



Bharati Vidyapeeth's
College of Engineering, Lavale, Pune
Department of Computer Engineering

Course Outcomes SE Computer 2019 Pattern)

Semester III

210241: Discrete Mathematics

CO1: Formulate problems precisely, solve the problems, apply formal proof techniques, and explain the reasoning clearly.

CO2: Apply appropriate mathematical concepts and skills to solve problems in both familiar and unfamiliar situations including those in real-life contexts.

CO3: Design and analyze real world engineering problems by applying set theory, propositional logic and to construct proofs using mathematical induction.

CO4: Specify, manipulate and apply equivalence relations; construct and use functions and apply these concepts to solve new problems.

CO5: Calculate numbers of possible outcomes using permutations and combinations; to model and analyze computational processes using combinatorics.

CO6: Model and solve computing problem using tree and graph and solve problems using appropriate algorithms.

CO7: Analyze the properties of binary operations, apply abstract algebra in coding theory and evaluate the algebraic structures.

210242: Fundamentals of Data Structures

CO1: Design the algorithms to solve the programming problems, **identify** appropriate algorithmic strategy for specific application, and **analyze** the time and space complexity.

CO2: Discriminate the usage of various structures, **Design/Program/Implement** the appropriate data structures; use them in implementations of abstract data types and Identity the appropriate data structure in approaching the problem solution.

CO3: Demonstrate use of sequential data structures- Array and Linked lists to store and process data.

CO4: Understand the computational efficiency of the principal algorithms for searching and sorting and choose the most efficient one for the application.

CO5: Compare and **contrast** different implementations of data structures (dynamic and static).

CO6: Understand, Implement and apply principles of data structures-stack and queue to solve computational problems.

210243: Object Oriented Programming (OOP)

CO1: Apply constructs- sequence, selection and iteration; classes and objects, inheritance, use of predefined classes from libraries while developing software.

CO2: Design object-oriented solutions for small systems involving multiple objects.

CO3: Use virtual and pure virtual function and complex programming situations.

CO4: Apply object-oriented software principles in problem solving.

CO5: Analyze the strengths of object-oriented programming.

CO6: Develop the application using object oriented programming language(C++).

210244: Computer Graphics

CO1: Identify the basic terminologies of Computer Graphics and interpret the mathematical foundation of the concepts of computer graphics.

CO2: Apply mathematics to develop Computer programs for elementary graphic operations.

CO3: Illustrate the concepts of windowing and clipping and **apply** various algorithms to fill and clip polygons.

CO4: Understand and **apply** the core concepts of computer graphics, including transformation in two and three dimensions, viewing and projection.

CO5: Understand the concepts of color models, lighting, shading models and hidden surface elimination.

CO6: Create effective programs using concepts of curves, fractals, animation and gaming.

210245: Digital Electronics and Logic Design

CO1: Simplify Boolean Expressions using K Map.

CO2: Design and implement combinational circuits.

CO3: Design and implement sequential circuits.

CO4: Develop simple real-world application using ASM and PLD.

CO5: Differentiate and Choose appropriate logic families IC packages as per the given design specifications.

CO6: Explain organization and architecture of computer system

210246: Data Structures Laboratory

CO1: Use algorithms on various linear data structure using sequential organization to solve real life problems.

CO2: Analyze problems to **apply** suitable searching and sorting algorithm to various applications.

CO3: Analyze problems to **use variants of** linked list and solve various real life problems.

CO4: Designing and implement data structures and algorithms for solving different kinds of problems.

210247: OOP and Computer Graphics Laboratory

CO1: Understand and **apply** the concepts like inheritance, polymorphism, exception handling and generic structures for implementing reusable programming codes.

CO2: Analyze the concept of file and **apply** it while storing and retrieving the data from secondary storages.

CO3: Analyze and **apply** computer graphics algorithms for line-circle drawing, scan conversion and filling with the help of object oriented programming concepts.

CO4: Understand the concept of windowing and clipping and **apply** various algorithms to fill and clip polygons.

