ECE4612 Course Syllabus

ECE4612

Telecommunications Systems Laboratory (0-0-3-1)

CMPE Degree
> This course is Elective for the CMPE degree.

EE Degree
> This course is Elective for the EE degree.

Lab Hours
> 3 supervised lab hours and 0 unsupervised lab hours

Course Coordinator
> Beck,Brian Michael

Prerequisites
> ECE4601 OR ECE4606

Corequisites
> None

Catalog Description
> Basic digital telecommunications systems are examined in a laboratory setting using electronic modules, covering concepts such as modulation, channel coding, AWGN, eye diagrams, and BER.

Textbook(s)
> No Textbook Specified.

Course Outcomes
> Upon successful completion of this course, students should be able to:
> 1. Use electronic test equipment to examine aspects of telecommunication systems
> 2. Design an experiment to determine the error performance of a telecommunication system
> 3. Construct an eye diagram
> 4. Construct a signal constellation
> 5. Design a digital telecommunications system from a block diagram perspective

Student Outcomes
> In the parentheses for each Student Outcome:
> "P" for primary indicates the outcome is a major focus of the entire course.
> "M" for moderate indicates the outcome is the focus of at least one component of the course, but not majority of course material.
> "LN" for "little to none" indicates that the course does not contribute significantly to this outcome.
> 1. (P) An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

2. (M) An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. (LN) An ability to communicate effectively with a range of audiences
4. (LN) An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
5. (LN) An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. (M) An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. (LN) An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Topical Outline

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Pseudorandom Binary Sequences
Eye Diagrams
Signal Constellations
Channel Model--Additive White Gaussian Bandlimited Channels
Signal Detection
Binary Modulation, BPSK, BASK, BPSK, DPSK
Mary Modulation, QAM, QPSK
Spread Spectrum Direct Sequence, FHSS
Line Coding
Channel Coding Block Coding, Convolutional Coding
PCM
OFDM
Software defined radio
Delta Modulation
Bit Error Rate Measurement
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