



<b>Course Code</b> ECE-452	<b>Course Title</b> Digital Communications	<b>ECTS Credits</b> 6
<b>Department</b> Engineering	<b>Semester</b> Fall or Spring	<b>Prerequisites</b> ECE-332, ECE-350
<b>Type of Course</b> Elective	<b>Field</b> Engineering	<b>Language of Instruction</b> English
<b>Level of Course</b> 1 <sup>st</sup> Cycle	<b>Year of Study</b> 4 <sup>th</sup>	<b>Lecturer(s)</b> Dr Ioannis Kyriakides
<b>Mode of Delivery</b> Face-to-face	<b>Work Placement</b> N/A	<b>Co-requisites</b> None

### **Objectives of the Course:**

The main objectives of the course are to:

- introduce communication channel models and explain the types of fading that affect a transmitted signal
- explain source coding for digital transmission of a message
- introduce signal detection and estimation theory
- introduce channel coding for improving performance in digital communications
- introduce spread spectrum communications

### **Learning Outcomes:**

After completion of the course students are expected to be able to:

1. identify communication channels and the various types of fading affecting the digital transmitted signal
2. apply binary representation of information using source coding
3. identify the essentials of signal detection and estimation theory
4. identify sources of error and derive the probability of error for a given communication scheme
5. apply channel coding to reduce the probability of error in a given communication system
6. explain the basics of spread spectrum communications

### **Course Contents:**

1. Elements of digital communication systems
2. Mathematical models of communication channels
3. Source coding
4. Signal detection, the matched-filter receiver, probability of error
5. Band-pass signal and system representation
6. Signal space representation of signals, representation of digitally modulated signals
7. Block coding, convolutional coding
8. Communication through fading channels
9. Spread spectrum signals

**Learning Activities and Teaching Methods:**

Lectures, in-class assignments.
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**Assessment Methods:**

Homework, in-class assignments, projects, exams, final exam.
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**Required Textbooks/Reading:**

<b>Authors</b>	<b>Title</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
John G. Proakis	Digital Communications	McGraw Hill	2000	0071263780

**Recommended Textbooks/Reading:**

<b>Authors</b>	<b>Title</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
John G. Proakis	Communication Systems Engineering	Prentice Hall	2003	0130617938