[ELEC1010] [Electronic and Information Technology] [Spring 2023/24] [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.

List of Topics

Lecture Outline

Week	Lecture	LECTURE SCHEDULE	
1	1	**Chapter 0** – Course Introduction	
2	2	**Chapter 1** - Introduction to Signals and Systems	
	3	**Chapter 1** - Sound Signal, Frequency and Harmonics	
3		**Public Holiday**	
	4	**Chapter 1** - Signals as Sum of Sine Waves	
4	5	**Chapter 1** - Spectrum - Representation of Signals in the Frequency Domain	
	6a	**Chapter 1** - Systems as Filters of Signals	
5	6b	**Chapter 1** - Systems as Filters of Signals	
	7	**Chapter 1** - Frequency Translation	
6	8	**Chapter 2** – Benefits of Digitization	
	9	**Chapter 2** - Logic with Bits and Bytes	
7	10	**Chapter 3** - Introduction to Analog to Digital Conversion	HW1 - up to filtering
	11	**Chapter 3** - Quantization	
8	12	**Chapter 3** - Claude Shannon and Information Theory	HW2 - up to Chapter 2
	13	**Chapter 4** - Introduction to Source Coding	
9a	14	**Chapter 4** - Huffman Code and MPEG	
	15	**Chapter 4** - Error Detection Codes	
9b		**Public Holiday**	HW3 - up to Chapter 3 **Midterm Exam on Week 9b (Sat AM) or Week 10 (Wed or Thu after 6pm)** (face-to-face) ***TBA*** **(Chapter 1-3)**
		Mid-tern break	
10	16	**Chapter 4** - Error Correcting Codes	
	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	
	20b	**Chapter 5** - Multiple Access Technologies	
13	21	**Chapter 6** - Nuts and Bolts View of the Internet Networks	HW4 - up to Chapter 4
		Public Holiday	
14	22	**Chapter 6** – Content Distribution Networks & Peer-to-Peer	HW5 - up to Chapter 6

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)

Textbook(s):

No textbook.

Reference Books/Materials:

Lecture notes and Tutorial notes.

Relationship of Course to Program Outcomes:

Lectures: Delivered by the instructor on key concepts (CO1, CO2)
Tutorials: 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)

Grading Scheme:

Homework	10%
Mid-Term Examination	35%
Final Examination	55%
Bonus group project	10 marks with 8/10 or above, one sub-grade up