CO5: Apply logic to implement, curves, fractals, animation and gaming programs.

210248: Digital Electronics Laboratory

CO1: Understand the working of digital electronic circuits.
CO2: Apply the knowledge to appropriate IC as per the design specifications.
CO3: Design and implement Sequential and Combinational digital circuits as per the specifications.

210249: Business Communication Skills

CO1: Express effectively through verbal/oral communication and improve listening skills
CO2: Write precise briefs or reports and technical documents.
CO3: Prepare for group discussion / meetings / interviews and presentations.
CO4: Explore goal/target setting, self-motivation and practicing creative thinking.
CO5: Operate effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership qualities.

210250: Humanity and Social Science

CO1: Aware of the various issues concerning humans and society.
CO2: Aware about their responsibilities towards society.
CO3: Sensitized about broader issues regarding the social, cultural, economic and human aspects, involved in social changes.
CO4:Able to understand the nature of the individual and the relationship between self and the community.
CO5: Able to understand major ideas, values, beliefs, and experiences that have shaped human history and cultures.

210251: Audit Course 3

AC3-I: Green Construction and Design

CO1: Understand the importance of environment friendly society.
CO2: Apply primary measures to reduce carbon emissions from their surroundings.
CO3: Learn role of IT solutions in design of green buildings.
CO4: Understand the use of software systems to complete statutory compliances involved in the design of a new home or office building through green construction.

AC3-II: Social Awareness and Governance Program

CO1: Understand social issues and responsibilities as member of society.
CO2: Apply social values and ethics in decision making at social or organizational level
CO3:Promote obstacles in national integration and role of youth for National Integration
CO4: Demonstrate basic features of Indian Constitution.

AC3-III: Environmental Studies

CO1: Comprehend the importance of ecosystem and biodiversity
CO2: Correlate the human population growth and its trend to the environmental degradation and develop the awareness about his/her role towards environmental protection and prevention
CO3: Identify different types of environmental pollution and control measures
CO4: Correlate the exploitation and utilization of conventional and non-conventional resources

AC3-IV: Smart Cities

CO1: Understand the dynamic behavior of the urban system by going beyond the physical appearance and by focusing on representations, properties and impact factors

CO2: Explore the city as the most complex human-made organism with a metabolism that can be modeled in terms of stocks and flows

CO3: Knowledge about data-informed approaches for the development of the future city, based on crowd sourcing and sensing

CO4: Knowledge about the latest research results in for the development and management of future cities

CO5: Understand how citizens can benefit from data-informed design to develop smart and responsive cities

AC3-V: Foreign Language- Japanese (Module 1)

CO1: Will have ability of basic communication.

CO2: Will have the knowledge of Japanese script.

CO3: Will get introduced to reading , writing and listening skills

CO4: Will develop interest to pursue professional Japanese Language course

Semester IV

207003: Engineering Mathematics III

CO1: Solve Linear differential equations, essential in modelling and design of computer-based systems.

CO2: Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.

CO3: Apply Statistical methods like correlation and regression analysis and probability theory for data analysis and predictions in machine learning.

CO4: Solve Algebraic and Transcendental equations and System of linear equations using numerical techniques.

CO5: Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.

210252: Data Structures and Algorithms

CO1:Identify and articulate the complexity goals and benefits of a good hashing scheme for real- world applications.

CO2:Apply non-linear data structures for solving problems of various domain.

CO3:Design and specify the operations of a nonlinear-based abstract data type and implement

CO4:Analyze the algorithmic solutions for resource requirements and optimization

CO5:Use efficient indexing methods and multiway search techniques to store and maintain data.

CO6:Use appropriate modern tools to understand and analyze the functionalities confined to the secondary storage.

210253: Software Engineering

CO1: Analyze software requirements and formulate design solution for a software.

CO2: Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns.

CO3: Apply new software models, techniques and technologies to bring out innovative and novelistic solutions for the growth of the society in all aspects and evolving into their continuous professional development.

