



**Akhil Bharatiya Maratha Shikshan Parishad's  
Anantrao Pawar College of Engineering &  
Research**

Record No.: ADM/D/036B  
Revision: 00

DoI: 01/02/2025



**Internal Correspondence For Department**

**Department: AI & DS**

**CO-PO Mapping**

**Second Year [2019 Pattern] Sem-1**

| Savitribai Phule Pune University<br>Bachelor of Computer Engineering |                                            |                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------|--------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Program Outcomes (POs)                                               |                                            |                                                                                                                                                                                                                                                                                    |
| Learners are expected to know and be able to–                        |                                            |                                                                                                                                                                                                                                                                                    |
| PO1                                                                  | Engineering knowledge                      | Apply the knowledge of mathematics, science, Engineering fundamentals, and an Engineering specialization to the solution of complex Engineering problems.                                                                                                                          |
| 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.                                                                      |
| 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.                           |
| 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.                                                                                             |
| 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.                                                                    |
| 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.                                                                         |
| 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.                                                                                                    |
| PO8                                                                  | Ethics                                     | Apply ethical principles and commit to professional ethics and responsibilities and norms of Engineering practice.                                                                                                                                                                 |
| PO9                                                                  | Individual and Team Work                   | Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.                                                                                                                                                              |
| 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. |
| 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.                                                                    |
| 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.                                                                                                                      |



Internal Correspondence For Department

210242: Fundamentals of Data Structures

Course Outcomes:

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

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 Identify 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.

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

@The CO-PO Mapping Matrix

| CO\PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1   | 2   | 2   | 1   | 2   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO2   | 1   | 2   | 2   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO3   | 1   | 1   | 1   | -   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO4   | 1   | -   | 1   | -   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO5   | 1   | 1   | -   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO6   | 1   | 1   | 1   | 1   | 1   | -   | -   | -   | -   | -    | -    | -    |





**Internal Correspondence For Department**

**210244: Computer Graphics**

**Course Outcomes:**

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

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.

**@The CO-PO Mapping Matrix**

| CO\PO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1   | 2   | 1   | 1   | -   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO2   | 3   | -   | 1   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO3   | 1   | 2   | -   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO4   | 2   | 1   | 1   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO5   | 1   | -   | 1   | -   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO6   | -   | 2   | 2   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |



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217522: Data Structures Laboratory

Course Outcomes:

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

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.

@The CO-PO Mapping Matrix

| PO  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 1   | 1   | 2   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO2 | 2   | 2   | 2   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO3 | -   | 2   | 1   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO4 | 1   | 2   | 2   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |



|                                                                                   |                                                                                                                 |                 |                                                                                     |
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## 217524: Operating Systems Laboratory

### Course Outcomes:

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

CO1: Choose the best CPU scheduling algorithm for a given problem instance

CO2: Demonstrate interprocess communication

CO3: Apply deadlock avoidance algorithm

CO4: Compare performance of page replacement algorithms

CO5: Demonstrate the fundamental UNIX commands & system calls

| @The CO-PO mapping table |     |     |     |     |     |     |     |     |     |      |      |      |
|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| PO                       | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1                      | 3   | 2   | -   | 3   | 2   | -   | -   | 2   | 1   | 1    | -    | 2    |
| CO2                      | 3   | 2   | -   | 3   | 2   | -   | -   | 2   | 1   | 1    | -    | 2    |
| CO3                      | 3   | 2   | -   | 3   | 2   | -   | -   | 2   | 1   | 1    | -    | 2    |
| CO4                      | 3   | 2   | -   | 2   | 2   | -   | -   | 2   | 1   | 1    | -    | 2    |
| CO5                      | 3   | 2   | 1   | -   | 2   | -   | -   | 2   | 1   | -    | -    | 2    |

|                                                                                   |                                                                                                                 |                 |                                                                                     |
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## 217526: Humanity and Social Science

### Course Outcomes:

On completion of the course, learner will be–

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.

