CAYMET's

Siddhant College of Engineering

Savitribai Phule Pune University, Pune

Second Year Computer Engineering (2019 Course)

COURSE OBJECTIVE & OUTCOMES

SEM I

Program Outcomes

1. PO1. Engineering knowledge Apply the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex Engineering problems.

2. PO2. Problem analysis Identify, formulate, review research literature and analyze complex Engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and Engineering sciences.

3. PO3. Design / Development of Solutions 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. PO4. Conduct Investigations of Complex Problems 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. PO5. Modern Tool Usage Create, select, and apply appropriate techniques, resources, and modern Engineering and IT tools including prediction and modelling to complex Engineering activities with an understanding of the limitations.

6. PO6. The Engineer and Society 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 practices.

7. PO7. Environment and Sustainability understand the impact of the professional Engineering solutions in societal and Environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. PO8. Ethics Apply ethical principles and commit to professional ethics and responsibilities and norms of Engineering practice.

9. PO9. Individual and Team Work Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. PO10. Communication Skills 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. PO11. Project Management and Finance Demonstrate knowledge and understanding of 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. PO12. Life-long Learning 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.

Subject Code &Name -210241 Discrete Mathematics

Course Objectives

1. To use appropriate set, function and relation models to understand practical examples, and interpret the associated operations and terminologies in context.

2. Determine number of logical possibilities of events.

3. Learn logic and proof techniques to expand mathematical maturity.

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

Course Outcomes

On completion of the course, learner will be able to

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

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

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

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

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

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

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

Subject Code &Name -210242 Fundamentals of Data Structures

Course Objectives

1. To understand the basic techniques of algorithm analysis.
2. To understand various algorithmic strategies to approach the problem solution.
3. To understand the memory requirement for various data structures.
4. To understand various data searching and sorting methods with pros and cons.
5. To acquaint with the structural constraints and advantages in usage of the data.
6. To understand the standard and abstract data representation methods.
7. To identify the appropriate data structure and algorithm design method for a specified application.

Course Outcomes

On completion of the course, learner will be able to–

1. Design the algorithms to solve the programming problems, identify appropriate algorithmic strategy for specific application, and analyze the time and space complexity.
2. 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.
3. Demonstrate use of sequential data structures-Array and Linked lists to store and process data.
4. Understand the computational efficiency of the principal algorithms for searching and sorting and choose the most efficient one for the application.
5. Compare and contrast different implementations of data structures (dynamic and static).
6. Understand, Implement and apply principles of data structures-stack and queue to solve computational problems.

Subject Code &Name -210243 Object Oriented Programming (OOP)

Course Objectives

1. To explore & understand the principles of Object Oriented Programming (OOP).
2. To use the object-oriented paradigm in program design.
3. To provide object-oriented programming insight using C++
4. To lay a foundation for advanced programming.

Course Outcomes

Course Outcomes: On completion of the course, learner will be able to–

1. Apply constructs-sequence, selection and iteration; classes and objects, inheritance, use of predefined classes from libraries while developing software.
2. Design object-oriented solutions for small systems involving multiple objects.
3. Use virtual and pure virtual function and complex programming situations.
4. Apply object-oriented software principles in problem solving.
5. Analyze the strengths of object-oriented programming.
6. Develop the application using object-oriented programming language (C++).

Subject Code &Name -<u>210244: Computer Graphics</u>

Course Objectives

1. **Remembering:** To acquaint the learner with the basic concepts of Computer Graphics
2. **Understanding:** To learn the various algorithms for generating and rendering graphical figures.
3. **Applying:** To get familiar with mathematics behind the graphical transformations
4. **Understanding:** To understand and apply various methods and techniques regarding projections, animation, shading, illumination and lighting
5. **Creating:** To generate Interactive graphics using OpenGL

Course Outcomes

On completion of the course, learner will be able to:

1. Identify the basic terminologies of Computer Graphics and interpret the mathematical foundation of the concepts of computer graphics.
2. Apply mathematics to develop Computer programs for elementary graphic operations.
3. Illustrate the concepts of windowing and clipping and apply various algorithms to fill and clip polygons.
4. Understand and apply the core concepts of computer graphics, including transformation in two and three dimensions, viewing and projection.
5. Understand the concepts of color models, lighting, shading models and hidden surface elimination.
6. Create effective programs using concepts of curves, fractals, animation and gaming.

