EECE 442L: Communications Laboratory

Catalog description
A laboratory course with experiments covering the following topics: AM and FM modulation and demodulation, sampling and quantization, baseband transmission, digital modulation (PSK, FSK, MSK, GMSK), digital demodulation, and inter-symbol interference.

Required or elective
Elective for CCE / ECE students

Prerequisites
By course: EECE 442
By topic: Basic knowledge of LabView, basic knowledge of modulation concepts in communication theory

Reference Material
Experiment sheets prepared for the lab course.


Course objectives
Demonstrate theory of communications.
Acquire practical skills in using relevant equipment and software: PXI, A/D, D/A, LabView

Experiments covered
1. Introduction to LabVIEW
2. Analog Modulation I (Amplitude modulation)
3. Analog Modulation II (Frequency modulation)
4. Sampling and Quantization I
5. Sampling and Quantization and PCM
6. Baseband transmission and ISI
7. Digital Modulation I (PSK, QAM)
8. Digital Modulation II (FSK, MSK)
9. Digital Demodulation and Channel Coding
10. Equalization
11. Communication System Setup or project
Course Outcomes

Has acquired significant skills in the use of LabView
Understands How Analog Modulation And Demodulation Can Be configured in a LabView simulation
Understands how basic parameters effect AM modulation and demodulation
Understands how basic parameters effect FM modulation and demodulation
Understands how sampling and quantization can be configured in a LabView simulation
Can determine the SNR related to quantization noise
Understands how basic parameters effect the implementation of BPSK and M-PSK
Understands how basic parameters effect the implementation of M-QAM
Understands how basic parameters effect the implementation of FSK in particular with regard to bandwidth
Understands how basic parameters effect the implementation of MSK and GMSK in particular with regard to bandwidth
Understands the basic principles of channel coding
knows the principle of determining BER for FSK and QAM
Understands how intersymbol interference can arise and can be dealt with using pulse shaping and equalization

Laboratory schedule
11 165-minute laboratory sessions and two tests per semester, including small project

Resources of the course
Reference books, online references, and Moodle.

Evaluation methods
Preparation Exercises and Lab reports completed
Surprise tests 10%
Test 1 40%
Test 2 50%

Professional component
Engineering topics: 100%
General education: 0%
Mathematics and basic sciences: 0%

Person(s) who prepared this description and date of preparation
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