



**CAYMET's**

**Siddhant College of Engineering**

**Savitribai Phule Pune University, Pune**

**Second Year Information Technology (2019 Course)**

**COURSE OBJECTIVE & OUTCOMES**

**SEM I**

**Program Educational Objectives**

1. PEO1 Possess strong fundamental concepts in mathematics, science, engineering and Technology to address technological challenges.
2. PEO2 Possess knowledge and skills in the field of Computer Science and Information Technology for analyzing, designing and implementing complex engineering problems of any domain with innovative approaches.
3. PEO3 Possess an attitude and aptitude for research, entrepreneurship and higher studies in the field of Computer Science and Information Technology.
4. PEO4 Have commitment to ethical practices, societal contributions through communities and life-long learning. PEO 5 Possess better communication, presentation, time management and team work skills leading to responsible & competent professionals and will be able to address challenges in the field of IT at global level.

**Program Outcomes**

1. PO1 An ability to apply knowledge of mathematics, computing, science, engineering and technology.
2. PO1 An ability to engage in life-long learning and continuing professional development to cope up with fast changes in the technologies/tools with the help of electives, professional organizations and extra-curricular activities.
3. PO3 Design / Development of Solutions An ability to design, implement, and evaluate a software or a software/hardware system, component, or process to meet desired needs within realistic constraints.
4. PO4 Conduct Investigations of Complex Problems An ability to identify, formulate, and provide systematic solutions to complex engineering/Technology problems.
5. PO5 Modern Tool Usage An ability to use the techniques, skills, and modern engineering technology tools, standard processes necessary for practice as a IT professional.
6. PO6 The Engineer and Society An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modeling and design of computer-based systems with necessary constraints and assumptions.

7. PO7 Environment and Sustainability An ability to analyze and provide solution for the local and global impact of information technology on individuals, organizations and society.
8. PO8 Ethics An ability to understand professional, ethical, legal, security and social issues and responsibilities;
9. PO9 Individual and Team Work An ability to function effectively as an individual or as a team member to accomplish a desired goal(s).
10. PO10 Communication Skills An ability to engage in life-long learning and continuing professional development to cope up with fast changes in the technologies/tools with the help of electives, professional organizations and extra-curricular activities;
11. PO11 Project Management and Finance An ability to communicate effectively in engineering community at large by means of effective presentations, report writing, paper publications, demonstrations;
12. PO12 Life-long Learning An ability to understand engineering, management, financial aspects, performance, optimizations and time complexity necessary for professional practice;

### **Program Specific Outcomes**

A graduate of the Information Technology Program will demonstrate –

1. PSO 1 An ability to apply the theoretical concepts and practical knowledge of Information Technology in analysis, design, development and management of information processing systems and applications also in the interdisciplinary domain.
2. PSO 2 An ability to analyze a problem, and identify and define the computing infrastructure and operations requirements appropriate to its solution. IT graduates should be able to work on large scale computing systems.
3. PSO 3 An understanding of professional, business and business processes, ethical, legal, security and social issues and responsibilities. At times technical decisions are influenced by the needs of the business and its processes like quality control processes. An IT graduate should be able to deal with that.
4. PSO 4 Practice communication and decision making skills through the use of appropriate technology and be ready for industry culture

### **Subject Code & Name – 214441 Discrete Mathematics**

#### **Course Objectives**

1. Gain sound knowledge to formulate and solve problems with sets and propositions.
2. To understand and solve counting problems by applying elementary counting techniques to solve problems of discrete probability.

3. To understand Graph and Tree terminologies and models to be applied in real life problems.
4. To recognize types of relation, formulate and solve problems with relations and functions.
5. To understand basics of number theory and its applications.
6. To understand the various types' algebraic structures and its applications.

### **Course Outcomes**

On completion of the course, learner will be able to

1. Formulate, apply formal proof techniques and solve the problems with logical reasoning.
2. Analyze and evaluate the combinatorial problems by using probability theory.
3. Apply the concepts of graph theory to devise mathematical models.
4. Analyze types of relations and functions to provide solution to computational problems.
5. Identify techniques of number theory and its application.
6. Identify fundamental algebraic structures.

### **Subject Code &Name – 214442 Computer Organization & Logic Design**

#### **Course Objectives**

1. To make undergraduates, aware of different levels of abstraction of computer systems from hardware perspective.
2. To make undergraduates, understand the functions, characteristics of various components of Computer& in particular processor & memory.

