# SYLLABUS

## CPSC 462, Microcomputer Systems 2022 Fall

**Instructor**

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Office Hours: by appointments, on-line

**Teaching Assistants**

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Office Hours: lab hours, other time by appointment

**LEARNING OBJECTIVES:** Develop independent and team design & implementation skills for microcomputer systems. Special emphasis is placed on embedded computing systems.

**OUTCOMES:** At the end of this course you should

- be able to formulate, plan an open project, and make a live demonstration of the project prototype;
- be able to analyze and choose microcontroller technologies to meet functional requirements;
- be able to cross compile application codes, and be able to document the design process.

**COURSE PRE-REQUISITES:** CSCE 350, or approval of instructor.

### Course Summary

The main technical focus of this class is integrated development of software and hardware components into a system that can make use of sensors and actuators to perform real-time sensing and control functions. Starting from the hands-on learning of development resources, constraints, and tools; the class will guide students to the next level of system design and implementation process in a combination of lectures and lab sessions. The lecture sessions will focus on selective design principles such as system modeling and abstraction, basic integration of components, and some use cases. At completion of the lab exercises, students are organized into project teams for the term project. The class style is highly interactive and students are expected to eventually advance to a self-learning process to solve open project problems, which are formulated by the teams and approved by the instructor.

### Course Outline

| | |
|---|---|
| Sensing and timing | Digital power control |
| Address decoding | Interrupts and exceptions |
| I/O fundamentals | Project use cases |
| Microcontroller kits | Instruments (Scope, logic analyzer) |

### Course Schedule

To be discussed during the first day of the class based on a separate document.

### COURSE REQUIREMENTS / GRADING SCHEME:

| Tasks | Frequency | weight |
|---|---|---|
| Test 1 | 1 | 20 points |
| Test 2 | 1 | 20 points |
| Labs | 4 | 20 points |
| Open Project | 1 | 40 points |

(project work plan 10 points, project progression 10

points, project outcome 20 points) More details at end of the syllabus

**GRADE SCHEME**:

Final grades are ranked into different grade letters. There is no hard numerical cutoff between grade letters.

Grade disputes may be appealed to the instructor in person.

**TEXTBOOKS:** None

- All the major technical materials are drawn from the vendor datasheets and open literature published on various web pages.
- Lab manual – will be distributed with lab assignments, and available in lab and on the class Web site.

**LAB: SEE THE "LAB OVERVIEW" DOCUMENT**

**COMMUNICATIONS:** Canvas, which contains the majority of the material with. Emails will be used for classroom communications.

**ASSIGNMENTS & GRADING:**

**No homework assignment**

**Test 1 and Test 2:** Closely follow the lectures, with pre-exam reviews.

**Labs:** For 4 labs, each lab is worth of 25% of the lab grade.

Standard lab turn-in requirements:

1. source codes, designs, annotation, following the report template
2. Video recorded demo as a part of the lab report. The TA may ask you for in person demo if the video recording is not considered adequate for proper assessment.
3. If you fail to **complete** 3 labs, your lab grad (20 points) will become zero. And at discretion of the instructor, you may receive an F grade.
4. Two strike deduction: 20% final lab grade deduction.
5. Tardiness: latest late submission Friday of due week, with up to 25% of penalty.

**Open project: 40 points**

The open project includes the following major stages:

1. **One pager**: A project idea described in a single page. (**0 point weight, a yes/no response**)
2. **Work plan**: Translate a chosen idea into an actionable plan, which will include a technical specification, part list and budget. Typically 5+ pages. (**10 points, rank-quality based**)
3. **Parts procurement**: Look at the source carefully. It sometimes takes 2 weeks to receive your parts, and some vendors do not refund or even accept parts return. <u>You will be responsible for rush order shipping charge.</u>
4. **Actions**: Activities will be tracked using Canvas. (**10 points, technical activity tracking & reporting on Canvas**)
5. **Demonstration and final report submission**. (**20 points, rank-quality based**)

**Report Submission**

- Lab reports: Canvas
- Project reports at different stages (it is a progressive build up process)

A dual reporting system: <u>Canvas</u> (to facilitate grading) and <u>designated Google Shared Folders</u> (to archive project works for future classes)

- One pager
- Work plan
- Final project
  - Final report extended from the work plan
  - PowerPoint presentation
  - Short demo video clips

    - Reimbursement paperwork
- Canvas project channels
  The Canvas channels are used to track your activities.
- Project cost reimbursement requests – separate forms, receipts, in emails

**ATTENDANCE POLICY:** As the lectures will be delivered in class using zoom, you may choose to attend the lectures in person, or in zoom. The previous experience suggest that students have very positive experience in using zoom for this class. The lectures will be recorded, and made available for students to view them at later time. Stats showed that most lectures have over 80% of reviewing rates. To the extent practically feasible, we will try to allow virtual submissions for lab assignments and term projects as well.