Subject Code &Name -<u>210245 Digital Electronics and Logic Design</u>

Course Objectives

1. To study number systems and develop skills for design and implementation of combinational logic circuits and sequential circuits
2. To understand the functionalities, properties and applicability of Logic Families.

3. To introduce programmable logic devices and ASM chart and synchronous state machines.

4. To basics of microprocessor.

Course Outcomes

On completion of the course, learner will be able to:

1. Simplify Boolean Expressions using K Map.

2. Design and implement combinational circuits.

3. Design and implement sequential circuits.

4. Develop simple real-world application using ASM and PLD.

5. Differentiate and choose appropriate logic families IC packages as per the given design specifications.

6. Explain organization and architecture of computer system.

Subject Code &Name - 210246 Humanity & Social Science

Course Objectives

1. To facilitate Holistic growth

2. To Educate about Contemporary ,National and International affairs

3. To bring awareness about the responsibility towards society.

4. To give an insight about the emergence of Indian society and the relevance of Economics.

Course Outcomes

1. Aware of the various issues concerning humans and society.

2. Aware about their responsibilities towards society.

3. Sensitized about broader issues regarding the social, cultural, economic and human aspects, involved in social changes.

4. Able to understand the nature of the individual and the relationship between self and the community.

5. Able to understand major ideas, values, beliefs, and experiences that have shaped human history and cultures.

Subject Code &Name - AC3-IV Smart Cities

Course Objectives

1. To identify urban problems

2. To study Effective and feasible ways to coordinate urban technologies.

3. To study models and methods for effective implementation of Smart Cities.

4. To study new technologies for Communication and Dissemination.

5. To study new forms of Urban Governance and Organization.

Course Outcomes

On completion of the course, learner will be able to–

1. Better understanding of the dynamic behavior of the urban system by going beyond the physical appearance and by focusing on representations, properties and impact factors
2. Exploration of the city as the most complex human-made organism with a metabolism that can be modeled in terms of stocks and flows
3. Knowledge about data-informed approaches for the development of the future city, based on crowd sourcing and sensing
4. Knowledge about the latest research results in for the development and management of future cities
5. Understanding how citizens can benefit from data-informed design to develop smart and responsive cities

SEM II

Subject Code &Name – <u>210252 Mathematics III</u>

Course Outcomes

On completion of the course, learner will be able to

1. Solve Linear differential equations, essential in modelling and design of computer-based systems.
2. Apply concept of Fourier transform and Z-transform and its applications to continuous and discrete systems and image processing.
3. Apply Statistical methods like correlation and regression analysis and probability theory for data analysis and predictions in machine learning.
4. Solve Algebraic and Transcendental equations and System of linear equations using numerical techniques.
5. Obtain Interpolating polynomials, numerical differentiation and integration, numerical solutions of ordinary differential equations used in modern scientific computing.

Subject Code &Name -<u>210252 Data Structures and Algorithms</u>

Course Objectives

1. To develop a logic for graphical modeling of the real life problems.
2. To suggest appropriate data structure and algorithm for graphical solutions of the problems.
3. To understand advanced data structures to solve complex problems in various domains.
4. To operate on the various structured data
5. To build the logic to use appropriate data structure in logical and computational solutions.
6. To understand various algorithmic strategies to approach the problem solution.

Course Outcomes

On completion of the course, learner will be able to

1. Identify and articulate the complexity goals and benefits of a good hashing scheme for real-world applications.
2. Apply non-linear data structures for solving problems of various domain.
3. Design and specify the operations of a nonlinear-based abstract data type and implement them in a high-level programming language.
4. Analyze the algorithmic solutions for resource requirements and optimization
5. Use efficient indexing methods and multiway search techniques to store and maintain data.
6. Use appropriate modern tools to understand and analyze the functionalities confined to the secondary storage.

Subject Code & Name -<u>210253 Software Engineering</u>

Course Objectives

1. To learn and understand the principles of Software Engineering.
2. To be acquainted with methods of capturing, specifying, visualizing and analyzing software requirements.
3. To apply Design and Testing principles to S/W project development.
4. To understand project management through life cycle of the project.

