

CORE1240 Electronic and Information Technology (Spring 22-23)

Course code: CORE1240

Title: Electronic and Information Technology

Credits: 3

(Previous code: ELEC1010)

Course Description

This general-education course introduces the basics of electronic and information technology and their applications to daily-life consumer electronics and communication devices. Contents include the representation of signals in the time and frequency domains; digitization of information; coding for data compression and error protection; transmission of signals; cellular mobile phones and wireless communications; and the Internet. It is expected that through studying these technologies and how they address the problems encountered in the information technology area, students will also grasp the skills in solving problems with engineering approach and spirit and appreciate how these technologies impact the society.

Enrollment requirement: a passing letter grade in CORE 1401 OR CORE 1402 OR CORE 1403 OR CORE 1404 OR LANG 1002 (prior to 2022-23)

Course objectives: Introduces the basics of electronic and information technology and their applications to daily-life consumer electronics and communication devices. On successful completion of this course, students will be able to recognize the key technological developments of electronic and information technology; identify the fundamental principles related to electronic and information technology.

Course Intended Learning Outcomes (CILOs)

CILO 1: Recognize the key technological developments of electronic and information technology which have reshaped industries, societies and the world.

CILO 2: Identify the fundamental principles related to electronic and information technology and how the technology changes our life and applies in daily life.

CILO 3: Use MS Excel to solve simple engineering problems.

CILO 4: Acquire engineering knowledge on up-to-date electronic and information technology.

CILO 5: Appreciate and understand the problem solving approach used in engineering discipline, in particular in the electronics and information technology area.

Teaching and Learning Activities:

Lectures: Delivered by the instructor on key concepts (CILO 1, CILO 2, CILO 4, CILO 5)

Tutorials: Delivered by the instructional assistant to reiterate and strengthen key concepts through daily examples and worked problems (CILO 1, CILO 2, CILO 4, CILO 5)

Homework assignments (through Canvas) /exams: For students to apply their knowledge of electronic and information technology to solve simple engineering problems (CILO 2, CILO 3, CILO 5)

Optional group projects: Conducting a group term project for students to

- Apply their knowledge on electronic and information technology to illustrate an up-to-date electronic and information technology (CILO 4)
- Use MS PowerPoint to create an interactive presentation (CILO 4)

Assessment Tasks and Their Respective Weighting

5 Homework assignments: 10%

Midterm: 35% (face-to-face closed-book)

Final Exam: 55% (face-to-face, closed-book)

Bonus group project (10 marks with 8/10 or above, one sub-grade up)

Weekly Course topic

Week	Lecture	LECTURE SCHEDULE	
1	1	Chapter 0 – Course Introduction	
	2	Chapter 1 - Introduction to Signals and Systems	
2	3	Chapter 1 - Sound Signal, Frequency and Harmonics	
	4	Chapter 1 - Signals as Sum of Sine Waves	
3	5	Chapter 1 - Spectrum - Representation of Signals in the Frequency Domain	
	6a	Chapter 1 - Systems as Filters of Signals	
4	6b	Chapter 1 - Systems as Filters of Signals	
	7	Chapter 1 - Frequency Translation	
5	8	Chapter 2 – Benefits of Digitization	
	9	Chapter 2 - Logic with Bits and Bytes	

6	10	Chapter 3 - Introduction to Analog to Digital Conversion	HW1 - up to filtering
	11	Chapter 3 - Quantization	
7	12	Chapter 3 - Claude Shannon and Information Theory	HW2 - up to Chapter 2
	13	Chapter 4 - Introduction to Source Coding	
8	14	Chapter 4 - Huffman Code and MPEG	
	15	Chapter 4 - Error Detection Codes	
9a	16	Chapter 4 - Error Correcting Codes	HW3 - up to Chapter 3
		Public Holiday	
9b		Public Holiday	Midterm Exam (face-to-face) (Chapter 1-3)
	17	Chapter 4 - Channel Capacity MT Review	
10	18	Chapter 5 - Introduction to Wireless Communications	
	19	Chapter 5 - Cellular Network Basics	
11	20a	Chapter 5 - Multiple Access Technologies	HW4 - up to Chapter 4
	20b	Chapter 5 - Multiple Access Technologies	
12		Public Holiday	
	21	Chapter 6 - Nuts and Bolts View of the Internet Networks	
13	22	Chapter 6 – Content Distribution Networks & Peer-to-Peer Course Review	HW5 - up to Chapter 6
14-15		Final exam (face-to-face)	