For excused absences, an opportunity will be provided to make up any graded work that was missed. For unexcused absences, a grade of zero will be assigned for a missed quiz or in-class assignment. Missed exams will be rescheduled without penalty for an excused absence, or with a 25% penalty if the absence is not excused, and at approval of the instructor.

To request approval of an absence, send me an e-mail explaining the reason for the absence **prior to the class or lab**. If advance notification is not possible (e.g. unexpected illness) send the e-mail within 48 hours of the absence and be sure to explain why you were not able to notify me in advance. For illness, follow-up the e-mail by submitting a note from a doctor or clinic to my office.

**SCHOLASTIC DISHONESTY** will not be tolerated. Plagiarism is the presentation of the work of someone else without giving him or her due credit. Any identified instances of scholastic dishonesty will be dealt with in accordance with the procedures outlined in the University Student Rules. Some specific rules:

1. In most cases, you are encouraged to discuss and to assist each other concerning programming strategy or technique or for one student to help another debug code which will not work; but each student is expected to write **his or her own programs from beginning to end**.
2. Always be prepared to answer the questions: "What is your contribution?" "Where did you get this design?" "What is your responsibility and contribution in the team?"
3. **Giving or receiving** unauthorized assistance during tests and quizzes is **cheating**. It is assumed that college students know what is honest and what is not.

**STUDENTS WITH DISABILITIES:** The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit **http://disability.tamu.edu**.

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# FEDC Information for Academic Courses

Please reference the FEDC website, Fischer Engineering Design Center – Resource central (tamu.edu), for update information.

Safety and PPE (tamu.edu) Upcoming Events (tamu.edu)

## ***NO PERSONAL PROJECTS ALLOWED IN THE FEDC***

### Admin/Front Desk:

- PPE will be checked at the front door as student users enter
- iLabs reservations need to be made prior to arriving at the facility
- Part drop off and pick up racks located within the FEDC horseshoe on the Prototyping side
- For questions and information email **info-FEDC@tamu.edu**

### Design Studio:

- Team accounts required for table or large build space reservations
- Full PPE required at all times no exceptions
- Equipment Check Out information tab will be added to the FEDC website soon
- Checked out equipment cannot leave the FEDC facility for any reason

### Prototyping:

- Default 3D printing method is low fidelity FDM using PLA filament; engineering justification required for all else
- Project/part requests must fit within the semester allotment of $10, $75 for Senior Design
- Faculty approval and bill-to account is required for projects/parts that exceed allotments
- Prototyping is open for consults, stop by Zach 140 or email **info-FEDC@tamu.edu**

### Fabrication Shop:

- Complete Membership process and Red Badge **ASAP**, this will expedite your ability to access the facility
- The larger or more complex the design/part the sooner you need to contact the FEDC Shop staff for consultation and schedule planning purposes
- Allotment information: This is being finalized and will be communicated soon
- For consultations, email **info-FEDC@tamu.edu** to schedule an appointment or visit during consultation office hours (will be posted prior to beginning of semester)
- Walk up consultations will be denied

## General FEDC Personal Protective Equipment Requirements:

- **Long pants** – pant leg opening must reach and completely cover the top opening of the shoe to prevent materials from entering. This is to include military fatigues; fatigue pants must be fully pulled out of boot and full pant length extended. Pants should have no holes, deformations, cuts or rubouts that will show skin or underclothes.
- **Shirts** – are defined as having complete circular sleeves that cover shoulder and extend at a minimum to the elbow. E.g. t-shirts, button-up oxfords, polos. Shirts must not have holes or loose frays of thread.
- **Closed shoes** – are defined as having a hard sole at least 1/4″ thick. Shoes must cover all toes including the sides, and must cover the top of the foot to the ankle from all sides. The heel must be completely enclosed. Shoes must be made of a substantial material able to withstand the impact of any falling materials.
- **Safety glasses** – are defined as clear polycarbonate Z87.1 certified safety glasses that wraparound or have side shields. Safety googles that are flexible are prohibited.
- **Welding Personal Protective Equipment (PPE)** – will be specified outside of welding area
- **No Food or Drink of any kind allowed in the FEDC**

## FEDC Fabrication Shop and Construction Area PPE Requirements:

- General FEDC PPE
- No jewelry should be worn on your hands, face, head or neck
- Long hair must be tied and stowed under a collar
- No Capri, yoga, 100% rayon, nylon or polyester pants
- 100% Cotton jeans, khakis or sturdy seat pants
- Long-sleeve shirts are to be rolled up to the elbow
- No cellphones or headphones in the fabrication shop unless prior approval is given for academic purposes only

08/22/22