queue data structure to solve a given programming problem of job scheduling and expression conversion
210247: OOP and Computer Graphics Laboratory	
Students will be able to	
210247.1	Implement the OOP concepts like encapsulation, inheritance, polymorphism, and generic structures- STL MAP, Vector- for implementing reusable program.
210247.2	Demonstrate file handling operations viz. open, close, read, write and append on file located on secondary storage.
210247.3	Implement DDA/Bresenham's line and circle drawing scan conversion algorithms to render 2D shapes and demonstrate 2D transformations with the help of object oriented programming concepts.
210247.4	Develop Cohen Sutherland line clipping algorithm and filling a concave polygon by using scan-line fill algorithm along with demonstration of Inheritance concept of OOP.
210247.5	Create fractals by using Koch/Hilbert curve.
210247.6	Demonstrate use of FOSS tools (OpenGL, Blender, Maya etc.) for computer graphics by creating animation/gaming programs containing OOP concepts.
210248: Digital Electronics Laboratory	
Students will be able to	
210248.1	Understand the working of Digital electronic circuits
210248.2	Apply the knowledge to choose appropriate IC as per the design specification.
210248.3	Design and implement sequential and combinational digital circuits as per the specification.
210249: Business Communication Skill	
Students will be able to	
210249.1	Demonstrate verbal and nonverbal communication skills through self-assessment activities for overall personality enhancement.
210249.2	Write an abstract & summarize the scene effectively as reports & technical document using open source documentation & presentation table.



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210249.3	Prepare for group discussion/ meetings/interviews & deliver presentation on a given topic of conversation in a given time frame and design resume template and demonstrate effective communication practices.
210249.4	Develop and motivate as a leader with creative thinking to achieve the goals and target with team to meet game objective using opportunity selection & related constraints.
210249.5	Operate effectively with active participation in multi-disciplinary & heterogeneous teams, through the knowledge of teamwork, interpersonal relationships, conflict management & leadership qualities.
210250: Humanity and Social Science	
Students will be able to	
210250.1	Demonstrate effectively on current affairs which will improve general knowledge and communication skills.
210250.2	Discover about cultural difference in society, enhance exploratory skills and learn how to present using technological tools.
210250.3	Survey and respond to broader issues regarding the social, cultural, economic and human aspects, involved in social changes.
210250.4	Analyze the areas of improvement for appreciating human nature and behavior in the society.
210250.5	Illustrate effectively in multi-disciplinary and heterogeneous society, to understand major ideas, values, beliefs, and experiences that have shaped human history and cultures.
210251: Audit Course 3	
Students will be able to	
210251.1	Understand the importance of environment friendly society
210251.2	Apply primary measures to reduce carbon emission from their surroundings
210251.3	Learn role of IT solutions in design of green buildings
210251.4	Understand the use of software systems to complete statutory compliances involved in the design of new home or office building through green construction.



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Second Year (2019 Pattern) Semester II

207003: Engineering Mathematics III	
Students will be able to	
207003.1	Solve linear differential equations, essential in modeling and design of computer-based systems.
207003.2	Obtain Fourier Transform of continuous and discrete functions which are useful in Signal processing. Find Z-Transform of discrete functions which are involved in image processing.
207003.3	Explain statistical methods like measures of central tendency, correlation, and regression analysis for data interpretation and data analysis in Machine Learning.
207003.4	Discuss probability theory for analysis and prediction of a given data.
207003.5	Solve algebraic and transcendental equations and systems of linear equations using Numerical techniques.
207003.6	Compute interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.
210252: Data Structures and Algorithms	
Students will be able to	
210252.1	Identify and articulate the complexity goals and benefits of a good hashing scheme for applications.
210252.2	Identify and apply non-linear data structure - trees for solving problems.
210252.3	Model and solve the problem by using Graph as a Data Structure and its algorithms
210252.4	Construct balanced search trees and illustrates its usage in application.
210252.5	Apply efficient indexing methods and multiway search techniques to store and maintain data.
210252.6	Ability to use relevant file organization technique for a given problem.



