

ENEE 428
COMMUNICATIONS
DESIGN LABORATORY

Spring 2024

Lab Lecture: Wednesday,
10:00–10:50 AM, AVW 1362

Instructor: Dr. Steven A.
Tretter

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**The room for the lab sessions
is AVW 1362.**

Laboratory Instructor/TA:

0101 Wednesday:

2:00–5:00 PM

Steven A. Tretter

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WEB Sites to Look At

All lecture slides will be posted at
<http://www.ece.umd.edu/~tretter>
under the heading

ENEE 428 COMMUNICATIONS DESIGN
LABORATORY Lecture Slides for the
TMS320C6713 DSK

The slides contain the latest updates. If the book
and slides differ, follow the instructions on the
slides.

ENEE 428 COMMUNICATIONS DESIGN LABORATORY

Spring 2024 Semester

Instructor: Dr. S.A. Tretter

Prerequisites: ENEE 322 Signals and Systems
and ENEE 324 Engineering Probability;
Working knowledge of PC's and C programming

Corequisites: ENEE 420 Communication
Systems or ENEE 425 Digital Signal Processing

Text: Steven A. Tretter, *Communication System
Design Using DSP Algorithms with Laboratory
Experiments for the TMS320C6713 DSK*,
Springer 2008

Optional Reference Books:

1. A C programming book like B.W. Kernighan and D.M. Ritchie, *The C Programming Language*, second edition, Prentice Hall, 1988. This is a detailed C reference, but not the best to learn from.
2. A good book to learn C from.

WARNING: Do not sign up for this class unless you like to work with PC's and enjoy programming!

COURSE GOALS

- To explore the signal processing and communication system theoretical concepts presented in ENEE 420 Communication Systems and ENEE 425 Digital Signal Processing by implementing them on actual hardware in real time.
- To gain experience using equipment commonly used in industry, such as, oscilloscopes, error rate test sets, digital signal processors, analog-to-digital and digital-to-analog converters, and signal generators.
- To learn about DSP's, in particular, the TMS320C6713 floating point DSP.

Experiments that Will be Done

All students must complete the following items:

1. Chapter 1 Brief Overview of the Hardware and Software Tools
2. Chapter 2 Learning to Use the Hardware and Software Tools by Generating a Sine Wave
3. Chapter 3 Digital Filters
4. Chapter 5 Amplitude Modulation
5. Chapter 6 DSBSC Amplitude Modulation and Coherent Detection
6. Chapter 7 Single-Sideband Modulation and Frequency Translation
7. Chapter 8 Frequency Modulation
8. Chapter 4 The FFT and Power Spectrum Estimation
9. Additional experiments if time permits

Grading Criteria

Your grade will be determined by the following items:

- Grades on lab reports
- Attendance at **lecture** and **lab**. Lack of attendance at either will reduce your grade.
- Opinion of TA and instructor on your contribution to work in lab
- Work done beyond minimum requirements

Lab Reports

Inform your TA when you have completed an experiment (chapter), or part of a chapter. Your TA will then ask you to demonstrate at a work station that your implementation is working correctly.

Individual written lab reports are required.

No report is required for Chapter 1. Your TA will set deadlines for when the reports are due.

Include all of the following items.

1. Include the experiment title, your name, and your partner's name on the first page.
2. A printed listing of your commented programs
3. Answers to all questions asked in the lab manual. Include data listings and output from the various filter design programs when relevant and plots for filter frequency responses.
4. Number pages, figures, and tables. Make captions for figures and tables.
5. Be sure to label the axes of plots.
6. Any additional items requested by your TA.
7. A short introduction discussing the experiment at the beginning, and a section with your conclusions at the end.

Lab Access

The lab has a university ID card reader on the door. I will submit a class roster to the ECE office and you should then have access to the lab from 7 AM to 11 PM every day as long as you are not interfering with another class.

Using the ECE Network

You can log on to the lab PC's using your university username and password. Each lab group will be given a private directory on the network server (ecelabsvr) that both group members can share. No other groups can read your directory. However, all administrators (including TA's) can access it.

Please do your program development in your network group directory so the local hard drive does not get cluttered up. The lab PC's will be re-imaged each time they are rebooted and you will lose anything you saved on the C drive.

WARNING: Disk drives and networks sometimes crash! To be safe, you should back up your programs on a USB memory drive or elsewhere before you leave for the day.

You can also use WinSCP to transfer files to and from your Glue account. If the network is down you can work from the local disk since all our utility software is stored on the C hard disk.