

## **AU Course Outline**

### ***College of Engineering***

### ***Mechanical Engineering Department***

### ***MECH390 – Project 2 (PBL)***

### ***MECH22***

### ***Bachelor of Engineering Technology - Mechanical***

- Prerequisites: MECH290
- Co-Requisites: NA
- Credit Hours: 3
- Contact Hours: 3
- Course Coordinator:
- Instructor's Information:
- Classroom Location and timings<sup>1</sup>: Refer to the schedule on EduGate

**This course is part of the mentioned above program which is accredited by Engineers Australia.**

### **Catalog Description**

This course is designed to complement other courses in a Project Based Learning (PBL) teaching approach under the framework of Conceive, Design, Implement and Operate (CDIO). PBL is a teaching method in which students learn by actively engaging in real-world and meaningful projects. PBL courses are self-driven learning with the guidance of a facilitator. The main purpose of PBL courses is to train students to become more time-efficient and to enhance their project management skills towards accomplishing different tasks to successfully implement the requirements of a real-life engineering project. As a result, students develop technical content knowledge as well as critical thinking, collaboration, health and safety, risk assessments, problem solving, creativity and communication skills while maintaining engineering ethics and work practices.

### **Course Objectives and Student Learning Outcomes**

Upon completion of this course, students should be able to:

- ✓ **LO1:** Acquire required engineering and sustainability principles to solve well-defined real-world engineering project
- ✓ **LO2:** Evaluate and analyze project specifications to organize and prioritize project tasks effectively considering technical, environmental and economical aspects

---

<sup>1</sup> Classroom timings and location are tentative, please refer to EduGate for the up to date information.

## AU Course Outline

- ✓ **L03:** Synthesize compliant solutions that meet high standards and best practices in engineering.
- ✓ **L04:** Critically assess and refine engineering solutions through iterative evaluation to maximize efficiency and ensure robust compliance.
- ✓ **L05:** Manage project workflows and lead teams, facilitating high-level oral and written communication and collaboration

### Engineers Australia Stage 1 Competencies

Achieving the student learning outcomes of this course partially fulfills the following EA Stage 1 Competencies for an Engineering Technologist.

|                                      |                                                                                                                                                                    |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Knowledge and Skills                 | 1.1 Systematic, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the technology domain. |
|                                      | 1.2 Conceptual understanding of the, mathematics, numerical analysis, statistics, and computer and information sciences which underpin the technology domain.      |
|                                      | 1.3 In-depth understanding of specialist bodies of knowledge within the technology domain.                                                                         |
|                                      | 1.4 Discernment of knowledge development within the technology domain.                                                                                             |
|                                      | 1.5 Knowledge of engineering design practice and contextual factors impacting the technology domain.                                                               |
|                                      | 1.6 Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice in the technology domain.                       |
| Engineering Application Ability      | 2.1 Application of established engineering methods to broadly-defined problem solving within the technology domain.                                                |
|                                      | 2.2 Application of engineering techniques, tools and resources within the technology domain.                                                                       |
|                                      | 2.3 Application of systematic synthesis and design processes within the technology domain.                                                                         |
|                                      | 2.4 Application of systematic approaches to the conduct and management of projects within the technology domain.                                                   |
| Professional and Personal Attributes | 3.1 Ethical conduct and professional accountability.                                                                                                               |
|                                      | 3.2 Effective oral and written communication in professional and lay domains.                                                                                      |
|                                      | 3.3 Creative, innovative and pro-active demeanor.                                                                                                                  |
|                                      | 3.4 Professional use and management of information.                                                                                                                |
|                                      | 3.5 Orderly management of self, and professional conduct.                                                                                                          |
|                                      | 3.6 Effective team membership and team leadership.                                                                                                                 |

## AU Course Outline

### Delivery Plan

Below are the topics that will be covered during this course<sup>2</sup>. Please note that topics are tentative to change.

| Week  | Topic                                                     | Learning Outcome |
|-------|-----------------------------------------------------------|------------------|
| 1-2   | Groups formation & identification of project requirements | LO1-2            |
| 3-4   | Project Plan & Sustainability                             | LO1-5            |
| 5-10  | Implementing Sustainable Project Solution                 | LO1-5            |
| 11-12 | Final Troubleshooting                                     | LO1-5            |
| 13-14 | Final Submission & Viva-Voce                              | LO 1-5           |

### Methods of Delivery

This course will be delivered through a face-to-face delivery method as a Project Based Learning (PBL) course which is briefly described as follows:

- ✓ A project is provided to the students at the early beginning of the semester.
- ✓ Students will be divided into groups. Group members are supposed to work together during the semester to come up with a solution(s) for the project.
- ✓ Students are expected to carry out teamwork during the scheduled class sessions. During class sessions, students will receive feedback (formative assessment) on their project work and progress.
- ✓ Students are majorly and solely responsible of solving the problems that may arise during the preparation of their projects. They should be self-dependent and try to find out the cause of these problems as well as solutions.
- ✓ Students may consult people from the industry, software engineer experts, or any other party that might help to achieve their goal upon the approval of the facilitator. They may also use the web to find resources that can help in answering their questions. All meeting agendas and meeting minutes with experts must be documented as evidence. However, work carried out by practitioners will not be accepted and will lead to a zero mark on the assessment(s) in question.
- ✓ In all cases, the students must build the project with their own hands since their knowledge and understanding of all LOs covered by the project will be assessed (as per the detailed assessment plan provided later in this document).

<sup>2</sup> For the Summer Sessions, number of lectures per week is doubled and number of weeks is halved.

## AU Course Outline

- ✓ Students should not consult their facilitator before trying to personally solve any project related issue. The instructor of a PBL is a facilitator who guides all groups to achieve their goal and not as a direct expert consultant.
- ✓ Students are requested to record their meetings and are also requested to reflect on their learning continuously. Meeting details should be kept as a record of activity in every MS Teams group.
- ✓ Every student's work should be documented in the MS Teams group. No other communication platform will be considered in the grading process.
- ✓ The students are also required to submit deliverables online as specified by their facilitator and are required to stick to the corresponding defined deadlines. All deliverables are submitted via the course homepage on EduLearn unless announced otherwise by the facilitator.

### Extent and Nature of Use of Technology

The students would be required to use computer and communication systems to facilitate the achievement of their projects such as search engines, databases, e-libraries, word processors, presentation software, etc.

The students are recommended to use MS Project for their project plan.

Course-related announcements are also sent by email to the students or announced on EduLearn. The students are required to check the course home page and their email daily throughout the week.

### Textbook/s

For this course, some handouts will be uploaded to the students on the course's page on EduLearn. However, as a PBL course, the students are required to go beyond this material. For instance, the following textbook would be very useful:

“Project-Based Learning: Differentiating Instruction for the 21st Century”, 2nd Edition, by William N. Bender, ISBN 978-1412997904.

“The Project Management Toolkit: Tools and Techniques for the Practicing Project Manager”, 3rd Edition, by Trish Melton, ISBN 978-1856178131.

### Attendance

The student is required to attend designated live sessions on campus. A student who fails to do so will be marked as absent from that class.

Please refer to the AU Student Attendance Policy and Procedure on the [AU Portal](#).

## AU Course Outline

### Submission of Work

All students' submissions must be free of plagiarism. AU has zero tolerance for Academic Dishonesty and is committed to dealing with all incidents promptly, effectively and with the principles of procedural fairness. Please refer to the AU Code of Academic Integrity on the [AU Portal](#).

### Assessment Plan

The assessments' dates are subject to change according to the material coverage page.

| # | Assessment Title           | Method of Assessment              | Learning Outcomes Covered | Week | Weight |
|---|----------------------------|-----------------------------------|---------------------------|------|--------|
| 1 | Deliverables               | Online submissions                | LO1-5                     | 1-6  | 15%    |
| 2 | Presentation               | Viva-Voce                         | LO1-5                     | 6-8  | 15%    |
| 3 | Comprehensive Evaluation   | Verbal Examination                | LO1-5                     | 7-14 | 30%    |
| 4 | Portfolio                  | Online Submissions                | LO1-5                     | 12   | 30%    |
| 5 | Attendance & Participation | In Class Participation/Attendance | LO1-5                     | 1-14 | 10%    |

\* Late submissions will be penalized by 10%-mark deduction for each day of late submission. No submissions are allowed after three days of the deadline. Each submission might be subject to one-to-one or group discussions as part of its grade.

\* A student who misses an in-class assessment (quiz, in-class group work, in-class assignment, etc.) of a weight of 10% or less will not be eligible for makeup and will be automatically awarded a zero mark.

**Students must refer to the AU Student Assessment Policy on the [AU Portal](#) with regards to assessments and re-assessment.**

### Grading Scale

Please refer to the AU Grading Policy on the [AU Portal](#).