ELEC1010 Electronic and Information Technology

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.

List of Topics

1. Introduction to Signals and Systems
2. Sound Signal, Frequency and Harmonics
3. Signals as Sum of Sine Waves
4. Spectrum - Representation of Signals in the Frequency Domain
5. Systems as Filters of Signals
6. Frequency Translation
7. Benefits of Digitization
8. Logic with Bits and Bytes
9. Introduction to Analog to Digital Conversion
10. Quantization
11. Claude Shannon and Information Theory
12. Introduction to Source Coding
13. Huffman Code and MPEG
14. Error Detection Codes
15. Error Correcting Code
16. Channel Capacity
17. Introduction to Wireless Communications
18. Cellular Network Basics
19. Multiple Access Technologies
20. Nuts and Bolts View of the Internet
21. Content Distribution Networks & Peer-to-Peer Networks

Statement of Objectives/Outcomes:

On completion of this course, students will be able to:

CO1 – Recognize the key technological developments of electronic and information technology

CO2 – Identify the fundamental principles related to electronic and information technology

CO3 – Use MS Excel to solve simple engineering problems

CO4 – Use MS PowerPoint to create an interactive presentation on up-to-date electronic and information technology, and to document their findings in a written report