

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	BME21302/IC2117
Subject Title	Applied Engineering Fundamentals
Credit Value	2 Training Credits
Level	2
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject offers fundamental engineering techniques to students, project-based learning approach will be adopted in this subject aiming to enhance the problem-solving skills for all Year 1 students in the Engineering Faculty.
Intended Learning Outcomes	Upon completion of the subject, students will: a) Be able to demonstrate an understanding of engineering design b) Develop their problem-solving ability and global outlook c) Be able to demonstrate an understanding on typical engineering material properties and basic prototyping and joining processes
Subject Synopsis/ Indicative Syllabus	<ol style="list-style-type: none"> Engineering Design and Prototyping Processes Engineering design concept, prototyping for design verification, digital modelling, measurement techniques, standard components. Basic Prototyping techniques; 3D Printing, Laser Cutting and standard components. Engineering material; polymers, metal, composite, surface treatment processes; painting, plating. Application of adhesives and mechanical parts in joint of material. Fundamental Engineering Projects There will be practical workshops, project briefing and demonstration sessions for the project which aim at developing students' creativity and problem-solving skills through practical and hands-on tasks at a level commensurate with their first-year engineering backgrounds. Students will work in small groups under the guidance of teachers/instructors to design and implement an engineering solution to some given problems.
Teaching/ Learning Methodology	<p><u>Mini Lectures</u> The Mini lectures are aimed at providing students the basic knowledge and concept about engineering design and the common processing technique for prototyping and design verification</p> <p><u>Workshop Tutorials</u> The workshop tutorials focus on deepening students' knowledge and enhancing their ability to apply concepts and skills to complete specific tasks. The practical works aim to reinforce learning by enabling students to explore the diverse topics covered in the course through active engagement in research, practice, questioning, and problem-solving in an integrated and hands-on manner.</p>

	<u>Fundamental Engineering Project</u> For the fundamental engineering project, students will be required to design and develop an engineering solution to a given problem under the guidance of instructors. Students will be given opportunities to develop creativity, problem-solving skills and research for information from this project.				
Assessment Methods in Alignment with Intended Learning Outcomes (Note 4)	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)		
			a	b	c
	1. Assignments	80	✓	✓	✓
	2. Quizzes	20	✓		✓
	Total	100			
	Assignments are designed to enable students to periodically reflect upon and apply the knowledge acquired throughout the training. Quizzes are designed to facilitate students to review the breadth and depth of their understanding on specific topics.				
Student Study Effort Expected	Class Contact				
	▪ Mini lecture, In-class Assignments and project works		60 Hrs.		
	Other Student Study Effort		0 Hrs.		
	Total Student Study Effort		60 Hrs.		
Reading List and References	1) Training material, manual and articles published by Industrial Centre. 2) “Engineering fundamentals & problem solving” (2012) A. R. Eide, New York, NY: McGraw-Hill				
Last Updated	January 2025				