

**ESE 342**  
**Digital Communications Systems**  
Spring 2017

- Instructor:** **Mónica Bugallo**  
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*Office Hours:* MW 10:00 AM - 12:00 PM
- Class Meetings:** MW 8:30-9:50 AM
- Grading:** Exercises and lab projects: 30%  
Four quizzes: 20% (best of the two first quizzes), 20% (second quiz), 30% (third quiz)
- Prerequisites:** ESE 340: Basic Communication Theory  
ESE 305: Deterministic Signals and Systems  
ESE 306: Random Signals and Systems
- Textbook:** B. Sklar, *Digital Communications: Fundamentals and Applications*, Prentice-Hall, 2001.
- Class resources:** <http://blackboard.stonybrook.edu>

**Learning outcomes:**

- Understand the basic concepts in digital communications: source coding; channel coding; digital modulation and demodulation; channel; reception of signals in noise.
- Develop and analyze a series of programming exercises and projects consisting of application of the materials studied in class.

It is the student responsibility to plan the semester avoiding exam conflicts and too many exams in the same day.

Each student must pursue his/her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Any suspected instance of academic dishonesty will be reported to the Academic Judiciary. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

If you have a physical, psychological or learning disability that may impact on your ability to carry out assigned course work, I would urge that you contact the staff in the Disabled Student Services office (DSS), room 133 Humanities, 632-6748/TDD. DSS will review your concerns and determine, with you, what accommodations are necessary and appropriate. All information of disability is confidential.

## Topics:

- Signals and Spectra. (Ch. 1)
  - Elements of a Digital communication System.
  - Classification of Signals.
  - Signal Transmission through Linear Systems.
- Digital Baseband Modulation and Demodulation/Detection. (Ch. 2 and 3)
  - Formatting Analog Information: The Sampling Theorem.
  - Pulse code Modulation.
  - Detection of Baseband Signals in Gaussian Noise.
  - Transmission Through Bandlimited Channels
  - Equalization.
- Digital Bandpass Modulation and Demodulation/Detection. (Ch. 4)
  - Representation of Bandpass Signals: Equivalent Low-Pass Signal.
  - Digital Bandpass Modulation Techniques.
  - Detection of Bandpass Signals in Gaussian Noise.
  - Coherent and Noncoherent Detection.
  - Error Performance for Binary Systems.
- Error Control Coding. (Ch. 6 and 7)
  - Types of Error Control.
  - Linear Block Codes.
  - Other Coding Schemes: Cyclic Codes, Convolutional Codes.
- Digital Networks. (Other books)
  - Network Topologies.
  - Access Protocols.
  - Circuit and Package Switching.