Course Outcomes

On completion of the course, learner will be able to

1. Analyze software requirements and formulate design solution for a software.
2. Design applicable solutions in one or more application domains using software engineering approaches that integrate ethical, social, legal and economic concerns.
3. 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.
4. Model and design User interface and component-level.
5. Identify and handle risk management and software configuration management.
6. Utilize knowledge of software testing approaches, approaches to verification and validation.
7. Construct software of high quality –software that is reliable, and that is reasonably easy to understand, modify and maintain efficient, reliable, robust and cost-effective software solutions.

Subject Code &Name -<u>210254 Microprocessor</u>

Course Objectives

1. To learn the architecture and programmer's model of advanced processor
2. To understand the system level features and processes of advanced processor
3. To acquaint the learner with application instruction set and logic to build assembly language programs.
4. To understand debugging and testing techniques confined to 80386 DX

Course Outcomes

On completion of the course, learner will be able to

1. Exhibit skill of assembly language programming for the application.
2. Classify Processor architectures.
3. Illustrate advanced features of 80386 Microprocessor.
4. Compare and contrast different processor modes.

5. Use interrupts mechanism in applications

6. Differentiate between Microprocessors and Microcontrollers.

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

Subject Code &Name -210255 Principles of Programming Languages

Course Objectives

1. To learn basic principles of programming languages and programming paradigms

2. To learn structuring the data and manipulation of data, computation and program structure

3. To learn Object Oriented Programming (OOP) principles using Java Programming Language

4. To learn basic concepts of logical and functional programming language

Course Outcomes

On completion of the course, learner will be able to

1. Make use of basic principles of programming languages.

2. Develop a program with Data representation and Computations.

3. Develop programs using Object Oriented Programming language : Java.

4. Develop application using inheritance, encapsulation, and polymorphism.

5. Demonstrate Multithreading for robust application development.

6. Develop a simple program using basic concepts of Functional and Logical programming paradigm.

Subject Code &Name -210259 Code of Conduct

Course Objectives

1. To promote ethics, honesty and professionalism.

2. To set standards that are expected to follow and to be aware that If one acts unethically what are the consequences.

3. To provide basic knowledge about engineering Ethics, Variety of moral issues and Moral dilemmas, Professional Ideals and Virtues

4. To provide basic familiarity about Engineers as responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards, Exposure to Safety and Risk, Risk Benefit Analysis

5. To have an idea about the Collegiality and Loyalty, Collective Bargaining, Confidentiality, Occupational Crime, Professional, Employee, Intellectual Property Rights.

Course Outcomes

On completion of the course, learner will be able to

1. Understand the basic perception of profession, professional ethics, various moral & social issues, industrial standards, code of ethics and role of professional ethics in engineering field.
2. Aware of professional rights and responsibilities of an engineer, responsibilities of an engineer for safety and risk benefit analysis.
3. Understand the impact of the professional Engineering solutions in societal and Environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
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.

Subject Code &Name -210260 Project Based Learning

Course Objectives
1. To develop critical thinking and problem-solving ability by exploring and proposing solutions to realistic/social problem.
2. To Evaluate alternative approaches, and justify the use of selected tools and methods,
3. To emphasizes learning activities that are long-term, inter-disciplinary and student-centric.
4. To engages students in rich and authentic learning experiences.
5. To provide every student the opportunity to get involved either individually or as a group so as to develop team skills and learn professionalism.
6. To develop an ecosystem this may promote entrepreneurship and research culture among the students.

Course Outcomes

On completion of the course, learner will be able to
1. Ability to solve real life problems by applying knowledge.
2. Ability to analyze alternative approaches, apply and use most appropriate one for feasible solution.
3. Ability to understand basics of IT Project management
4. Students should be able to accept and meet challenges in the real world, mirroring what professionals do every day.
5. Able to Classify software applications and identify unique features of various domains
6. Learning by doing approach in PBL will promote long-term retention of material and replicable skill, as well as improve teachers' and students' attitudes towards learning.

Subject Code &Name - <u>AC4-II Intellectual Property Rights and Patents</u>

Course Objectives

1. To encourage research, scholarship, and a spirit of inquiry
2. To encourage students at all levels to develop patentable technologies.
3. To provide environment to the students of the Institute for creation, protection, and commercialization of intellectual property and to stimulate innovation.

Course Outcomes

On completion of the course, learner will be able to–

1. Understand the fundamental legal principles related to confidential information, copyright, patents, designs, trademarks and unfair competition
2. Identify, apply and assess principles of law relating to each of these areas of intellectual property
3. Apply the appropriate ownership rules to intellectual property you have been involved in creating

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