

EECE 1070 Introduction to Engineering for ECE

Fall 2017

Professor Jay Weitzen

University of Massachusetts Lowell

Department of Electrical and Computer Engineering

Ball 411, Jay_weitzen@uml.edu

OH Thursday 1630-1800 and Tuesday After Class 10:30-
11:30

Official Course Web Site

- **<http://faculty.uml.edu/jweitzen>**
- **Please check the website week for announcements, course materials etc.**
- **All materials will be distributed via the Web site.**
- **Please check your University Email regularly, that is how I will contact you**
 - **Please use your UML email to contact me**

Overview

- What are we going to cover ?
- How will you be graded?
- Why should you take this course?
- How to get the most out of this class?
- Introduction to Good Programming!

What are we going to cover ?

- Application Programming in Matlab (7 weeks)
 - Learn Basic Programming Skills
 - See Examples of Digital Signal Processing
 - Help Strengthen your math and problem solving skills
 - Learn Basics of Analysis of Data
- ECE “Lab Anywhere” (6 weeks)
 - Learn Analog Devices “Lab Anywhere” digital oscilloscope and function generator
 - Write Simple Programs on a C micro-controller to make lights blink, control servos, read sensors, make sounds
 - Play with basic electronic components, learn to breadboard
 - Learn design through open ended design projects

Grading Policy

- 4 Regular Matlab Exercises 24%
- 2 Special Matlab Exercises 30%
- 6 ECE Hdw/Sw Labs 36%
- Attendance 10%
- Attendance at 7 Lectures is required. (Lab Attendance will be factored into the final grade)
- Late Lab Reports are 20% loss per week late starting at the end of lab 1 week after assignment
- **All Labs must be completed and submitted for grade of A or A-**
- Be aware: We are going to be very picky about good programming techniques, and things like axis titles and descriptions, comments, variable naming, block indenting, etc.

My Course Expectations!!!

- **Have Fun!**
 - If what we do in this class is not fun for you, consider whether ECE is the right major.
- **COME TO LAB PREPARED**
 - Attend or watch Lab Lectures
 - Read Lab Exercises and materials in Advance
 - Stay Caught UP, it is your responsibility
- **Do your Best**
 - Get Help if you Need it; it is your responsibility
- **What you hand in should look professional**

ORDERING YOUR OWN Lab In The Box

- You need to order your own Lab-In-A-Box kit:
You will use it in future laboratories.
 - URL is on website
 - You need it by 10/11/2017: [Don't Wait Order Now!](#)
 - Software Available Free on the Website
- Contents of Lab in a Box:
 - Analog Devices Discovery Module
 - Oscilloscope
 - Function Generator
 - Logic Analyzer
 - Volt Meter
 - Arduino Uno 32 Microcontroller
- Parts kit (given out on first day of Hardware Labs)

Textbook and References

Matlab Textbook is free on Website to save you money

Optional Text available in bookstore

Reference For Microcontroller: See Website

Other References :

Lecture Notes, Online Help

Why this course

- Matlab is used in many upcoming courses.
- This course builds your analytical and problem solving skills in preparation for circuits, signal processing, communications, and control disciplines.
- Give you a first C programming experience in advance of EECE 2160
- Learn to use a digital oscilloscope, function generator
- Learn basic Electronic Components such as resistors, capacitors and basic assembly and test techniques
- Understand interfacing software and hardware based systems

Getting Help

- See your TA in Lab or in office hours
- Come see me in office hours
- Make an appointment with me
 - (I really don't bite and am here to help you ☺)
- Send an e-mail to me
- Talk to your peers, but be careful, they may be even more lost than you are!

Getting the Most Out of This Class

- Come to the lectures or watch them on video. I will give you useful hints for solving the week's problem
 - Download the notes and annotate them
- Please be prepared for lab by reviewing the lab and lecture notes before coming to lab.
 - Ask questions, that is why **your** TA's are there
- Read the Reference Materials for each week's labs
- Check the Course Website each week for hints and important updates.
 - If Classes are cancelled go to the website for instructions.
- Come and see me if you have questions, are stuck, or just want to talk.
 - If you have spent 2 hours in lab and 2 more hours stuck, please stop and come see me.

Course Logistics

- One hour of lecture on Tuesday and two hours of lab each week are for ECE 1070
 - Each Week there will be assigned readings and video's
- ALL LABS meet in Maker Space Falmouth 102
 - Lab attendance is required and counts towards your grade.
 - At your scheduled time, you get priority on a seat: You are welcome at other times as space permits.
 - You can check out a laptop during lab times, or bring your own
- If you want an A or A- you need to complete and submit all lab exercises
- There is a Matlab Site license, you can download to your computer. It is a very good idea.

Cheating in Lab

- Copying and submitting somebody else's work is cheating.
 - If we catch you and we probably will, you will get a 0 for the lab and may get an F for the course.
- If you have to cheat in to get by in a lab course you really need to change majors. This is where you learn and perfect your hands on skills that employers want!

Assignment for Lab This Week

- Load Matlab on your own computer or run VLabs.
- Download and read Lecture Notes 0 and 1
- Do Exercise 0 and submit to your TA.
Answers included

Professor Jay Weitzen (that's me)

- **EDUCATIONAL & PROFESSIONAL EXPERIENCE:**

- **Education:**

- Ph.D. University of Wisconsin, Madison, 1983
- MSEE University of Wisconsin, Madison, 1979
- BSEE University of Wisconsin, Madison, 1978

- **Professional Experience:**

- More than 35 Years of Industrial and Academic experience in wireless networks, radio propagation, wireless network design. 2 US patents, and over 100 publications in the open literature in areas of modern wireless systems.

- **Current Research Interests:**

- Performance of large wireless 3G.4G and 5G networks, small cell networks, high speed wireless data networks, network planning, wireless position location and applications, radio propagation

LEARNING TO PROGRAM

c 2007-2014 Dr. Jay Weitzen



How to write a program

- Start with the requirements. What is the program supposed to do?
 - No point running fast if you do not know where you are going
- What are the external interfaces (inputs and outputs)
- Define the algorithm
 - Describe it in pseudo-code or English. How are you going to meet the requirements
 - Turn the algorithm into real code e.g. Matlab
 - Don't forget to add comments, and good variable naming
- Test, validate, and debug.
 - Spend less time here, more at beginning

Some Comments on good Programming!

- Stream of consciousness programming usually gets you in trouble
 - Understand clearly what you want to do before you start to program. It is more likely to work, and you will have to do less debugging (debugging takes 3-5x longer than doing it right!)
- Programming can be addicting like a video game
 - If you are stuck, do not keep doing the same thing over and over again (you will get same results)
 - Step back and understand what you are trying to do
 - Single step your program with the real time debugger
 - Test all Code paths including error handling

End of Notes 0: Good Luck