ELEC1010 Electronic and Information Technology

Course code: ELEC1010

Title: Electronic and Information Technology

Credits: 3

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 phone and wireless communications; and Internet.

Enrollment requirement: No prerequisite

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.

Intended Learning Outcomes

CO1: Recognize the key technological developments of electronic and information technology. (PO6)

CO2: Identify the fundamental principles related to electronic and information technology. (PO1)

CO3: Use MS Excel to solve simple engineering problems. (PO2)

CO4: Use MS PowerPoint to create an interactive presentation on up-to-date electronic and information technology. (PO4, PO6, PO7)

Teaching and Learning Activities:

Lectures (mixed-mode): Delivered by the instructor on key concepts (CO1, CO2)

Tutorials (mixed-mode): Delivered by the instructional assistant to reiterate and strengthen key concepts through daily examples and worked problems (CO1, CO2)

Homework assignments (through Canvas) /**exams** (face-to-face): For students to apply their knowledge of electronic and information technology to solve simple engineering problems (CO2, CO3)

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 (CO4)
- use MS PowerPoint to create an interactive presentation (CO4)

Assessment Tasks and Their Respective Weighting

5 Homework assignments: 10%

Midterm: 45% (face-to-face on campus, closed-book)

Final Exam: 45% (face-to-face on campus, closed-book)

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

Weekly Course topic

Week	Lecture	LECTURE SCHEDULE (mixed mode)	
1	1	**Chapter 0** – Course Introduction	
2	2	**Chapter 1** - Introduction to Signals and Systems	
	3	**Chapter 1** - Sound Signal, Frequency and Harmonics	
3	4	**Chapter 1** - Signals as Sum of Sine Waves	
	5	**Chapter 1** - Spectrum - Representation of Signals in the Frequency Domain	
4	6a 6b	**Chapter 1** - Systems as Filters of Signals	
		Chapter 1 - Systems as Filters of Signals	
5	7	**Chapter 1** - Frequency Translation	
	8	**Chapter 2** – Benefits of Digitization	
6	9	**Chapter 2** - Logic with Bits and Bytes	HW1 - up to filtering
	10	**Chapter 3** - Introduction to Analog to Digital Conversion	
7	11	**Chapter 3** - Quantization	
		Public Holiday	
8	12	**Chapter 3** - Claude Shannon and Information Theory	HW2 - up to Chapter 2
	13	**Chapter 4** - Introduction to Source Coding	

9	14	**Chapter 4** - Huffman Code and MPEG	
	15	**Chapter 4** - Error Detection Codes **MT Review**	
10	16	**Chapter 4** - Error Correcting Codes	HW3 - up to Chapter 3 **Midterm Exam** (face-to-face) **(Chapter 1-3)**
	17	**Chapter 4** - Channel Capacity	
11	18	**Chapter 5** - Introduction to Wireless Communications	
	19	**Chapter 5** - Cellular Network Basics	
12	20a	**Chapter 5** - Multiple Access Technologies	HW4 - up to Chapter 4
	20b	**Chapter 5** - Multiple Access Technologies	
13a	21	**Chapter 6** - Nuts and Bolts View of the Internet Networks	
	22	**Chapter 6** – Content Distribution Networks & Peer-to-Peer	
13b	23	**Course Review**	HW5 - up to Chapter 6
14-15		**Final exam** (face-to-face)	