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210253: Software Engineering	
Students will be able to	
210253.1	Apply software engineering principles to develop a software.
210253.2	Analyze software requirements and formulate design solutions for a software.
210253.3	Explain concepts of project estimation, planning and scheduling.
210253.4	Identify risks associated with a software development process and apply appropriate risk, software configuration management strategy.
210253.5	Explain various types of software testing.
210254: Microprocessor	
Students will be able to	
210254.1	Exhibit skill of assembly language programming using 80386 instructions set and addressing mode.
210254.2	Illustrate Memory Management by Means of Segmentation and Paging.
210254.3	Understand the various protection and multitasking mechanism in 80386
210254.4	Use (Apply)interrupts mechanism in applications
210254.5	Differentiate between Microprocessors and Microcontrollers
210255: Principles of Programming Languages	
Students will be able to	
210255.1	To illustrate the principles underlying the programming paradigms.
210255.2	To develop a program with data representation and computations.
210255.3	To apply object oriented programming concepts for solving selective functionalities of banking system using Java.
210255.4	To demonstrate multithreading for banking/gaming system and to understand web based application using Javascript.
210255.5	To understand functional and logic programming paradigm and develop a program using LISP and Prolog.
210256: Data Structures and Algorithms Laboratory	
Students will be able to	
210256.1	Understand and write the ADT for nonlinear data structures.
210256.2	Choose the most appropriate data structures for an efficient solution by comparing advantages and disadvantages of data structures with respect to space and time.
210256.3	Design and analyze nonlinear data structures to solve real world complex



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	problems.
210256.4	Demonstrate implementation of algorithmic strategies/techniques such as Greedy method, Dynamic programming to solve the problem efficiently.
210256.5	Choose and implement appropriate file representation method to maintain the data.
210256.6	Practice and apply acquired knowledge for case study development using modern FOSS tools.
210257: Microprocessor Laboratory	
Students will be able to	
210257.1	Understand and apply various addressing modes an instruction set to implement 64-bit assembly language programs using FOSS
210257.2	Apply logic to implement code conversion
210257.3	Analyze and apply logic to demonstrate processor mode of operation
210257.4	Analyze and apply ALP to demonstrate segment descriptors and descriptor tables, stack manipulation operations
210258: Project Based Learning II	
Students will be able to	
210258.1	Identify the real life problem preferably from societal need point of view
210258.2	Compare alternative approaches suitable for the selected problem
210258.3	Select the identified approaches from technological perspective
210258.4	Design the reliable and scalable solution to meet challenges
210258.5	Evaluate the solution based on the test cases
210258.6	Develop lifelong learning attitude towards the societal problems
210259: Code of Conduct	
Students will be able to	
210259.1	Understand the basic perception of profession, professional ethics, various moral and social issues, industrial standards, code of ethics and role of professional ethics in engineering field.
210259.2	Be Aware of professional rights and responsibilities of an engineer, responsibilities of an engineer for safety and risk benefit analysis.
210259.3	Understand the impact of the professional Engineering solutions in societal



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	and Environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
210259.4	Acquire knowledge about various roles of engineers in variety of global issues and able to apply ethical principles to resolve situations that arise in their professional lives.
210260: Audit Course 4	
Students will be able to	
210260.1	Understand what happiness is and why it matters to you.
210260.2	Learn how to increase your own happiness.
210260.3	Understand the power of social connections and the science of empathy.
210260.4	Understand what is mindfulness and its real world applications.



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Second Year (2015 Pattern) Semester I

210241: Discrete Mathematics	
Students will be able to	
210241.1	Design a solution using set notations and elementary set theory.
210241.2	Validate arguments using rules of mathematical logic.
210241.3	Model problems using properties of relation and function.
210241.4	Solve problems using counting techniques.
210241.5	Model and solve computing problems using Graph theory.
210241.6	Analyze properties of binary operation on set for classifying algebraic structures.
210242: Digital Electronics and Logic Design	
Students will be able to	
210242.1	Realize and simplify boolean algebraic assignments for designing digital circuits using K-maps.
210242.2	Design Sequential and combinational digital circuits using basic gates, universal gates and ICs.
210242.3	Identify appropriate digital components to design the given digital circuit such as adder, counter, etc.
210242.4	Design Digital system like BCD adders, shift registers using VHDL.
210242.5	Design an embedded system for home automation application / surveillance application.
210243: Data Structures and Algorithms	
Students will be able to	
210243.1	Compare the usage of linear data structures, array, linked list, stack and queue in solving programming problems.
210243.2	Design the algorithms using linear data structures to solve the given programming problem.
210243.3	Use effective and efficient linear data structures in solving the given



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	Computer Engineering problem.
210243.4	Analyze time and space complexity for applying suitable algorithm and data structure for the given programming problem.
210243.5	Use appropriate algorithmic strategy for the given programming problem.
210244: Computer Organization and Architecture	
Students will be able to	
210244.1	Demonstrate computer architecture concepts related to design of Processors, Memories and Input outputs.
210244.2	Analyze the principles of computer architecture using examples drawn from 16/32 bit available computers.
210244.3	Evaluate design alternatives of functional units and components in processor organization.
210244.4	Illustrate fundamental concepts of Micro programmed and Hardwired control unit in processor organization.
210245: Object Oriented Programming	
210245.1	Apply object oriented programming principles - abstraction, encapsulation, polymorphism, inheritance in C++ language.
210245.2	Design and develop inventory applications using C++ language.
210245.3	Analyze the strengths and applications of standard template library in C++ language.
210245.4	Lay the foundation of files and streams in object oriented programming language.
210246: Digital Electronics Lab	
Students will be able to	
210246.1	Design and implement digital circuits using K-maps.
210246.2	Design and implement combinational digital circuits using gates and ICs.
210246.3	Design and implement sequential digital circuits using gates and ICs.
210246.4	Design and implement the circuits using Algorithmic state machine.
210246.5	Design and simulate combinational and sequential circuits using VHDL.



