<table>
<thead>
<tr>
<th>Course</th>
<th>ECE 42800 - Modern Communication Systems</th>
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<tbody>
<tr>
<td>Type of Course</td>
<td>Required for EE Program, Elective for CmpE Program</td>
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<td>Catalog Description</td>
<td>Development of the basic principles of communication systems with emphasis on digital modulated systems. The analysis of the performance of these systems in an additive noise channel is studied so as to make comparisons between the different types of digital modulation systems. The principles of forward error correction are studied along with the concepts of performance bounds and optimum receiver performance. The use of Matlab simulation models is introduced as a companion technique for communication systems analysis.</td>
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<tr>
<td>Credits</td>
<td>3</td>
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<td>Contact Hours</td>
<td>3</td>
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<td>Prerequisite Courses</td>
<td>ECE 30100, ECE 30200</td>
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<td>Course Objectives</td>
<td>This course provides an introduction to communication system principles with an emphasis on digital communication systems. It develops the basic analysis tools to characterize a communication system’s performance. The use of computer modeling and simulation techniques employed to compliment analysis methods.</td>
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| Course Outcomes | 1. An understanding of how to represent communication signals in time and frequency using complex analysis and Fourier analysis techniques. (a, e)  
2. An understanding of the effects of noise and channel properties on communication system performance. (a, e)  
3. An understanding of the difference in performance among the basic digital modulation systems. (a, c, e)  
4. An understanding of the basic functions required of a digital communications receiver. (a, c, e)  
5. An understanding of the effects of band-limiting and the
tradeoffs of performance and capacity. (a, c, e)
6. A basic understanding of information theory and bounds on communication system performance. (a, c, e)
7. An understanding of the basic forward error correction coding techniques of convolutional and block codes. (a, c, e)
8. The application of computer modeling and simulation techniques to compliment communication system performance analysis. (a, c, e, k)

Lecture Topics
1. Review of background material and Introduction
2. Digital modulation and transmission of digital signals
3. Optimum receivers in additive Gaussian noise
4. Receiver synchronization
5. Transmission through band-limited channels
6. Advanced digital modulation signals
7. Introduction to information theory and bounds on performance
8. Coding for reliable communications
9. Review
10. Exams

Computer Usage
Medium

Laboratory Experience
Medium

Design Experience
Medium

Coordinator
Carlos Pomalaza-Ráez, Ph.D.

Date
1/31/2017