Form 2B

City University of Hong Kong

Information on a Course
offered by Department of MBE
with effect from Semester B in 2014/2015

Part I

Course Title: **CAD/CAM Integration**

Course Code: **MBE6001**

Course Duration: **One Semester**

No. of Credit Units: **3**

Level: **P6**

Medium of Instruction: **English**

Prerequisites: **Nil**

Precursors: **Nil**

Equivalent Courses: **MEEM6001 CAD/CAM Integration**

Exclusive Courses: **Nil**

Note: Students may repeat a course, or an equivalent course, to improve course grade only if the previous course grade obtained is C or below.

Part II

1. Course Aims:

The aim of this course is to develop a comprehensive understanding of technology underlying Computer Aided Design and Manufacture. Students will learn how to apply CAD/CAM technology to solve design/manufacturing problems with a significant geometric component.

2. Course Intended Learning Outcomes (CILOs)

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

No.	CILOs	Weighting* (if applicable)
1.	**describe** the mathematical basis in the technique of representation of geometric entities including parametric curves and free-form surfaces.	2
2.	**describe** the basic theories and algorithms for solid modelling and other advanced representation schemes.	3
3.	**describe** the techniques in CNC toolpath computation for 3-axis and multi-axis machining, feature recognition and selected topics in advanced CAD/CAM applications.	3
4.	**apply** relevant techniques to **design** algorithms for simple CAD/CAM operations.	2
5.	**interpret** a design/manufacturing problem with a significant geometric component, **translate** it into an algorithmic problem, and **apply** relevant techniques to solve it.	2

***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/Laboratory Mix	Lecture (2); Tutorial (1)

TLAs	Large Class Activities	Small Group Activities	Total Hours
CILO 1	6	3	9
CILO 2	6	3	9
CILO 3	6	3	9
CILO 4	4	2	6
CILO 5	4	2	6
Total (hrs)	**26**	**13**	**39**

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)

ATs	Examination (2 hours)	Assignment/ Test	Mini-project	Total (%)
CILO 1	20	5	-	25
CILO 2	20	5	-	25
CILO 3	20	5	5	30
CILO 4	-	-	10	10
CILO 5	-	-	10	10
Total (%)	**60**	**15**	**25**	**100**

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:

Examination, test, mini-project and assignment will be numerically graded. The questions posed in these assessments will basically follow the CILOs and test students' attainments.

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+ C C-	2.3 2.0 1.7	Adequate
D	1.0	Marginal
F	0.0	Failure
P	-	Pass

Please refer to the SGS's website for details.

Part III

Keyword Syllabus:

CAD/CAM systems, Bezier, B-spline and NURBS for curve and surface modelling, subdivision-based modelling, CSG and B-Rep for solid modelling, algorithms for curve/curve intersection, curve/surface intersection and surface/surface intersection, algorithms for point membership classification and boundary evaluation, algorithms for 3-axis and multi-axis toolpath extraction, data processing for 3D printing.

Recommended Reading:

Lee K, “Principles of CAD/CAM/CAE”, Addison Wesley Longman, Reading Massachusettes, 1999.

David F. Rogers, “An Introduction to NURBS : with Historical Perspectives”, Academic Press, San Francisco, 2001.

Zeid I, “Mastering CAD/CAM with Engineering Subscription Card”, McGraw-Hill, 2004.

Computer-Aided Design Journal, Elsevier Science.