City University of Hong Kong
Course Syllabus

offered by

Department of Mechanical Engineering
with effect from Semester A 2019 / 2020

Part I Course Overview

Course Title:	Mechanics
Course Code:	MNE2003
Course Duration:	1 semester
Credit Units:	3 credits
Level:	B2
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites[#]: *(Course Code and Title)*	AP1201/PHY1201 General Physics I
Precursors: *(Course Code and Title)*	Nil
Equivalent Courses: *(Course Code and Title)*	MBE2003 Mechanics **or** MBE2109/BME2109/MNE2109 Engineering Mechanics
Exclusive Courses: *(Course Code and Title)*	MBE2040/MNE2040 Basic Mechanical Engineering Principles **or** MBE2107/MNE2107 Basics of Mechanical Engineering

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

Part II Course Details

1. Abstract

(A 150-word description about the course)

Engineers plan, analyse, design and build anything that may move and sustain load – products range from toys to automobiles and aircrafts. They employ an energy source and convert it into mechanical motions in machines such as robots or pumps. This course aims to lay down the foundations of mechanical engineering principles in such a way that the students can identify the appropriate concepts required in given engineering problems and apply them to formulate the suitable engineering solutions. In addition, the course also aims to develop students' engineering report writing skill.

2. Course Intended Learning Outcomes (CILOs)

(CILOs state what the student is expected to be able to do at the end of the course according to a given standard of performance.)

No.	CILOs	Weighting* (if applicable)	Discovery-enriched curriculum related learning outcomes (please tick where appropriate)		
			A1	*A2*	*A3*
1.	**Describe** the basic principles of kinematics and kinetics of machines and the fundamental concepts of stress and strain analysis.			√	
2.	**Solve** a mechanical problem which involves loading and motion using given principals.			√	
3.	**Select** relevant principles to obtain the solutions for mechanical problems.			√	
4.	**Present** 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.			√	
** If weighting is assigned to CILOs, they should add up to 100%.*		N.A.			

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 self-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.

3. Teaching and Learning Activities (TLAs)

(TLAs designed to facilitate students' achievement of the CILOs.)

TLA	Brief Description	CILO No.				Hours/week (if applicable)
		1	2	3	4	
Lecture	Explain key concepts and theories on kinematics and kinetics of machines, and solid mechanics.	✓	✓	✓		4 hrs/week for two days (10 weeks)
Laboratory Work	Investigate concepts through hand-on experiments; Acquire skills in handling of apparatus and in engineering report write up; Promote active participation.	✓	✓	✓	✓	3 hrs/week for 4 weeks

4. Assessment Tasks/Activities (ATs)

(ATs are designed to assess how well the students achieve the CILOs.)

Assessment Tasks/Activities	CILO No.				Weighting*	Remarks
	1	2	3	4		
Continuous Assessment: 40%						
Tests and Assignments	✓	✓	✓		20%	Mid-term test and 2 assignments
Laboratory Reports	✓	✓	✓	✓	20%	3-4 reports to be submitted
Examination: 60% (duration: 3 hours)						
** The weightings should add up to 100%.*					100%	

For a student to pass the course, at least 30% of the maximum mark for both coursework and examination should be obtained.

5. Assessment Rubrics

(Grading of student achievements is based on student performance in assessment tasks/activities with the following rubrics.)

Assessment Task	Criterion	Excellent (A+, A, A-)	Good (B+, B, B-)	Fair (C+, C, C-)	Marginal (D)	Failure (F)
1. Tests and Assignments	Ability to solve given mechanical problems and provide correct numerical answers.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Laboratory Reports	2.1 Capacity for self-learning to understand the principles of mechanics through performing experiments by following instructions given. 2.2 Ability to analyse and present the results of experiments in the proper technical report format.	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Examination	3.1 Ability to explain the basic principles and fundamental concepts of engineering mechanics. 3.2 Capacity for analysing and solving given mechanical problems using relevant and appropriate formulae.	High	Significant	Moderate	Basic	Not even reaching marginal levels

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

(An indication of the key topics of the course.)

- Statics and Dynamics:
  - Vectors,
  - Static equilibrium,
  - Kinematics and kinetics of particles,
  - Plane kinematics and kinetics of rigid bodies,
  - Energy.
- Stress and Strain Analysis: Direct and shear stresses. 2D stress and strain systems. Principal planes, stresses and strains. Mohr's circle.
- Elastic Loading: Bending and torsion. Shear centre. Combined bending and torsion.
- Deflection of beams: Macaulay's method. Moment-area method. Simply supported, cantilever, built-in and continuous beams.
- Cylinders and spheres: Thin walled cylinders and shells.
- Deflection of simple beams. Castigliano's theorem.

2. Reading List

2.1 Compulsory Readings

(Compulsory readings can include books, book chapters, or journal/magazine articles. There are also collections of e-books, e-journals available from the CityU Library.)

2.2 Additional Readings

(Additional references for students to learn to expand their knowledge about the subject.)

1.	Vector Mechanics for Engineers – Dynamics 10th edition, Beer Johnston, McGraw Hill.
2.	Vector Mechanics for Engineers – Statics 10th edition, Beer Johnston, McGraw Hill.
3.	Engineering Mechanics – Dynamics 11th edition, Hibbeler, Prentice Hall.
4.	Engineering Mechanics – Statics 11th edition, Hibbeler & Fan, Prentice Hall.
5.	Mechanics of Materials, Gere, Brooks/Cole.
6.	Mechanics of Material, Beer, Johnston, De Wolf, Mazurek, McGraw Hill.