#### **Course Outcomes**

Describe the basics of thermodynamics with heat and work interactions.

1. Perform basic binary arithmetic & simplify logic expressions.
2. Grasp the operations of logic ICs and Implement combinational logic functions using ICs.
3. Comprehend the operations of basic memory cell types and Implement sequential logic Functions using ICs.
4. Elucidate the functions & organization of various blocks of CPU.
5. Understand CPU instruction characteristics, enhancement features of CPU.
6. Describe an assortment of memory types (with their characteristics) used in computer systems and basic principle of interfacing input, output devices.

### **Subject Code &Name - 214443 Data Structure & Algorithms**

#### **Course Objectives**

1. To study data structures and their implementations and applications.

2. To learn different searching and sorting techniques
3. To study some advanced data structures such as trees, graphs and tables.
4. To learn different file organizations.
5. To learn algorithm development and analysis of algorithms.

### **Course Outcomes**

On completion of the course, learner will be able to

1. Analyze algorithms and to determine algorithm correctness and time efficiency class.
2. Understand different advanced abstract data type (ADT) and data structures and their implementations.
3. Understand different algorithm design techniques (brute -force, divide and conquer, greedy, etc.) and their implementation.
4. Apply and implement learned algorithm design techniques and data structures to solve problems.
5. Perform basic analysis of algorithms with respect to time and space complexity.
6. Use algorithmic foundations for solving problems and programming.

### **Subject Code &Name - 214444 Object Oriented Programming**

#### **Course Objectives**

1. Apply concepts of object oriented paradigm.
2. Design and implement models for real life problems by using object oriented programming
3. Develop object oriented programming skills.

#### **Course Outcomes**

1. Differentiate various programming paradigms and apply basic concepts of OOP.
2. Identify classes, objects, methods, and handle object creation, initialization, and destruction to model real-world problems.
3. Identify relationship among objects using inheritance and polymorphism.
4. Handle different types of exceptions and perform generic programming.
5. Use file handling for real world application.
6. Apply appropriate design patterns to provide object-oriented solutions

### **Subject Code &Name – 214445 Basics of Computer Network**

#### **Course Objectives**

1. To understand the fundamentals of communication system.
2. To understand the basics of internetworking.
3. To understand services and protocols used at Physical, Data Link, Network, Transport Layer.

### **Course Outcomes**

1. Understand and explain the concepts of communication theory and compare functions of OSI and TCP/IP model.
2. Analyze data link layer services, error detection and correction, linear block codes, cyclic codes, framing and flow control protocols.
3. Compare different access techniques, channelization and Ethernet standards.
4. Apply the skills of subnetting, supernetting and routing mechanisms.
5. Compare IPv4 and IPv6
6. Understand services and protocols used at transport layer.

### **Subject Code &Name- 214446 Computer Organization & Logic Design Lab**

#### **Course Objectives**

1. To design & implement combinational and sequential circuits.
2. To manage and access computer system.
3. To learn to simulate digital system

#### **Course Outcomes**

1. Use logic function representation for simplification with K-Maps and design Combinational logic circuits using SSI & MSI chips.
2. Design Sequential Logic circuits: MOD counters using synchronous counters.
3. Apply the basics of system management to access the resources of computer system.
4. Apply the basics of simulator tool & to simulate simple ALU / CPU.

### **Subject Code &Name -214447 Data Structure & Algorithms Lab**

#### **Course Objectives**

1. To study data structures and their implementations and applications.
2. To learn different searching and sorting techniques.
3. To study some advanced data structures such as trees, graphs and tables.
4. To learn different file organizations.
5. To learn algorithm development and analysis of algorithms.

#### **Course Outcomes**

1. Analyze algorithms and to determine algorithm correctness and time efficiency class.
2. Understand different advanced abstract data type (ADT) and data structures and their implementations.

3. Understand different algorithm design techniques (brute -force, divide and conquer, greedy, etc.) and their implementation.
4. Apply and implement learned algorithm design techniques and data structures to solve problems.
5. Perform basic analysis of algorithms with respect to time and space complexity.
6. Use algorithmic foundations for solving problems and programming.

**Subject Code &Name- 214448 Object Oriented Programming Lab**

**Course Objectives**

1. Apply concepts of object oriented paradigm.
2. Design and implement models for real life problems by using object oriented programming. Develop object oriented programming skills.

