Course Description

An introduction to analog and digital communication systems. Topics include: amplitude and frequency/phase modulation and demodulation; pulse code modulation (PCM); digital data transmission in baseband and passband; M-ary communications; The effects of noise on the performance of analog and digital communication systems (optional).

Course Outline

• Introduction to communication systems
• Amplitude modulation: DSB-SC, DSB, QAM, SSB, VSB, carrier acquisition, superheterodyne
• Angle modulation: Instantaneous frequency, FM bandwidth, FM generation, FM demodulation, FM receiver
• Pulse code modulation: Sampling, PCM, DPCM, Delta modulation, Line codes
• Baseband data transmission: pulse shaping, M-ary communication, eye diagram
• Digital band-pass modulation: ASK, PSK, DPSK, FSK, noncoherent schemes, M-ary modulation
• Analog communications in noise (optional)
• Digital communications in noise (optional)

Class Time and Location

Lecture times: M W 5:00pm - 6:45pm, Physical Sciences, Room 136.
Holidays: Monday January 18, Monday February 15
Text Book


Required Background

Students are expected to be up-to-date on the material learned in Signals and Systems (EE103 or equivalent). In particular, the Fourier transform and filters of various kinds are heavily used throughout the course. Later in the course some background in random variables (CE107 or equivalent) may be needed. In particular, the mean and variance of random variables, the Gaussian probability density function and cumulative density function, and notions of independence and correlation will be used.

Grading Policy

Course grade will be based on weekly homework assignments (10% of the final grade), midterm examination (35% of the final grade) and a final examination (55% of the final grade). However, you must get a passing grade on the final to pass the course.

Academic Dishonesty

Any confirmed academic dishonesty including but not limited to copying homeworks or cheating on exams, will result in a no-pass or failing grade. You are encouraged to read the campus policies regarding academic integrity. Examples of cheating include (but are not limited to): Sharing results or other information during an examination. Working on an exam before or after the official time allowed. Submitting homework that is not your own work. Reading another student’s homework solution before it is due. Allowing someone else to read your homework solution before the assignment is due.

For more details see the Official UCSC Guideline on Academic Integrity.