

Department of Electrical and Computer Engineering
ECE 489 Communication Systems Laboratory
Course Syllabus for Fall 2014.

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Office Hours: Tuesday 11 am to 12 pm and Monday 4:30pm-5:30 pm and by drop in or appointment at other times.

TEXTBOOK(S)/MATERIALS REQUIRED: lab manual at <http://ECELabs.njit.edu> on the NJIT Intranet

The Honor Code

Students should be familiar with NJIT Honor Code. This code will be rigorously upheld, any violations will be brought to the immediate attention of the administration.

COURSE OBJECTIVES:

1. Experience with spectra of AM FM signals. Knowledge of how varying the depth of modulation effects the spectrum.
2. Understanding of how noise effects digital systems communications.
3. Understanding and experience with the basic techniques of digital communication for coding, eye diagrams and Bit Error Rate testing (BER)
4. Knowledge of the principles of CDMA and ability to demonstrate a multi user BPSK CDMA system
5. Understanding of the principles of OFDM
6. Know the basics of using and programming Labview to control instruments
7. Understand the definition of Software Defined Radio and the ability to describe how it works and its utility.
8. The ability to communicate the methods and results of experiments in a professional quality lab report.

Grading Policy:

An important goal of a lab course is to impart hands-on experience. Although it may appear that the grade is given based on the submitted report only, it should be realized that an essential part of the lab experience is actually doing the experiment. No grade will be given for a lab session if the student did not attend the session. Lab reports are due the week after the lab is completed unless discussed with the instructor in advance. There a penalty of one point out 10 points for each week for late report.

Grades will be determined with 30% of the grade from the prelab and class participation and 70% from the lab reports.

Another important goal of the lab experience is to reinforce the theory learned in lecture courses. Hence students are expected to review the write up of the experiment to be done and the relevant theory before coming to the lab to do the experiment.

Each student should include in his/her report a section titled "Discussion and Analysis of results." This is an important part of the experiment and it is given 50% of the grade of the report.

The report should be readable by itself without referencing the lab manual, etc. It should be written using your own words. Cutting and pasting form the manual and other resources is not rewarded.

To summarize: There are 10 total points for each experiment: 3 points Data, 4 points for Discussion and Analysis of results: 3 points for other items including:

1. Title Sheet and Cover
2. Abstract or Synopsis
3. Procedure
4. Connection Diagram (s)
7. Curves and graphs if appropriate
9. Discussion and Conclusions

Lab Order Schedule: (labs 1-9 utilize Emona Tims units)

1.	AM Modulation
2.	FM Modulation
3.	PBRs Generation Eye Diagrams, noisy channel model (2 weeks)
4.	Detection with decision Maker, Line Coding and BER testing
5.	BPSK & QPSK
6.	CDMA1: 1-channel baseband processing gain and noise effect on performance
7.	CDMA2: Full 2-user System with BPSK mod Spectra at each stage
8.	CDMA BER Detection
9.	OFDM – frequency division multiplexing
10.	SDR 1: Introduction to Lab View PRBP generation and BER vs. noise power
11.	SDR 2: Transmit and Receive, Receive pwr vs. distance
12.	SDR 3: Modulate – Constellations and Eye Diagram