**Course Outcomes**

1. Differentiate various programming paradigms and apply basic concepts of OOP.
2. Identify classes, objects, methods, and handle object creation, initialization, and destruction to model real-world problems.
3. Identify relationship among objects using inheritance and polymorphism.
4. Handle different types of exceptions and perform generic programming.
5. Use file handling for real world application.
6. Apply appropriate design patterns to provide object-oriented solutions.

**Subject Code &Name- 214449 Soft Skills Lab**

**Course Outcomes**

1. Introspect about individual's goals, aspirations by evaluating one's SWOC and think creatively.
2. Develop effective communication skills including Listening, Reading, Writing and Speaking.
3. Constructively participate in group discussion, meetings and prepare and deliver presentations
4. Write precise briefs or reports and technical documents.
5. Understand professional etiquette, present oneself confidently and successfully handle personal interviews CO6:Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of teamwork, Inter-personal relationships, conflict management and leadership quality.

## SEM II

### **Subject Code &Name -207003 Engineering Mathematics III**

#### **Course Objectives**

1. To make the students familiarize with concepts and techniques in Linear differential equations, Fourier transform & Z-transform, Statistical methods, Probability theory and Numerical methods.
2. The aim is to equip them with the techniques to understand advanced level mathematics and its applications that would enhance thinking power, useful in their disciplines.

#### **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 & regression analysis and probability theory for data analysis and predictions in machine learning.
4. Solve Algebraic & 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 – 214451 Processor Architecture**

#### **Course Objectives**

1. To study architectural details of PIC 18 microcontroller.
2. To study applications of PIC through various interfacing devices.

#### **Course Outcomes**

On completion of the course, learner will be able to

1. Apprehend architecture and memory organization of PIC 18 microcontroller.
2. Implement embedded C programming for PIC 18.
3. Use concepts of timers and interrupts of PIC 18.
4. Demonstrate real life applications using PIC 18.
5. Analyze architectural details of ARM processor.

## **Subject Code & Name -214452 Database Management System**

### **Course Objectives**

1. The objective of the course is to present an introduction to database management system as a subject in its own right.
2. To understand the fundamental concepts of Relational Database management system.
3. To present SQL and procedural interfaces to SQL comprehensively.
4. To provide a strong formal foundation in Relational Database Concepts, database concepts, technology and practice & to introduce the concepts of Query Processing
5. To introduce the concepts of Transaction Processing and to present the issues and techniques relating to concurrency and recovery in multi-user database environments.
6. To introduce the recent trends in database technology.

### **Course Outcomes**

On completion of the course, learner will be able to

1. Define fundamental elements of database management systems
2. Describe the fundamental elements of relational database management systems and Design ER-models to represent simple database application scenarios.
3. Populate relational database and formulate SQL queries on data.
4. Improve the database design by normalization & to incorporate query processing
5. Illustrate ACID properties for transaction management & to describe concurrency control protocols.
6. Understand recent trends in database technology.

## **Subject Code & Name -214453 Computer Graphics**

### **Course Objectives**

1. Understand the foundations of computer graphics: hardware systems, math basis, light and color.
2. Understand the complexities of modeling realistic objects through modeling complex scenes using a high-level scene description language.
3. Become acquainted with some advanced topics in computer graphics. The student should gain an expanded vocabulary for discussing issues relevant to computer graphics (including both the underlying mathematics and the actual programming).
4. The student should gain an appreciation and understanding of the hardware and software utilized in constructing computer graphics applications.
5. The student should gain a comprehension of windows, clipping and view-ports in relation to images displayed on screen.



6. The student should gain an understanding of geometric, mathematical and algorithmic concepts necessary for programming computer graphics.

### **Course Outcomes**

On completion of the course, learner will be able to

1. Specify mathematical and logical aspects for developing elementary graphics operations like scan conversion of points, lines and circle and apply it for problem solving.
2. Explain and employ techniques of geometrical transforms to produce, position and manipulate objects in 2 dimensional and 3-dimensional space respectively.
3. Describe mapping from a world coordinates to device coordinates, clipping, and projections in order to produce 3D images on 2D output device.
4. Apply the concepts of rendering, shading, animation, curves and fractals using computer graphics tools in design, development and testing of 2D, 3D modeling applications.
5. Develop the competency to understand the concepts related to Virtual reality

### **Subject Code &Name -214455 Software Engineering**

#### **Course Objectives**

1. To learn the principles of Software Engineering.
2. To learn and understand methods of capturing, specifying, visualizing and analyzing software requirements.
3. To know design principles to software project development.
4. To learn basics of IT project management.
5. To understand software quality attributes and testing principles.
6. To introduce formal methods and recent trends in Software Engineering.

