

EENG 101 – The Digital Information Age (Summer Session B - 2017)
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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 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 circuits for manipulating bits.
4. Sequential logic circuits for remembering and counting events.
5. Test 1
6. Analog-to-digital conversion. Aliasing & Quantization.
7. Random numbers and their arithmetic.
8. Modeling random data & noise.
9. Data signal processing & design. Probability of error. Signal-to-noise ratio.
10. Test 2
11. Orthogonal signals for multiple user access.
12. Source coding for data compression
13. Source coding for encryption.
14. Channel coding for error correction. Data rate and channel capacity.
15. Test 3

Grading:

- Homework – 10%
- Three exams – 30% each

Materials:

- Text: *The Digital Information Age 2nd Edition* by Kuc.
(ISBN-10: 1305077717 | ISBN-13: 978-1305077713)
(First edition not acceptable)
- Laptop running 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.