BME2109: ENGINEERING MECHANICS

Effective Term
Semester B 2024/25

Part I Course Overview

Course Title
Engineering Mechanics

Subject Code
BME - Biomedical Engineering
Course Number
2109

Academic Unit
Biomedical Engineering (BME)

College/School
College of Biomedicine (BD)

Course Duration
One Semester

Credit Units
3

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

Medium of Instruction
English

Medium of Assessment
English

Prerequisites
PHY1201 General Physics I

Precursors
Nil

Equivalent Courses
Nil

Exclusive Courses
Nil

Additional Information
Prerequisites which are not part of the Major Requirement are waived for students admitted with Advanced Standing and for BME students with A/AS-level Physics, HKDSE Physics with Level 3 or above, or equivalent admitted with Advanced Standing.

Part II Course Details

Abstract

This course provides basic knowledge of engineering mechanics covering the topics including statics of particles, equilibrium of rigid bodies, distributed forces, analysis of structures, kinematics and kinetics of particles, system of particles, kinematics of rigid bodies, plane motion of rigid bodies and kinetics of rigid bodies in three dimensions.

Course Intended Learning Outcomes (CILOs)

	CILOs	Weighting (if app.)	DEC-A1	DEC-A2	DEC-A3
1	Describe the fundamental concepts of engineering mechanics and their impacts on the static and dynamic behaviour of structures subject to forces or displacements.			x	
2	Apply the taught techniques to solve a problem of engineering mechanics which involves loading and motion using given principals.			x	
3	Justify relevant principles to obtain the solutions for mechanical problems.			x	
4	Demonstrate the presentation of analyses and results of experiments in a proper format of a written report such that a technically-qualified person can follow and obtain similar findings.			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	Lecture	Students will develop an understanding on different topics of engineering mechanics and applications accompanied by in-class activities.	1, 2, 3	3 hrs/week

2	Laboratory	Students will engage in laboratory exercises on different topics of experimental techniques and applications. Students will discuss the results obtained from the experiments.	3, 4	3 hrs/week for 2 weeks

Assessment Tasks / Activities (ATs)

	ATs	CILO No.	Weighting (%)	Remarks (e.g. Parameter for GenAI use)
1	Test and Assignments	1, 2, 3	20	2-3 assignments to be submitted
2	Laboratory Reports	3, 4	20	2 reports to be submitted

Continuous Assessment (%)

40

Examination (%)

60

Examination Duration (Hours)

3

Assessment Rubrics (AR)

Assessment Task

1. Test and Assignments

Criterion

Describe the fundamental concepts of engineering mechanics and apply them to solve problems with given principles.

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

Assessment Task

2. Laboratory Reports

Criterion

Ability to explain the methodology and procedure and analyse the experimental data and discuss the experimental findings.

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

Assessment Task
3. Examination

Criterion
Describe the fundamental concepts of engineering mechanics and apply them to solve the problems that involve loading and motion.

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
Statics of Particles; Rigid Bodies; Equivalent Systems of Forces; Distributed Forces; Centroids and Moment of Inertia; Equilibrium of Rigid Bodies; Friction; Kinematics and Kinetics of Particles; Newton’ s Second Law; Energy and Momentum Method; Systems of Particles; Plane Motion of Rigid Bodies; Kinetics of Rigid Bodies in Three Dimensions; Mechanical Vibration

In addition to the examination and in-class test, students are required to learn through collaborative lab sessions in order to improve their understanding on strategic thinking, problem solving, team working processes, the relationships and interactions between the fields of knowledge that they have learnt in this and other courses.

Reading List

Compulsory Readings

	Title
1	Ferdinand P. Beer, E. Russell Johnston, David F. Mazurek, Phillip J. Cornwell, Vector Mechanics for Engineers: Statics and Dynamics, McGraw-Hill.

Additional Readings

	Title
1	J.L. Meriam, L.G. Kraige, Engineering Mechanics: Dynamics, John Wiley & Sons, Inc., 2012.
2	Russell C. Hibbeler, Engineering Mechanics: Statics & Dynamics, Prentice Hall, 2012.