#### **Course Outcomes**

On completion of the course, learner will be able to

1. Identify various software application domains and classify software applications.
2. Analyze software requirements by applying various modeling techniques.
3. Translate the requirement models into design models.
4. Apply planning and estimation to any project.
5. Apply quality attributes and testing principles in software development life cycle.
6. Discuss recent trends in Software engineering by using CASE and agile tools.

## **Subject Code &Name – 214455 Programming Skill Development Lab**

### **Course Objectives**

1. To learn embedded C programming and PIC18FXXX microcontrollers.
2. To learn interfacing of real world input and output devices to PIC18FXXX microcontroller

### **Course Outcomes**

On completion of the course, learner will be able to

1. After completion of this course student will be able to
2. Students will learn concepts related to embedded C programming.
3. Students will be able to write and execute embedded C program to perform array addition, block transfer, sorting operations
4. Students will be able to learn interfacing of real world input and output devices to PIC18FXXX microcontroller.
5. Students will learn open source prototype platform like Raspberry-Pi/Beagle board/Arduino.

## **Subject Code &Name – 214456 Database Management System LAB**

### **Course Objectives**

1. Understand the fundamental concepts of database management. These concepts include aspects of database design, database languages, and database-system implementation.
2. To provide a strong formal foundation in database concepts, recent technologies and best industry practices.
3. To give systematic database design approaches covering conceptual design, logical design and an overview of physical design.
4. To learn the SQL database system.
5. To learn and understand various Database Architectures and its use for application development.
6. To programme PL/SQL including stored procedures, stored functions, cursors and packages.

### **Course Outcomes**

On completion of the course, learner will be able to

1. To install and configure database systems.
2. To analyze database models & entity relationship models.
3. To design and implement a database schema for a given problem-domain
4. To understand the relational database systems.
5. To populate and query a database using SQL DDL / DML / DCL commands.
6. To design a backend database of any one organization: CASE STUDY

## **Subject Code &Name – 214457 Computer Graphics Lab**

### **Course Objectives**

1. To acquaint the learners with the concepts of OpenGL
2. To acquaint the learners with the basic concepts of Computer Graphics
3. To implement the various algorithms for generating and rendering the objects
4. To get familiar with mathematics behind the transformations
5. To understand and apply various methods and techniques regarding animation

### **Course Outcomes**

On completion of the course, learner will be able to

1. Apply and implement line drawing and circle drawing algorithms to draw the objects.
2. Apply and implement polygon filling methods for the object
3. Apply and implement polygon clipping algorithms for the object
4. Apply and implement the 2D transformations on the object
5. Implement the curve generation algorithms
6. Demonstrate the animation of any object using animation principles

## **Subject Code &Name – 214458 Project Based Learning**

### **Course Objectives**

After completing PBL course, the student will be able to:

1. Know about project and project based learning
  - a. Experience the concept of learning by doing,
  - b. Experience advanced and efficient learning model
2. Understand the various processes involved in project based learning and the importance of team work in project based learning
  - a. develop projects for various real life situations
  - b. work in realistic contextualized problem-solving environments
  - c. realize the success of a project by experiencing the desired output
3. Apply knowledge and understanding of project based learning processes in new situations
  - a. improve communication skills
  - b. enhance self-confidence
  - c. build up teamwork and leadership skills

### **Course Outcomes**

On completion of the course, learner will be able to

1. Students will gain knowledge of how to provide solution to real life problems and analyze its concerns through shared cognition.
2. Students will be able to understand concepts of various disciplines and apply them in practical way.
3. Learning by doing approach in PBL will promote long-term retention of material and replicable skill.
4. Becoming well prepared for the labor market.
5. Student will motivate to collaborate with external partners and engage in interdisciplinary learning environments

**Subject Code &Name - 214459 Mandatory Audit Course -4B: Language Study Japanese: Module-II**

**Course Objectives**

1. To develop the Japanese communicative competence of students with small sentence formation to make primitive social conversation in Japanese
2. To enable students with comprehension ability of Japanese grammar
3. To enable students to translate simple conversations from English to Japanese and vice a versa
4. To make students aware about Japanese Culture and Customs

**Course Outcomes**

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

1. Have Japanese Communicative competence for primitive Social conversation in Japanese
2. Comprehend Grammar of Japanese Script
3. Translate simple sentences from Japanese to English and vice a versa
4. Be aware about Japanese society and people

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