ELE 1601
Introduction to Embedded Systems Programming
Fall 2024

Syllabus

JUST THE FACTS

Class Format:
This class will be taught in a flipped format. This format requires students to critically read/view the lecture material before class. Class time will be spent highlighting key points, answering student questions, and working through examples.

Class website:
https://faculty-web.msoe.edu/johnsontimoj/ELE1601/index-ele1601.html
or search "Johnson MSOE", it will be the first result in Google
Notes, Handouts, readings, and assignments will be available on the website

Grading:
- Homework   25% - lowest 3 dropped
- Programming   30% - lowest 1 dropped
- Tests (weighted to highest score in the class)   30%
- Projects (2)   15%

*** Regardless of your overall class score, failure to achieve a passing score (>60) on the average of all tests combined will result in a failing grade for the class. ***

No late HW assignments will be accepted.
Late Programming assignments will be reduced 10%/day

Grade scale: 60 – 70 – 80 – 90 – 100
                      F | D | C | B | A
Final scores in the lower 15% of each range and the upper 15% of the subsequent range will receive a mixed grade of AB, BC, or CD. E.g. 88.5 – 91.5 → AB

The web page will be used for distributing all material in this class. Canvas will be used for announcements and grades. All assignments will be due as indicated on the website.

Help:
MSOE is a student-centered educational institution. If you need help – ASK!

Don't Cheat!

Expectations

From the MSOE Catalog:

> For each academic credit hour, a typical undergraduate student is expected to spend 2 clock hours outside of class preparing for and studying for the class.

ELE1601 is a 3-credit class. This implies students would be expected to spend 6 clock hours **in addition** to class periods on ELE1601.

Typical week:

Class prep:	3 classes * 0.5hr/class	1.5hr
Homework:	2 * 0.5hr/homework	1.0hr
Programming:	1 * 1.5hr/program	1.5hr
Total: Outside of class work		4.0hr

Previous experience shows that if you do the class prep work **before** class, the homework and programming is much easier to complete. When the prep work is skipped, the homework and programming can take **significantly** longer to complete.

COVID STATEMENT

MSOE is committed to the health, safety and well-being of all members of our community. If you test positive for COVID-19, please refrain from coming to class or lab and follow the CDC's isolation protocols which can be found here: https://www.cdc.gov/coronavirus/2019-ncov/your-health/isolation.html. MSOE is committed to your education and your faculty will work to support your learning should you need to isolate.

STUDENT ACCESSIBILITY SERVICES (SAS)

Student Accessibility Services (SAS): For students with documented disabilities, chronic medical conditions or mental health concerns; MSOE provides services to make reasonable accommodations available. If you are a student who requires or anticipates the need for accommodations, please contact Student Accessibility Services Office at 414-277-7281, by email at moureau@msoe.edu, or in person at K250 to discuss appropriate accommodations and eligibility requirements.

Your success as a student is of utmost importance to me. If you have a disability or any other special circumstance that may have some impact on your work in this class, and for which you may require special accommodations, please contact me early in the semester so that accommodations can be made in a timely manner.

Raider Center for Academic Success:

STUDENT SUPPORT
  Raider Success Coaches are professional staff who assist students one-on-one with emotional, personal, and academic support to develop a plan, establish goals, and identify the habits to help achieve success. To schedule a meeting, contact RCAS (rcas@msoe.edu) or email the Coach listed on your class schedule.

  Raider Success Allies are upperclassmen peers who assist students in their pursuit of success in and out of the classroom. An Ally serves in a variety of ways - mentorship, accountability, study partner. Students looking to enhance their academic skills can stop by the RCAS HYPE Desk in the library M-F | 830AM-430PM.

ACADEMIC SUPPORT
  Tutoring offers free peer and professional academic support through one-on-one, group, and online sessions. Tutoring is located on the 2nd floor of the Library and online via Teams. To schedule a one-on-one, group, or online session please go to https://tutoring.msoe.edu or Writing Assistance Request Form | MSOE

  Course-Specific Academic Support is coordinated with the instructor or department for individual classes. Support comes in a variety of offerings: High Impact Review Sessions, Learning Assistants, Interactive Study Sessions. To identify course-specific academic support, inquire with your instructor or visit the RCAS Calendar: Help With Classes | MSOE

<h1 style="text-align:center">COURSE DESCRIPTION, GOALS, and OUTCOMES</h1>

Course Description
This course introduces concepts that are required to solve engineering problems using structured programming techniques. Students will develop a working knowledge of a high-level programming language, structured programming techniques, and the tools used in developing solutions to solve engineering problems. Emphasis will be placed on understanding the interaction of programs with the supporting hardware (program flow in memory, data usage in memory, pointers, and structures). Homework assignments will include moderate sized, multi-lecture programs. Many assignments will introduce concepts found in Electrical Engineering problems. A course project incorporating the major topics from the class may be included.

Prerequisites
none

Primary Goal:
Provide a solid foundation in creating software to solve engineering problems.

