City University of Hong Kong

**Information on a Course
offered by Department of Electronic Engineering
with effect from Semester B 2012/13**

Part I

Course Title:	Signal Processing
Course Code:	EE5410
Course Duration:	One Semester (13 weeks)
No. of credits:	3
Level:	5
Medium of Instruction:	English

Prerequisites *(Course Code and Title)*:	Nil
Precursors *(Course Code and Title)*:	EE3008 Principles of Communications or EE3112 Signal Analysis or EE3210 Signals and Systems; or equivalent
Equivalent Course *(Course Code and Title)* :	Nil
Exclusive Courses: *(Course Code and Title)*:	Nil

Part II

Course Aims:

The aim of this course is to provide students with a solid foundation in signal processing, and to facilitate students to solve real-world problems by signal processing techniques.

Course Intended Learning Outcomes (CILOs)

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

No.	CILOs
1.	Recognize properties of continuous-time and discrete-time signals and systems.
2.	Explain the relationship among different transforms in signal processing.
3.	Analyse discrete-time systems and calculate system parameters using appropriate transforms.

4.	Design and realize digital filters.
5.	Apply signal processing techniques for solving science and engineering problems.

Teaching and learning Activities (TLAs)

(Indicative of the possible activities and tasks designed to facilitate students' achievement of the CILOs. Fine details will be provided for students upon the commencement of the course.)

CILO 1-5	Lecture, work-along examples, in-class exercise, tutorials, case study, mini-projects and assignments.

Case study and mini-projects are designed for students to apply the knowledge learned from the course to tackle real-world applications.

Timetabling Information

Pattern	**Hours**
Lectures:	26
Tutorials:	13

Assessment Tasks/Activities

(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)

	Type of assessment tasks	*Weighting (if applicable)*
Continuous Assessment	Assignments, Mini projects, Tests, and Case study	40%
Examination	Written examination	60% 2 hours

Remarks:. To pass the course, students are required to achieve at least 35% in course work and 35% in the examination.

Grading of Student Achievement:

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

Constructive Alignment with Programme Outcomes

PILO	How the course contribute to the specific PILO(s)
1,2,3	The course provides students with ample opportunities in acquiring knowledge of signal processing as well as applications of mathematics and engineering problem solving skills, which are central to the aims of this program.
4,5	Students are required to complete assignments designed to apply signal processing techniques for solving real-world problems. The analytical and research skills developed are central to the aims of this program.

Part III

Keyword Syllabus:

Analog and Digital Signal Analysis

Analog Signal Analysis, Sampling and Reconstruction of Continuous-Time Signals, z-Transform, Fourier Transform of Discrete-Time Signals, Discrete Fourier Transform, Fast Fourier Transform.

Design and Implementation of Digital Filters

Linear Time-Invariant Systems and Transform Analysis, Structure for Discrete-Time Systems, Design of FIR and IIR Filters, Implementation Considerations.

Selected Topics

Estimation Theory, Multirate Signal Processing, Optimal Linear Filters, Adaptive Filters, Spectral Analysis, Principal Component Analysis, Transform Coding, Sub-band Coding, and Wavelet Coding.

Recommended Reading:

Essential Reading
H.C.So, Digital Signal Processing: Foundations, Transforms and Filters, with Hands-on MATLAB Illustrations, McGraw-Hill, 2011

Supplementary ReadingA.V.Oppenheim and R.W.Schafer, Discrete-Time Signal Processing, 3rd Edition, Pearson, 2009

V.K.Ingle and J.G.Proakis, Digital Signal Processing Using Matlab, 2nd Edition, Nelson, 2007

S.K.Mitra, Digital Signal Processing: A Computer-Based Approach, 4th Edition, McGraw-Hill, 2011

J.G.Proakis and D.G.Manolakis, Digital Signal Processing: Principles, Algorithms and Applications, 4th Edition, Prentice-Hall, 2007

Online Resources (if any)

http://www.ee.cityu.edu.hk/~hcso/ee5410.html