CO4: Model and design User interface and component-level.

CO5: Identify and handle risk management and software configuration management.

CO6: Utilize knowledge of software testing approaches, approaches to verification and validation.

210254: Microprocessor

CO1: Exhibit skill of assembly language programming for the application. **CO2: Classify** Processor architectures.

CO3: Illustrate advanced features of 80386 Microprocessor.

CO4: Compare and **contrast** different processor modes.

CO5: Use interrupts mechanism in applications

CO6: Differentiate between Microprocessors and Microcontrollers.

CO7: Identify and **analyze** the tools and techniques used to design, implement, and debug microprocessor-based systems.

210255: Principles of Programming Languages

CO1: **Make** use of basic principles of programming languages.

CO2: **Develop** a program with Data representation and Computations.

CO3: **Develop** programs using Object Oriented Programming language : Java. for robust application development.

CO4: **Develop** application using inheritance, encapsulation, and polymorphism.

CO5: **Demonstrate** Multithreading

CO6: **Develop** a simple program using basic concepts of Functional and Logical programming paradigm.

210256: Data Structures and Algorithms Laboratory

CO1: Understand the ADT/libraries, hash tables and dictionary to design algorithms for a specific problem.

CO2: Choose most appropriate data structures and **apply** algorithms for graphical solutions of the problems.

CO3: Apply and **analyze** non linear data structures to solve real world complex problems.

CO4: Apply and **analyze** algorithm design techniques for indexing, sorting, multi-way searching, file organization and compression.

CO5: Analyze the efficiency of most appropriate data structure for creating efficient solutions for engineering design situations.

210257: Microprocessor Laboratory

CO1. **Understand** and **apply** various addressing modes and instruction set to implement assembly language programs

CO2. **Apply** logic to **implement** code conversion

CO3. **Analyze** and **apply** logic to **demonstrate** processor mode of operation

210258: Project Based Learning II

CO1: Identify the real life problem from societal need point of view

CO2: Choose and compare alternative approaches to select most feasible one

CO3: Analyze and synthesize the identified problem from technological perspective

CO4: Design the reliable and scalable solution to meet challenges

CO5: Evaluate the solution based on the criteria specified

CO6: Inculcate long life learning attitude towards the societal problems

210259: Code of Conduct

CO1: 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.

CO2: Aware of professional rights and responsibilities of an engineer, responsibilities of an engineer for safety and risk benefit analysis.

CO3: Understand the impact of the professional Engineering solutions in societal and Environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

CO4: 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

AC4-I Water Management

CO1: Understand the global water cycle and its various processes

CO2: Understand climate change and their effects on water systems

CO3: Understand Drinking treatment and quality of groundwater and surface water

CO4: Understand the Physical, chemical, and biological processes involved in water treatment and distribution.

AC4-II Intellectual Property Rights and Patents

CO1: Understand the fundamental legal principles related to confidential information, copyright, patents, designs, trademarks and unfair competition

CO2: Identify, apply and **assess** principles of law relating to each of these areas of intellectual property

CO3: Apply the appropriate ownership rules to intellectual property you have been involved

AC4-III The Science of Happiness

CO1: Understand what happiness is and why it matters to you

CO2: Learn how to increase your own happiness

CO3: Understand of the power of social connections and the science of empathy

CO4: Understand what is mindfulness and its real world applications

AC4-IV Stress Relief: Yoga and Meditation

CO1: Understand philosophy and religion as well as daily life issues will be challenged and enhanced.

CO2: Enhances the immune system.

CO3: Intellectual and philosophical understanding of the theory of yoga and basic related Hindu scriptures will be developed.

CO4: Powers of concentration, focus, and awareness will be heightened.

AC4-V: Foreign Language (Japanese) Module 2

CO1: Have ability of basic communication.

CO2: Have the knowledge of Japanese script.

CO3: Get introduced to reading , writing and listening skills

CO4: Develop interest to pursue professional Japanese Language course