City University of Hong Kong
Course Syllabus

offered by
Department of Biomedical Engineering
with effect from Semester A 2020 / 2021

Part I Course Overview

Course Title:	Consumer Mechatronics
Course Code:	BME4006
Course Duration:	1 semester
Credit Units:	3 credits
Level:	B4
Medium of Instruction:	English
Medium of Assessment:	English
Prerequisites[#]: *(Course Code and Title)*	MBE2029/BME2029/MNE2029 Electrical and Electronic Principles I or equivalent
Precursors: *(Course Code and Title)*	MBE3010/MNE3010 Mechanical Design and MBE3049/MNE3049 Control Principles
Equivalent Courses: *(Course Code and Title)*	MBE4006 Consumer Mechatronics
Exclusive Courses: *(Course Code and Title)*	Nil

[#]Prerequisites which are not part of the Major Requirement are waived for students admitted with Advanced Standing.

Part II Course Details

1. Abstract

(A 150-word description about the course)

The aim of the course is to develop an awareness of the major issues and technologies in designing high-value-added, user-friendly, and eco-friendly mechatronic products.

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 design strategies, concepts and environmental factors, for the design of mechatronic products.			✓	
2.	**Explain** the technologies for the design of mechatronic products.			✓	
3.	**Recognize** the product design methodology and **understand** modelling techniques.		✓	✓	
4.	**Apply** the design methods and modelling techniques to design a simple mechatronic product/system.		✓	✓	✓
** 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	Lectures on the topics of the keyword syllabus The activities could include lectures, group discussion and watching relevant videos.	✓	✓	✓		2 hrs/week
Tutorial	Group projects are assigned to students for the investigation in relation to the CILOs. Students will discuss the projects during the tutorial period. The group assessment is based on the group presentation and the peer assessment.	✓	✓	✓	✓	1 hr/week
Self-study	Students are required to carry out self-study on webs and search appropriate information/data in conjunction with the lecturing materials to accomplish a set of given requirements. The work of the self-study will be presented as an individual report for assessment.	✓	✓	✓	✓	

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%						
Group Presentation		✓	✓	✓	25%	Involves periodic assignments while working on the project
Individual Report		✓	✓	✓	25%	Based on regular assignments
Examination: 50%						
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. Group Presentation	1.1 Ability to explain in detail and with accuracy methods of inquiry useful in analysing for the design of high-value-added, user-friendly, and eco-friendly mechatronic products. 1.2 Ability to assess the teamwork.	High	Significant	Moderate	Basic	Not even reaching marginal levels
2. Individual Report	Capacity for self-directed learning to understand the principles of consumer mechatronics.	High	Significant	Moderate	Basic	Not even reaching marginal levels
3. Examination	3.1 Ability to explain in detail the design principles of consumer mechatronics. 3.2 Ability to recognize and translate the product design methodology and modelling techniques. 3.3 Capacity for applying accuracy methods to the design of consumer mechatronic products.	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.)

- Product design and evaluation, SWOT Analysis and targeting.
- Systematic design, object-oriented analysis and dynamic modelling.
- Ergonomics in product design.
- Eco-product design consideration including RoHS and WEEE.
- Mechatronic products and systems, and positioning for a product design.
- Modelling techniques, block diagrams, frequency domain.
- Selection of actuator technologies such as motors and piezoelectric actuators.
- Selection of sensory technologies, such as displacement sensing, force sensing, strain gauges.
- Case study.

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.	Michael B. Histand and David G. Alciaytore, Introduction to Mechatronics and Measurement Systems, McGraw-Hill, 2007, ISBN 007-125407-2.
2.	J. Billingsley, Essentials of Mechatronics, John Wiley & Sons, 2006, ISBN 9780471723417.
3.	Devdas Shetty and Richard Kolk, Mechatronics System Design, CL Engineering, 2nd Edition, 2010.
4.	Kevin Otto and Kristin Wood, Product Design, Prentice-Hall, 2001.
5.	Stefanos Zenios, Josh Makower, et al, Biodesign: The Process of Innovating Medical Technologies, 2009, ISBN-13: 978-0521517423.