| @The CO-PO Mapping Matrix |     |     |     |     |     |     |     |     |     |      |      |      |
|---------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO\PO                     | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| C01                       | -   | -   | -   | -   | -   | -   | 2   | 2   | 2   | -    | -    | -    |
| C02                       | -   | -   | -   | -   | -   | -   | 2   | -   | -   | -    | -    | -    |
| C03                       | -   | -   | -   | -   | -   | -   | -   | 2   | 2   | -    | -    | 1    |
| C04                       | -   | -   | -   | -   | -   | -   | 2   | 2   | 2   | -    | -    | -    |
| C05                       | -   | -   | -   | -   | -   | -   | -   | 2   | -   | -    | -    | -    |
| C06                       | -   | -   | -   | -   | -   | -   | -   | -   | -   | -    | -    | -    |

|                                                                                   |                                                                                                                 |                 |                                                                                     |
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## Second Year [2019 Pattern] Sem-2

### CO-PO Mapping

**217528 : Statistics**

**Course Outcomes:**

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

CO1: Identify the use of appropriate statistical terms to describe data

CO2: Use appropriate statistical methods to collect, organize, display, and analyze relevant data.

CO3: Use distribution functions for random variables

CO4: Distinguish between correlation coefficient and regression

CO5: Understand tests for hypothesis and its significance

**@The CO-PO mapping table**

| PO  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 1   | -   | -   | -   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO2 | 1   | -   | -   | -   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO3 | 1   | 1   | -   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO4 | 1   | -   | 1   | 1   | -   | -   | -   | -   | -   | -    | 1    | -    |
| CO5 | 1   | -   | 1   | 1   | -   | -   | -   | -   | -   | -    | 1    | 1    |



|                                                                                   |                                                                                                                 |                 |                                                                                     |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------|-------------------------------------------------------------------------------------|
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## 210252: Data Structures and Algorithms

### Course Outcomes:

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

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 them in a high-level programming language.

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.

### @The CO-PO Mapping Matrix

| PO  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 2   | 1   | 2   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO2 | 1   | 2   | -   | -   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO3 | 2   | -   | -   | -   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO4 | -   | 2   | -   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO5 | 1   | -   | 1   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |
| CO6 | 2   | 1   | 1   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |



|                                                                                   |                                                                                                                 |                        |                                                                                     |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------|
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## 217531: Internet of Things Laboratory

### Course Outcomes:

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

CO1: Understand IOT Application Development using Raspberry Pi/ Beagle board/ Arduino board

CO2: Develop and modify the code for various sensor based applications using wireless sensor

modules and working with a variety of modules like environmental modules.

CO3: Make use of Cloud platform to upload and analyse any sensor data

@The CO-PO mapping table

| PO  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 2   | 1   | 3   | --  | --  | --  | --  | --  | --  | --   | --   | --   |
| CO2 | --  | 2   | 3   | --  | --  | --  | --  | --  | --  | --   | --   | --   |
| CO3 | --  | --  | 3   | 2   | --  | --  | --  | --  | --  | --   | --   | 3    |



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## 217532: Data Structures and Algorithms Laboratory

### Course Outcomes:

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

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.

@The CO-PO Mapping Matrix

| PO  | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| C01 | 1   | 2   | 2   | -   | -   | -   | -   | -   | -   | -    | -    | -    |
| C02 | -   | 2   | 2   | -   | -   | -   | -   | -   | -   | -    | -    | -    |
| C03 | -   | 2   | 2   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |
| C04 | 1   | 2   | 1   | 1   | -   | -   | -   | -   | -   | -    | -    | -    |
| C05 | 1   | 1   | 2   | 2   | -   | -   | -   | -   | -   | -    | -    | -    |





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## 217534: Code of Conduct

### Course Outcomes:

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

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.

@The CO-PO Mapping Matrix

| CO\PO | PO 1 | PO2 | PO3 | PO 4 | PO5 | PO6 | PO7 | PO 8 | PO9 | PO1 0 | PO1 1 | PO12 |
|-------|------|-----|-----|------|-----|-----|-----|------|-----|-------|-------|------|
| CO1   | -    | -   | -   | -    | -   | -   | 2   | 2    | -   | -     | -     | -    |
| CO2   | -    | -   | -   | -    | -   | -   | 2   | 2    | -   | -     | -     | -    |
| CO3   | -    | -   | -   | -    | -   | -   | 3   | 2    | -   | -     | -     | -    |
| CO4   | -    | -   | -   | -    | -   | -   | 2   | 3    | -   | -     | -     | -    |

Date: 9/4/2026

*Mwagh*  
9/4/2026

Prof. Mangal V. Wagh  
Dept. NBA Criteria-3 Coordinator

*Musale*  
09/04/2026

Dr. Jitendra Musale  
HOD, AI & DS

*Thakare*

Dr. Sunil Thakare  
Principal

