

MSE3244: DESIGN LABORATORY

Effective Term

Semester A 2024/25

Part I Course Overview

Course Title

Design Laboratory

Subject Code

MSE - Materials Science and Engineering

Course Number

3244

Academic Unit

Materials Science and Engineering (MSE)

College/School

College of Engineering (EG)

Course Duration

One Semester

Credit Units

3

Level

B1, B2, B3, B4 - Bachelor's Degree

Medium of Instruction

English

Medium of Assessment

English

Prerequisites

Nil

Precursors

AP2212/PHY2212 Measurement and Instrumentation

Equivalent Courses

AP3245 Design and Manufacturing Project

AP3244 Design Laboratory

Exclusive Courses

Nil

Part II Course Details

Abstract

The aim is to train student to acquire high-level laboratory skill, especially on experiment design, to prepare them to face open-end experimental situations in a professional environment.

Course Intended Learning Outcomes (CILOs)

CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Select an innovative engineering problem to solve.		x	
2	Design and implement engineering prototypes		x	
3	Analyze data to arrive at a scientific result, and if possible, interpret the result to review critically the theory behind, and/or to generalize the result to a wider situation		x	
4	Present the project idea clearly		x	

A1: Attitude

Develop an attitude of discovery/innovation/creativity, as demonstrated by students possessing a strong sense of curiosity, asking questions actively, challenging assumptions or engaging in inquiry together with teachers.

A2: Ability

Develop the ability/skill needed to discover/innovate/create, as demonstrated by students possessing critical thinking skills to assess ideas, acquiring research skills, synthesizing knowledge across disciplines or applying academic knowledge to real-life problems.

A3: Accomplishments

Demonstrate accomplishment of discovery/innovation/creativity through producing /constructing creative works/new artefacts, effective solutions to real-life problems or new processes.

Learning and Teaching Activities (LTAs)

LTAs		Brief Description	CILO No.	Hours/week (if applicable)
1	Lab	Large-scale engineering project. Students would: <ul style="list-style-type: none"> - perform literature and market review to select an innovative engineering problem/product idea - translate the above idea into a design that is technically feasible to be implemented in one semester - work, communicate, and resolve conflict with team members during the project - present their idea and progress to the instructor and in some cases external advisors to gain feedback - develop technical skills such as 3D printing, computer-aided design, test, and quality assurance skills - develop engineering prototypes to showcase various designed functionalities 	1, 2, 3, 4	

Assessment Tasks / Activities (ATs)

ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Final report and demonstration	1, 2, 3, 4	100

Continuous Assessment (%)

100

Examination (%)

0

Assessment Rubrics (AR)**Assessment Task**

1. Final report and demonstration

Criterion

1.1 CAPACITY to innovate

1.2 ABILITY to solve engineering problems

1.3 ABILITY to EXPLAIN engineering concepts

1.4 ABILITY to implement an idea into a prototype

Excellent (A+, A, A-)

High

Good (B+, B, B-)

Significant

Fair (C+, C, C-)

Moderate

Marginal (D)

Basic

Failure (F)

Not even reaching marginal levels

Part III Other Information

Keyword Syllabus

Physics measurement and investigation

Reading List

Compulsory Readings

Title	
1	Nil

Additional Readings

Title	
1	“Basic Electronics For Scientists” , James J Brophy, McGraw-Hill Internation Editions, 5th Edition, New York, 1990.
2	“The Art of Electronics” , Paul Horowitz and Winfield Hill, 2nd Edition, Cambridge University Press, New York, 1993.
3	“Electronic Workbench” , 5th Edition, Interactive Image Technologies Ltd., Toronto, 1996.