

**Department of Electrical Engineering and Computer Sciences
University of California, Berkeley**

**EE 121: Introduction to Digital Communications
SPRING 2016**

Description

In today's multi-layered communication systems, data is stored, processed, transmitted and received dominantly in *digital* form. This course is an introduction to basic fundamental principles and mathematical tools for the design and analysis of digital communication systems. Topics include source and channel coding, network coding and distributed storage, baseband and passband modulation and transmission through wireless channels. Applications to classical and modern systems are specifically targeted and concepts are illustrated via exercises and projects.

Prerequisites

Background in probability and linear systems are required. CS70, EE20 and EE126 are recommended.

Instructor

Omur Ozel, ozel@berkeley.edu

Office: Cory 201

Office hours: Tuesday 4:00–5:00 pm, Thursday 4:00–5:00 pm, and by appointment

GSI

Preetum Nakkiran, preetum@berkeley.edu

Office hours: Wednesday 4:00–5:00 pm @ 341B Soda.

Meetings

Tuesday, Thursday, 2:00–3:30 pm, Cory 299

Discussions: Friday, 1:00–2:00 pm, Cory 521

Recommended Reading

J. G. Proakis and M. Salehi and G. Bauch, *Contemporary Communication Systems using MATLAB*, Cengage Learning (2013).

J. G. Proakis, *Digital Communications*, McGraw Hill (1995).

Online Resources

All related online resources will be provided through bcourses.berkeley.edu.

Course Outline

We will cover the following topics in the specified order:

- (1) Preliminaries and review of basics
- (2) Classical communications
 - Communication over noisy channels
 - Transmission through wireless channels
 - Erasure and error correcting codes
 - Linear codes and decoding algorithms
- (3) Modern topics
 - Network coding
 - Distributed storage
 - Network caching

Course Expectations & Grading

Homework assignments, class participation, two midterms, two projects with the following percentages:

- Homework: 10 %
- Participation: 10 %
- Midterm 1: 25 %
- Midterm 2: 20 %
- Project 1: 15 %
- Final Project: 20 %

Key Dates

The following dates are tentative and subject to change:

- Midterm 1: March 17, 2016
- Project 1: March 31, 2016
- Midterm 2: April 21, 2016
- Final Project: Week of May 09-13, 2016

Assignments & Readings

The students are expected to follow announcements in `bcourses.berkeley.edu`. Homework and project assignments will be posted in `bcourses.berkeley.edu`. Additionally, student discussions will be run through Piazza.

Ethics

In this course, you must abide by EECS academic honesty and integrity policies, see <http://www.eecs.berkeley.edu/Policies/acad.dis.shtml>. This is essential for the success of our academic system.

Students with Disabilities

Any student with a disability who may need accommodation in this class must obtain an accommodation letter from the Disabled Students Program. If you have already obtained this letter, please contact the instructor for further details.