

**City University of Hong Kong
Course Syllabus**

**offered by College/School/Department of Electronic Engineering
with effect from Semester B in 2017/2018**

Part I Course Overview

Course Title: Foundations of Digital Techniques

Course Code: EE1001

Course Duration: One Semester

Credit Units: 3

Level: B1

Proposed Area:
(for GE courses only)

Arts and Humanities

Study of Societies, Social and Business Organisations

Science and Technology

Medium of Instruction: English

Medium of Assessment: English

Prerequisites:
(Course Code and Title) Nil

Precursors:
(Course Code and Title) Nil

Equivalent Courses:
(Course Code and Title) Nil

Exclusive Courses:
(Course Code and Title) Nil

Part II Course Details

1. Abstract

This course is aimed at providing students with an understanding of the basic mathematical and fundamental concepts required for Foundations of Digital Techniques.

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.	Apply symbolic logic to determine the validity of arguments.		✓	✓	
2.	Describe the basic concepts of set theory.		✓	✓	
3.	Apply methods of proof to determine and demonstrate the truth or falsity of mathematical statements.		✓	✓	
4.	Manipulate numbers in binary form for digital system.		✓	✓	
5.	Use Boolean function to represent logic operation of digital circuit.		✓	✓	
6.	Design simple logic circuit with minimization techniques		✓	✓	
		100%			

* If weighting is assigned to CILOs, they should add up to 100%.

[#] Please specify the alignment of CILOs to the Gateway Education Programme Intended Learning outcomes (PILOs) in Section A of Annex.

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	Large group in-class activity involving the entire class	✓	✓	✓	✓			10 weeks of 2 hrs Lecture
Tutorial	Discussion and demonstration activities	✓	✓	✓	✓			13 weeks of 1 hr Tutorial
Laboratory	Apply and practise the skills for circuit implementation			✓	✓			2 hours/week for 3 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				
<u>Continuous Assessment: 40%</u>								
Quiz/at least 3 assignments (laboratories, assignments, etc)	✓	✓	✓	✓			40%	
<u>Examination: 60%</u>								
Examination (duration: 2hrs , if applicable)	✓	✓	✓	✓			60%	
<i>* The weightings should add up to 100%.</i>							100%	

Remark:

To pass the course, students are required to achieve at least 30% in the coursework and 30% in the examination. Also, 75% laboratory attendance rate must 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)
Examination	Achievements in CILOs	High	Significant	Moderate	Basic	Not even reaching marginal levels
Coursework	Achievements in CILOs	High	Significant	Moderate	Basic	Not even reaching marginal levels

6. Constructive Alignment with Major Outcomes
(Please state how the course contribute to the specific MILO(s))

MILO	How the course contribute to the specific MILO(s)
1	Apply knowledge of mathematics, science and engineering.
2	Design and conduct experiments as well as to analyze and interpret data.
3	Design a system, component, or process that conforms to a given specification within realistic constraints.
5	Identify, evaluate, formulate and solve engineering problems.
7	Communicate effectively.
10	Use necessary engineering tools.

Part III Other Information (more details can be provided separately in the teaching plan)

1. Keyword Syllabus

Logic, Set, and Proof

Proposition, truth value, logic connectives, conditional and bi-conditional statements, universal and existential quantifiers, necessary condition, sufficient condition, theorem, converse, direct proof, contrapositive, contradiction, counter-examples, subset, power set, cardinality, disjoint sets, universal set, set operations, Venn diagram.

Number System and Binary Arithmetic:

Number systems and codes: Binary, octal, and hexadecimal number systems, Gray code, ASCII code, parity. Number representation methods in computers: unsigned number, signed number, integers and floating number. Binary Arithmetic.

Boolean Functions and Logic Gates:

Boolean algebra and switching functions; logic operations; De Morgan's Laws; minterm and maxterm canonical forms; sum of products and products of sums; logic switch and basic logic gates.

Boolean Function Minimization and Simple Logic Circuit Design:

Boolean function minimization by Boolean algebra and Karnaugh map, don't care condition. Adders, subtractor, and comparator.

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.	Nil
----	-----

2.2 Additional Readings

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

1.	S. S. Epp, Discrete Mathematics with Applications, 4th edition, Brooks Cole, ISBN 978-1111775780, 2011.
2.	Alan B. Marcovitz: Introduction to Logic Design, Third Edition, ISBN 978-0-07-016490-1 (McGraw-Hill Higher Education 2010).