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210247: Data Structures Lab	
Students will be able to	
210247.1	Analyze and select appropriate data structure and algorithmic strategy while problem solving and programming.
210247.2	Design and implement static and dynamic data structures for solving different problems.
210247.3	Implement stack and queue in solving various engineering problems using OOP techniques.
210247.4	Design and implement searching and sorting techniques for different applications using FOSS.
210247.5	Develop software solution for different case studies.
210248: Object Oriented Programming Lab	
Students will be able to	
210248.1	Design and implement programs using OOP concepts.
210248.2	Implement C++ programs using FOSS tools and techniques.
210248.3	Implement programs using templates, Exception handling and File handling in C++.
210249: Soft Skills	
Students will be able to	
210249.1	Write & present case study using gaming to meet game objective using opportunity selection & related constraints.
210249.2	Write an abstract & summarize the scene effectively.
210249.3	Write & present a view on a given topic of conversation in a given time frame.
210249.4	Present the case study of demonstrating manners in business & professional using open source documentation & presentation table.
210249.5	Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.



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Second Year (2015Pattern) Semester II

207003: Engineering Mathematics III

Students will be able to

207003.1	Solve higher order linear differential equations using appropriate techniques for modeling and analyzing electrical circuits.
207003.2	Solve problems related to Fourier transform, Z-Transform.
207003.3	Apply statistical methods like correlation, regression analysis and probability theory for analysis and prediction of a given data.
207003.4	Perform vector differentiation and integration to analyze the vector fields and apply to compute line, surface and volume integrals.
207003.5	Analyze conformal mappings, transformations and perform contour integration of complex functions required in engineering problems.

210251: Computer Graphics

Students will be able to

210251.1	Apply relevant mathematics and logic to perform primitive graphic operations, point, line, polygon & circle.
210251.2	Design the given graphics application using transformation, area filling & clipping.
210251.3	Apply algorithms of shading, curves & fractals for given computer graphics application.
210251.4	Design animation sequence for given application using open source tool.

210252: Advanced Data Structures

Students will be able to

210252.1	Effectively use and select nonlinear data structures for problem solving and programming.
210252.2	Design and analyze algorithm for correctness and time effectiveness.
210252.3	Evaluate algorithms based on hashing and multiway trees in terms of time and space complexity.
210252.4	Use dynamic trees-Optimal Binary Search Tree and AVL trees for problem



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	solving.
210252.5	Identify and use relevant file organization technique for a given problem.
210253: Microprocessor	
Students will be able to	
210253.1	Design solutions for engineering problems using 80386 Programmer's model.
210253.2	Illustrate Memory Management by means of Segmentation and Paging.
210253.3	Demonstrate the Intel processor evolution in order to achieve Protection, Multitasking and Virtualization (Virtual 8086 mode).
210253.4	Represent floating point numbers using IEEE standards and solve problems using 80387 Math Processor.
210254: Principles of Programming Languages	
Students will be able to	
210254.1	Practice and analyze a variety of concepts underpinning modern programming languages.
210254.2	Inculcate the principles underlying the programming languages enabling to learn new programming languages.
210254.3	Recognize and differentiate different programming paradigms.
210254.4	Apply key design concepts of object oriented paradigms in application development using Java.
210255: Computer Graphics Lab	
Students will be able to	
210255.1	Apply mathematics and logic to develop Computer programs for graphic operations on pixel, line and polygon.
210255.2	Implement filling polygon and line clipping algorithm.
210255.3	Develop programs for 2D and 3D transformations.



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210255.4	Apply the logic to develop animation and gaming programs using FOSS tool: OpenGL/QtCreator.
210256: Advanced Data Structures Lab	
Students will be able to	
210256.1	Design and analyze appropriate non-linear data structures and algorithms to solve real life applications.
210256.2	Implement Non Linear Data Structures using OOP.
210256.3	Implement hashing techniques for storage and retrieval.
210256.4	Use efficient file storage methods in real life applications.
210256.5	Develop solutions using modern tools for real life data.
210257: Microprocessor Lab	
Students will be able to	
210257.1	Implement Assembly Language Programming for 32/64 bit processor using FOSS.
210257.2	Write Assembly Language Programming, using segment descriptors and multitasking.
210257.3	Write 80387 Assembly Language Programming, to understand a working of Math co-processor.
210257.4	Write a TSR.