



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad-500043

## STANDARD OPERATING PROCEDURE

for

### Engineering Development Project

*(Design – Development – Implementation – Report)*

01 December, 2025

#### 1. INTRODUCTION

Engineering Development Project (EDP) is a student-centric, outcome-based learning approach focused on the **design and implementation of engineering solutions** to real-world problems. It emphasizes a “**design-to-implementation**” methodology, where students actively engage in system design, development, and deployment of functional prototypes or working systems.

#### 2. SCOPE

This SOP applies to all undergraduate engineering programs implementing:

- Engineering Development Projects
- Research-Based Learning (RBL) Courses
- Industry-Oriented Implementation Projects
- Interdisciplinary and Industry-Oriented Projects

#### 3. OBJECTIVES

- Promotes hands-on design and development skills
- Strengthen analytical and problem-solving abilities
- Foster innovation and product realization
- Enhance teamwork, communication and collaboration
- Align learning outcomes with Program Outcomes (POs), Program Specific Outcomes (PSOs) and Course Outcomes (COs)

#### 4. OUTCOMES:

- Design engineering systems based on real-world requirements
- Develop and implement working prototypes
- Apply appropriate tools and technologies
- Analyze system functionality and performance
- Work effectively in teams

#### 5. PROCESS FLOW

The Five main phases during the engineering design project were identified in the team's collaborative work and Timeline for Engineering development project phases. shown in figure 1:

##### Phase 1: System Design

- Develop system architecture and design specifications
- Prepare block diagrams, flowcharts, and design models
- Define system inputs, outputs, and functional requirements
- Select appropriate tools, technologies, and platforms

##### Phase 2: Planning & Resource Allocation

- Prepare project plan with timelines and milestones

- Allocate tasks among team members
- Identify required software, hardware, and development resources

### Phase 3: Development

- Develop the system/prototype using suitable techniques
- Perform coding, modeling, simulation, or fabrication
- Integrate modules and components
- Follow iterative and modular development practices

### Phase 4: Implementation

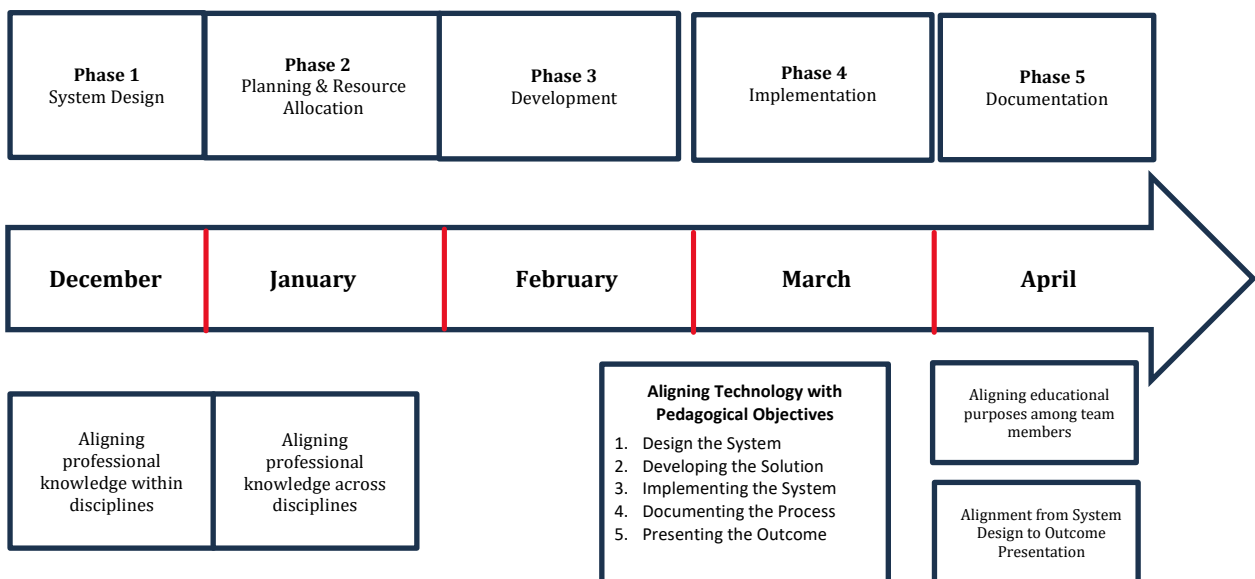
- Deploy the developed system/prototype
- Execute the system in real-time or simulated environment
- Ensure system functionality as per design specifications

### Phase 5: Documentation

- Prepare detailed project report
- Maintain development logs and technical documents
- Document system design, implementation, and outcomes

### Along the above:

- Demonstrate the working system/prototype
- Present design, development, and implementation process
- Explain results, performance, and applications
- Attend viva and evaluations



**Figure. 1. Timeline for Engineering Development Project phases.**

### Aligning Technology with Pedagogical Objectives

#### 1. Designing the System

Developing a structured and feasible system design by defining architecture, components, and functional requirements.

#### 2. Developing the Solution

Building the system through coding, modeling, fabrication, or integration while applying appropriate tools and technologies.

### **3. Implementing the System**

Deploying and executing the developed solution in a real-time or simulated environment to ensure functionality and performance.

### **4. Documenting the Process**

Recording design decisions, development steps, and implementation details to ensure clarity and reproducibility.

### **5. Presenting the Outcome**

Demonstrating the working system and communicating the design, development, and implementation effectively.

## **6. ROLES AND RESPONSIBILITIES**

### **6.1 Students**

- Perform design and development tasks
- Work collaboratively in teams
- Complete implementation within timeline

### **6.2 Faculty Mentor/Supervisor**

- Guide system design and development
- Monitor progress and provide technical support
- Ensure proper implementation

### **6.3 Department**

- Provide infrastructure and resources
- Ensure academic alignment
- Conduct periodic reviews

## **7. ASSESSMENT AND EVALUATION**

Evaluation shall be based on:

- Design methodology
- Development process
- Functionality of implemented system
- Use of tools and technologies
- Teamwork and participation

## **8. OUTCOME ALIGNMENT**

The Engineering Development Project activities are aligned with:

- Program Outcomes (POs)
- Program Specific Outcomes (PSOs)
- Course Outcomes (COs)

## **9. EXPECTED OUTCOMES**

Upon completion, students will be able to:

- Design and implement engineering systems
- Develop practical and functional solutions
- Apply technical knowledge effectively
- Work in team-based environments
- Demonstrate implementation skills

## **10. RECORDS AND DOCUMENTS**

- Project report
- Design Documents
- Development methods used

- Implementation Details
- Evaluation Rubrics

#### **11. REVIEW AND CONTINUOUS IMPROVEMENT**

- Periodic monitoring of development progress
- Feedback from faculty and stakeholders
- Continuous improvement based on implementation outcomes

**PRINCIPAL**