EE 308: Communication Systems

Instructors: D. Manjunath and Bikash Kumar Dey

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Class Hours: (Slot 1) Mon 0830–0930; Tue 0930–1030; Thur 1035–1130;

Office Hours: Thursdays 1130-1230. Meetings at other times by appointment only.

Teaching Assistants: To be announced

Topics Covered

- Introduction and background
- Recap of Fourier techniques and bandpass representation of signals.
- Overview of amplitude and phase modulation techniques.
- Amplitude modulation (AM) systems: modulation and demodulation of signals; different types of AM systems like carrier suppression, single sideband, vestigial sideband, examples of analog TV signals.
- Phase modulation: frequency and phase modulation; narrowband and wideband FM, modulation and demodulation of FM signals, stereo-FM, pre-emphasis and de-emphasis
- Phase locked loops and carrier synchronisation
- Overview of equalisation, clock synchronisation and digital modulation techniques.
- Introductory random processes and noise processes. Performance of amplitude and phase modulated signals with noise in analog modulation systems
- Sampling and quantization: Sampling theorem, Quantisation and quantisation noise, companding, non linear quantisation and the Lloyd-Max algorithm.
- Multiplexing techniques and multiple access.
- Example communication systems: wireline telephone, cellular telephony,

Evaluation

In-Semester (Continuous Evaluation)	20%
Mid-semester exam	30%
End-semester exam (full syllabus)	50%

Quiz and Examination Schedule:

1. Homework problems will be assigned at regular intervals (upto about ten in the semesters). Many of the problems will be from the prescribed text. They will be announced in class. Additional problems may also given. Some homework problems will need to be submitted for grading by the due date specified.
2. Short, in-class, unannounced quizzes will be conducted regularly. Quizzes will most likely have one or more of the homework problems. All quizzes will not be equal.
3. The mid semester and end-semester exams will be as per institute and department timetable. The end-semester exam will cover the entire syllabus.
4. Institute attendance rule will be enforced.

Expected Effort

It is expected that you will be spending at least 6 hours per week, in addition to the lectures, towards this course. Much of the material will follow the prescribed text which has end-of-chapter problems. You are expected to solve these as the material is covered. Some problems may be suggested. TAs may conduct tutorials to assist you in problem solving.Reading assignments may be be given.

Re-exam policy

If you miss a quiz or an examination for **any reason**, it will not be administered to you again. Adjusting the marks for a missed quiz or examination will be the discretion of the instructor. No appeal will be entertained.

Text and reference

1. S. S. Haykin, "An Introduction to Analog and Digital Communication Systems," John Wiley & Sons. A pdf appears to be legally available on the web.
2. B. P. Lathi, "Modern Digital and Analog Communication Systems," Oxford University Press.