Form 2B

City University of Hong Kong

Information on a Course
offered by Department of Mechanical and Biomedical Engineering
with effect from Semester A in 2013/2014

Part I

Course Title: **Human Machine Interface**

Course Code: **MBE5108**

Course Duration: **One Semester**

No. of Credit Units: **3**

Level: **P5**

Medium of Instruction: **English**

Prerequisites: **Nil**

Precursors: **Nil**

Equivalent Courses: **Nil**

Exclusive Courses: **Nil**

Part II

1. Course Aims:

A human machine interface gives a user a visual display of what's going on in the controller and a way to interact with the system. The course aims to develop an understanding of the history and state-of-the-art of human machine interface technologies and the communication between machines and humans to let students identify the appropriate concepts required in given control problems and apply them to formulate the suitable engineering solutions. Upon completing the course, students should be able to:

- Understand the human machine interface technological integration of applying the principles and techniques to combine automated devices with mathematical and organizational tools to create complex systems for a rapidly expanding range of applications and human activities;
- manage and apply scientific methods for the design, implementation of user friendly user interface through hypermedia on automatic control system, mobile devices, the web, and desktop platforms; and
- evaluate the performance of the human machine interface with standard methods during an iterative design process to shorten the project schedules and decrease the budgets.

2. Course Intended Learning Outcomes (CILOs)

Upon successful completion of this course, students should be able to:

No.	CILOs	Weighting* (if applicable)
1	**Explain** the basic concepts and design mechanism of the human machine interface	1
2	**Understand** the scientific methods and design principles to different control objects and customize those generic concepts in meeting the needs of particular requirements	2
3	**Identify** the strategies and evaluation standards in satisfying a set of given requirements to user interface design	3
4	**Design** a user friendly user interface through hypermedia on automatic control system, mobile devices, the web, or desktop platforms	4

***Weighting ranging from 1, 2, 3 to indicate the relative level of importance in an ascending order.**

3. Teaching and Learning Activities (TLAs)

(Indicative of likely activities and tasks designed to facilitate students' achievement of the CILOs. Final details will be provided to students in their first week of attendance in this course)

Activity Type	Timetabled Activity (Hours per week)
Lecture/Tutorial Mix	Lecture mixed with tutorial (3)

CILO No.	Large class Activities	Group work Activities	Individual work Activities	Total Hours
	Lecture	Tutorial	(Self study)	L+T (+S)
CILO 1	3	1.5	(2.5)	4.5 (+ 2.5)
CILO 2	5	2.5	(4.5)	7.5 (+ 4.5)
CILO 3	8	4	(6)	12 (+ 6)
CILO 4	10	5	(7)	15 (+ 7)
Total	26	13	(20)	**39** (+ 20)

Large class activities:
Lectures on the topics of the keyword syllabus

Group work activities
Group projects are given 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.

Individual work activities

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)

(Indicative of likely activities and tasks designed to assess how well the students achieve the CILOs. Final details will be provided to students in their first week of attendance in this course)

Assessment Tasks / ILOs	Group presentation & peer assessment	Individual report	Examination (2 hrs)	Total (%)
CILO 1	2	2	7	11
CILO 2	3	3	10	16
CILO 3	7.5	7.5	15	30
CILO 4	12.5	12.5	18	43
Total (%)	25	25	50	100

Group presentation & peer assessment: 25% Marks
20% of the marks is based on the presentation and 5% is based on the peer assessment.

Individual report: 25% Marks
20% of the marks is based on the accomplishment of satisfying the given requirements and 5% is based on the self study of webs.

Examination: 50% Marks
2 hours.

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

5. Grading of Student Achievement:

To reflect the ILOs listed above, the coursework and the final exam will be designed in ways which require the students to demonstrate their understanding of each topic and to solve a specific problem by applying their knowledge in an integrative manner. Grading will be based on the students' ability to demonstrate their skills convincingly.

Grade Table

Letter Grade	Grade Point	Grade Definitions
A+ A A-	4.3 4.0 3.7	Excellent
B+ B B-	3.3 3.0 2.7	Good
C+	2.3	Adequate

C C-	2.0 1.7	
D	1.0	Marginal
F	0.0	Failure
P	-	Pass

Please refer to the SGS's website for more details.

Part III

Keyword Syllabus:

- Introduction to human machine interface; Programmable logic controller; Networked control systems;
- User friendly user interface; Hypermedia domains; User model; Knowledge management; Frameworks
- Evaluating Interface Designs; Managing Design Processes; Command and Natural Languages; Interaction Devices; Information Visualization; Societal and Individual Impact of User Interfaces

Recommended Reading:

Tyson Macaulay, Bryan L. Singer "Cybersecurity for Industrial Control Systems: SCADA, DCS, PLC, HMI, and SIS". CRC Press, 2 Feb, 2012.
Newman, W M & Lamming, M G "Interactive System Design". Addison-Wesley 1995.
Dix, Alan, et. al. "Human-Computer interaction". Pearson Education 2003.
Shneiderman, Ben; and Plaisant, Catherine "Designing the User Interface: Strategies for Effective Human-Computer Interaction". Fourth ed. Addison Wesley 2004.
Pearrow, Mark "Web site usability handbook". Charles River Media 2000.