

# **MECHANICAL ENGINEERING UNDERGRADUATE PROGRAM LEARNING OUTCOME - PROGRAM COMPETENCY ACHIEVEMENT LEVEL DETERMINATION PROCEDURES AND PRINCIPLES**

## **1. Purpose**

These procedures and principles define the method, responsibilities, and processes for determining the achievement level of course learning outcomes (LO) and program competencies (PC) in the Mechanical Engineering Undergraduate Program. The purpose is to ensure regular data collection, evaluation, and operation of the improvement process in line with the criteria of accreditation bodies.

## **2. Scope**

These procedures and principles cover all compulsory and elective courses in the program. For each course, the following studies are carried out in the relevant semester.

## **3. Definitions**

**Learning Outcome (LO):** Knowledge, skills, and attitudes targeted to be observed in the student at the end of the course.

**Program Competency (PC):** Knowledge, skills, and competences expected of program graduates.

**LO-PC Relationship Matrix:** A table showing which program competencies each course learning outcome is related to.

## **4. Method and Process**

### **4.1. Course Learning Outcomes and Program Competencies**

- 1 In the Education Information System (EBS), the learning outcomes of each course are reviewed and necessary corrections are made.
- 2 For each course, the LO-PC relationship matrix is checked and updated when necessary.

### **4.2. Measurement and Evaluation**

- 1 Outcome-Question Matching: Each question/group in an exam, assignment, or project is matched with the "course learning outcome(s) (LO)" it measures. (See Appendix-1: Entry steps through the system)
- 2 Scoring: Student responses to questions measuring each outcome are scored.
- 3 Outcome Percentage: For each outcome, the outcome achievement percentage is calculated using the sum of the points obtained from the questions measuring that outcome.
- 4 Course Percentage: By combining the percentages of all outcomes, the overall LO achievement percentage of the course is obtained.
- 5 Transfer to PC: Course LO percentages are converted into program competency (PC) percentages via the LO-PC relationship matrix.

- Click for the calculation method.

### **4.3. Evidence to be Collected**

Each course instructor uploads the following evidence to the system:

- Up-to-date course syllabus
- Relevant exam papers or assignment samples (including student work at good, medium, weak levels)
- Answer key or rubric
- Example of course content/course materials
- Evaluation results table (LO achievement percentages)

### **4.4. Program-Level Calculation**

- 1 At the end of the relevant academic term, the program competency achievement level of the department is calculated by combining the data of all courses.
- 2 Results are evaluated in the Department/Division Board.

### **4.5. Improvement Plan**

- 1 LOs or PCs with low achievement levels are identified.
  - 2 Improvement proposals for these areas are prepared (e.g., diversifying teaching methods, developing materials, additional activities, etc.).
  - 3 Improvement plans are recorded and monitored through PUSULA Quality Management Information System > PDCA Processes Module.
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- 1 Exam/assignment/project questions are matched with the relevant Learning Outcomes (LO).
  - 2 Questions measuring each outcome are scored on a question basis.
  - 3 Scores are converted into outcome achievement percentages.
  - 4 The LO percentage is calculated at course level for all outcomes.
  - 5 LO percentages are transferred to PC percentages via the relationship matrix.

## 5. Responsibilities

- **Course instructor:** Make the course LO-PC matching, associate exams/assignments with outcomes, upload evidence.
- **Program Coordinator:** Perform program-level calculations, prepare the report.
- **Department Chair:** Approve the report, publish it on the web page under the title “Program Self-Assessment>LO-PC Achievement Level”, and notify the Dean’s Office.

## Appendix-1: Steps for Actions Through the System

- 1 Log in to the Pusula Information System.
- 2 In the “Faculty Member Operations” tab in the “Student Information System”, click on “LO-End-of-term exam questions”.
- 3 Select the relevant term information (e.g., 2024-2025 Spring).
- 4 From the listed courses, click the “Edit” button next to the relevant course.
- 5 Enter the number of questions for the end-of-term exam and press the “Select” button.
- 6 For each question or assessment section, mark the relevant Learning Outcome level, then click the Save button.
- 7 Repeat these steps for all courses and sections.
- 8 From the Reports menu, open the “Learning Outcomes Statuses” tab.

- 9 When you select the Student Outcome Status List, the report viewing page opens. Enter the Unit / Program / Term / Course and Section information to view the department average.
- 10 You can perform the same operations for Assignment/Project via the "Technical Trip/Project" entry.
- 11 Based on the available information, in the PDCA text, article 4(d) (The level of achievement of learning outcomes should be calculated cumulatively at the end of the academic term according to the points students receive from exam questions) is calculated cumulatively.