Course Outline:
The course will consist of three major sections:
- Foundations – 1/3 of classes
- EE depth   – 1/3 of classes
- Advanced   – 1/3 of classes

Learning Outcomes and Objectives:
A student who successfully fulfills the course requirements will have demonstrated the ability to:
Design, write, and document algorithmic solutions for engineering problems
Employ variables, expressions, and operations in C
Use structured programming techniques in C
Design and write functions in C
Explain concepts and terminology related to processor architecture
Describe the relationship between Software and Hardware
Use Integrated Development Environment tools for software development and debugging
Utilize library functions and algorithms
Utilize basic data structures
<div style="text-align:center">Recognize and employ good software practices</div>

<p style="text-align: center; color: blue;">COURSE MECHANICS</p>

Class Details:
    See website

Instructor:
    Dr. Johnson
    Office: S-336
    Email: johnsontimoj@msoe.edu
        preferred method of contact
        (prepend all email subjects with EE3921 - subject**…)**
    Website – ***https://faculty-web.msoe.edu/johnsontimoj***
    Office hours: see the web site

Text Book – required
    None

Class website:
https://faculty-web.msoe.edu/johnsontimoj/ELE1601/index-ele1601.html
Notes, Handouts and readings will be available on the website

Support Outside of Class:
If you are struggling it is ALWAYS better to ask for help early since concepts build upon each other.

Class Attendance:
This is a freshman level course and will move pretty quickly. While you may be able to learn the material on your own, if you fail to attend class you will not:
> be exposed to the subtlety of the concepts
> learn the details "between the lines"
> know what points I consider important
> learn from the questions of other students
> get the benefit of the doubt on any borderline decisions

In Class Behavior:
You are young professionals and I expect you to act accordingly. Disruptive behavior of any kind will be referred to the appropriate administrative office.

Research shows that taking notes on a laptop or tablet is less effective than taking them long-hand.

No video or audio recording is allowed in class. Failure to follow this rule will be treated as academic dishonesty and dealt with accordingly.

Professionalism and Academic Honesty:

A professional does not take credit for the work of someone else.

A major component of your education is learning how to learn and perform. Now is the time you must develop the discipline, mindset, and ethics to contribute in the technical society. I can assure you; those who claim the work of others in the workplace are dealt with rather harshly.

Any documented case of "cheating" will result in a **FAILING GRADE** as well as possible disciplinary action. All cases of academic dishonesty will be reported to the EECS Chair as well as to the Dean of Students.

Examples of Cheating include (**but are not limited to**) the following:
Testing
- copying the work of another student (past or present) during a test
- providing test information to students who have not yet taken it
- obtaining information about a test prior to taking it
- having someone else take a test for you
- bringing "cheat sheets" in any form with you to a test
- using a cell phone or other electronic device during a test

Homework
- modifying a homework paper and submitting it for reevaluation
- turning in work that was done by someone else (including AI bots)
- using another student's (past or present) homework files
- posting solutions to homework problems or lab experiments

Working collaboratively on homework assignments is allowed and encouraged. The work you turn in however must be your own. If you short circuit this process and let someone else do the work for you, you will be cheating yourself.

EFFECTIVE LEARNING CONCEPTS

As an engineer you most likely consider yourself a scientist also. A critical piece of being a scientist is believing in the scientific method and not ignoring the results. Here are some key learning and learning behavior results.

- Multi-tasking reduces competency in each task undertaken
- <5% of the population can multi-task and the odds are high that you are not one of them
- Repetition is a key factor in long term retention
- Your brain tosses out anything it thinks is irrelevant each night – review material the same day to help make it relevant to your brain
- Sleep is not an option – it is critical to learning (7 hours min – no exceptions)
- Connect new concepts to concepts you already know
- Taking notes by hand increases understanding – not true for typing
- Study as you go and review in the days before the test – then sleep the night before
- Hear – Do – Teach   Teaching others solidifies learning
- Cramming has no long term learning value
- Cramming works for a few hours – if you do it – do it the morning of the test

Seven Things you can do to be a better learner:
1. Make connections. Use analogies or mnemonic devices to build upon your existing knowledge. Not only do these help you remember – but the act of creating these helps you learn.
2. Never read anything without a purpose and stop once you have accomplished it.
3. When you read – stop after every major section or chapter and write down a few key notes. Review the summary within 24hrs to help transition it from short term to long term memory.
4. 20-30 min maximum at any task – then take a short stretch break (30-60sec) and get the blood flowing – review what you have been doing in your mind.
5. 2 hours total without a long break (10 - 15 minutes). Do something that stimulates other parts of your brain – music, exercise, food – when you return – review your short notes from earlier.
6. Plan your time – keep a record – modify your schedule accordingly – Stress reduces learning and being overloaded with no time left is very stressful.
7. Ask – when you don't get it, and have tried a few times - ASK

Always remember – your goal is not to accomplish a task – it is to learn something in the process.

COURSE SCHEDULE

SUBJECT TO CHANGE – depending on overall class progress and any unforeseen natural phenomena.

Please check the website for the current schedule