

EENG 101 – The Digital Information Age (Summer Session B - 2018)
Instructor: Roman Kuc

Smart devices, robots and communication systems rely mainly on digital technology in this information age. This course examines the path that information takes from sensors in smart devices, through processors that digitize and process data, communication networks that transmit data packets, and the actuators that inform the human at the receiving end.

Students completing EENG 101 will have an understanding of how digital devices, such as smartphones, robots, and networks that generate information & transmit data. The goal is not only to understand **how** digital devices work, but also **why** they work that way. Relevant concepts from probability are introduced as needed. Theory is illustrated with projects using Excel with Visual Basic for Applications (VBA).

1. Overview. Intro to Excel and VBA.
2. Sensors & actuators in smart devices & robots.
3. Combinatorial logic gates and circuits.
4. Designing efficient combinational and sequential logic circuits.
5. ADC and DAC. Aliasing & Quantization.
6. Random numbers and random arithmetic.
7. Data transmission signals in noise. Modeling data & noise. Signal-to-noise ratio.
8. Test 1
9. Characterizing Communication Systems
10. Orthogonal signals for multiple user access.
11. Source coding for data compression
12. Source coding for encryption.
13. Channel coding for error correction.
14. Symbology – Making codes machine readable
15. Test 2

Grading:

- Homework – 10%
- Two exams – 45% each

Materials:

- Text: *The Digital Information Age 2nd Edition* by Kuc.
(ISBN-10: 1305077717 | ISBN-13: 978-1305077713)
(First edition not acceptable)
- Laptop running Microsoft Excel 2013 or newer
 - Open-source spread sheet programs do not contain all the features of MS Excel.
 - Bring your laptop to class to try Excel instructions.