

**City University of Hong Kong
Course Syllabus**

**offered by
Department of Biomedical Engineering
with effect from Semester A 2021 / 2022**

Part I Course Overview

Course Title:	<u>Biomedical Engineering CAD</u>
Course Code:	<u>BME3016</u>
Course Duration:	<u>1 semester</u>
Credit Units:	<u>3 credits</u>
Level:	<u>B3</u>
Medium of Instruction:	<u>English</u>
Medium of Assessment:	<u>English</u>
Prerequisites: <i>(Course Code and Title)</i>	<u>Nil</u>
Precursors: <i>(Course Code and Title)</i>	<u>Nil</u>
Equivalent Courses: <i>(Course Code and Title)</i>	<u>BME2016 Biomedical Engineering CAD</u>
Exclusive Courses: <i>(Course Code and Title)</i>	<u>MNE2016 Engineering Graphics</u>

Part II Course Details

1. Abstract

(A 150-word description about the course)

The aim of this course is to introduce students the basic concepts and use of Computer Aided Drawing/Design (CAD) in the biomedical engineering field. Upon successful completion of this course, students should acquire the following learning outcomes:

- (i) **Use** the medium of drawings in engineering communications;
- (ii) **Describe** the general principles involved in the use of engineering drawing;
- (iii) **Demonstrate** skills in interpreting, and producing engineering drawings accurately and efficiently;
- (iv) **Demonstrate** skills in computer-aided-draughting to produce detailed 2D and 3D drawings; and **Design** biomedical engineering products using CAD tools, with engineering drawings as the medium of effective communication with colleagues in a community for the students' future career.

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.	Use the medium of drawings in engineering communications.			✓	
2.	Describe the general principles involved in the use of engineering drawing.			✓	
3.	Demonstrate skills in interpreting, and producing engineering drawings accurately and efficiently.			✓	
4.	Demonstrate skills in computer-aided-draughting to produce detailed 2D and 3D drawings.			✓	
5.	Design biomedical engineering products using CAD, with engineering drawings as the medium of effective communication with colleagues in a community for the students' future career.			✓	
		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	5	
Lecture	Explain key concepts, such as orthographic projection, etc., related to engineering communications and drawing. CAD software tool demonstration and practice in class.	✓	✓	✓			1.5 hrs/week
Tutorial	Learn and Apply CAD software to do assignments.			✓	✓	✓	1 hr/week
Laboratory	Design a biomedical engineering product and draw the design by CAD.			✓	✓	✓	3 hrs 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	5		
Continuous Assessment: 100%							
Tests	✓	✓	✓		✓	60%	3 in-class tests during the semester
Lab assignments			✓	✓	✓	20%	4 computer-based drawing assignments
Project			✓	✓	✓	20%	1 project about biomedical product for presentation
Examination: 0%							

* The weightings should add up to 100%.

100%

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)
Tests	1.1 Ability to use the medium of drawings in engineering communications.	High	Significant	Moderate	Basic	Not even reaching marginal levels
	1.2 Ability to describe the general principles involved in the use of engineering drawing.					
	1.3 Ability to demonstrate skills in interpreting, and producing engineering drawings accurately and efficiently.					
Lab Assignments	2.1 Ability to demonstrate skills in interpreting, and producing engineering drawings accurately and efficiently.	High	Significant	Moderate	Basic	Not even reaching marginal levels
	2.2 Ability to demonstrate skills in computer-aided-draughting to produce detailed 2D and 3D drawings.					
Project	3.1 Ability to design a biomedical product by using CAD.	High	Significant	Moderate	Basic	Not even reaching marginal levels
	3.2 Ability to communicate the product details with others by using CAD in the presentation.	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 Computer for Engineering Design Drawing. Conventional Representation of Standard Features. Orthographic Projection: 1st and 3rd angle. Isometric View and Oblique Projection. Standard Symbols on a Working Drawing. Dimensioning and tolerance applications. Sectioning. Assembly Drawing. Solid Modelling. 2D and 3D computer-aided-draughting software.

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.	Bertoline, G., Wiebe, E., Hartman, N., Ross, W., Fundamentals of Graphics Communication, 7 th edition, McGraw Hill, 2018.
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2.2 Additional Readings

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

1.	Giesecke, F.E., Mitchell, A., Spencer, H.C., Hill, I.L., Dygdon, J.T., Novak, J.E., Loving, R.O., Lockhart, S., Johnson, C., Technical Drawing with Engineering Graphics, Pearson.
2.	M.A. Parker and F. Pickup, Engineering Drawing with Worked Examples, Part 1, Stanley Thornes Ltd.
3.	Chen T. G. et al, Gaoli, Engineering Graphics, 2015.