

**City University of Hong Kong  
Course Syllabus**

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

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**Part I Course Overview**

<b>Course Title:</b>	Basics of Mechanical Engineering
<b>Course Code:</b>	MNE2107
<b>Course Duration:</b>	1 semester
<b>Credit Units:</b>	2 credits
<b>Level:</b>	B2
<b>Medium of Instruction:</b>	English
<b>Medium of Assessment:</b>	English
<b>Prerequisites#:</b> (Course Code and Title)	MA1201 Calculus and Basic Linear Algebra II <b>or</b> MA1301 Enhanced Calculus and Linear Algebra II
<b>Precursors:</b> (Course Code and Title)	Nil
<b>Equivalent Courses:</b> (Course Code and Title)	MBE2107 Basics of Mechanical Engineering
<b>Exclusive Courses:</b> (Course Code and Title)	MBE2016/MNE2016 Engineering Graphics <b>or</b> MBE2003/MNE2003 Mechanics <b>or</b> MBE2040/MNE2040 Basic Mechanical Engineering Principles <b>or</b> MBE2109/BME2109/MNE2109 Engineering Mechanics

**#Waived for students admitted with Advanced Standing if the course is not a College-specified course**

## Part II Course Details

### 1. Abstract

(A 150-word description about the course)

The aim of this course is to introduce to students basic concepts of engineering drawing and mechanical systems in the mechanical engineering field. Upon successfully completing this course, students should acquire the following learning outcomes:

- (i) **Use** the medium of drawings in engineering communications.
- (ii) **Demonstrate** skills in interpreting, and producing engineering drawings accurately and efficiently; and
- (iii) **Demonstrate** skills in computer-aided-draughting to produce detailed 2D drawings.
- (iv) **Describe** the basic principles of steady state fluid flow, heat transfer and the fundamental concepts of stress and strain analysis.
- (v) **Describe** the basic principles of machine tools, hydraulic devices and heat engines.

### 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.	<b>Explain</b> the role of drawings in engineering communications.			✓	
2.	<b>Demonstrate</b> skills in interpreting and producing engineering sketch drawings of engineering artefacts.			✓	
3	<b>Describe</b> the basic principles of steady state fluid flow, heat transfer and the fundamental concepts of stress and strain analysis.			✓	
4	<b>Describe</b> the basic principles of machine tools, hydraulic devices and heat engines.			✓	
		N.A.			

\* If weighting is assigned to CILOs, they should add up to 100%.

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, such as orthographic projection and sectioning, basic principles of machine tools, hydraulic devices and heat engines etc., related to basics of mechanical engineering.	✓	✓	✓	✓	2 hrs/week
Laboratory work	1. Learn and use CAD softwares to do assignment on engineering drawings. 2. Investigate concepts through hand-on experiments; acquire skills in handling of apparatus and in engineering report write up; related to basics of mechanical engineering.	✓	✓	✓	✓	3 hrs/week for 4 weeks only

### 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: 50%						
Tests	✓	✓	✓	✓	20%	2 tests
Assignments	✓	✓	✓	✓	20%	2-3 assignments to be submitted
Laboratory Reports			✓	✓	10%	2 reports to be submitted
Examination: 50% (duration: 2 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	1.1 Describe the role of drawings in engineering communications. 1.2 Demonstrate skills in interpreting and producing basic engineering sketch drawings. 1.3 Explain and use basic principles of mechanical engineering in products and systems used in day-to-day life.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Assignments	2.1 Ability to demonstrate skills in interpreting, and producing engineering drawings accurately and efficiently. 2.2 Ability to demonstrate skills in computer-aided-drawing to produce detailed engineering drawings. 2.3 Ability to explain and solve given mechanical problems. 2.4 Ability to describe the basic principles of machine tools, hydraulic devices and heat engines.	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Laboratory Reports	3.1 Capacity for self-learning to understand the principles of mechanics through performing experiments by following instructions given. 3.2 Ability to analyse and present the results of experiments in the proper technical report format.	High	Significant	Moderate	Basic	Not even reaching marginal levels
4. Examination	4.1 Demonstrate skills in interpreting and producing basic engineering sketch drawings. 4.2 Explain and use basic principles of mechanical engineering in products and systems used in day-to-day life.	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.)*

Use of Engineering Design Drawing. Orthographic projection: 1st and 3rd angle. Sectioning and assembly drawings. Isometric Projection. Dimensioning. Standard symbols on a working drawing.

Engineering materials and their mechanical properties. Stresses and strains. Introduction to measurement and machine tools. Basic concept of fluid mechanics: water turbines, pumps and hydraulic devices. Basic concept of thermodynamics: refrigeration and air-conditioning. Reciprocating machines.

#### 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.)*

1.	M.A. Parker and F. Pickup, Engineering Drawing with Worked Examples, Part 1, 3rd or later edition, Stanley Thornes Ltd.
2.	T. Gupta and B.C. Sharma, Basic of Mechanical Engineering, Satya Prakashan.

##### 2.2 Additional Readings

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

1.	W.J. Luzadder, Fundamentals of Engineering Drawing for Design, Product Development and Numerical Control, Prentice-Hall.
2.	James H. Earle, Engineering Design Graphics, Addison Wesley.
3.	P.K. Nag, K Tripathi and C.B. Pawar, Basic Mechanical Engineering, Tata McGraw-Hill.
4.	V.N. Phadkule, K.B. Kale, A.A. Karad, R.S. Wale, Basic Mechanical Engineering, Technical Publications Pune.