Syllabus
CSE 398 - Embedded and Mobile Systems Lab, 25 Spring

1. Contact Information

Lab Instructor: Yue Cao ycao70@syr.edu

Lab TA: Jiamin Zhao jzhao40@syr.edu

Lab Extra Help: Duane Marcy dlmarcy@syr.edu

(Begin all email subject lines with [CSE 398], thanks)

Room: CST 3-217 (Password for the door is posted on Blackboard)

Cao' office hours: Monday 4-5 pm. [SCITC 2-179]

Marcy's office hours: Thursday 12:30-1:30 pm, Friday 12:30-1:30 pm. [SCITC 3-177A]

2. About the Course

2.1 Description

This is a Junior design lab with 3 credit hours.
This lab will focus on the Raspberry Pi 5-based embedded systems.

2.2 Corequisite

COREQ CSE 384 Systems and Network Programming

2.3 Required Supplies

* Your own laptop.
The lab room has a desktop. However, you cannot install any software on the lab desktop.

* ChatGPT Plus subscription ($20/month) or any alternative way to access GPT-4o/o1 models.

* Any software to write Markdown files.
Recommend: Obsidian (Free) or Typora ($14.99 for 3 devices)

3. Learning Outcomes

A student who successfully fulfills the course requirements will have demonstrated:

* An ability to utilize a Raspberry Pi 5 as an embedded system.

* An ability to ability to manage the software development environment within the Raspberry Pi OS.

* An ability to configure peripheral interfaces on Raspberry Pi.

* An ability to set up wireless communication with Raspberry Pi.

* An ability to deploy AI models, including deep vision and large language models, on Raspberry Pi.

* An ability to present technical content in the field of embedded systems.

* An ability to propose, implement and demonstrate a design project to an audience.

* An ability to write Markdown files for lab logging and reporting.

* An ability to use generative AI tools, such as ChatGPT, to assist programming and troubleshooting embedded systems.

4. Course Format

4.1 First hour

4.1.1 Student lecture

At the start of the class, students in a group will take on the role of “lecturer” and introduce a specific technical topic. Their presentations, which should last around 20 minutes, will be evaluated by both peers and lab staff (Prof. and TA).

Students are required to send their presentation materials to the instructor before class.

Each 3-student group is required to complete 2 presentations.

Each 2-student group only needs to complete 1 presentation, with the second presentation automatically receiving full credit.

The schedule can be found on Blackboard. The 2-student group can pick the topic first.

4.1.2 Worksheet

After the student lecture, each student will complete a worksheet individually to assess their fundamental understanding of embedded systems.

ChatGPT is prohibited in finishing worksheet.

This worksheet also serves as an attendance record and may be assigned once or twice a week.

4.2 After - Lab work

4.2.1 Regular lab Phase (Before Spring Break)

In this phase, we will do some regular lab works implementing independent functionalities on the Raspberry Pi.

The result will be verified thru a check-list. Students can leave the lab early once they verify all items on the check-list with lab staff (Prof. and TA).

The check-list is due every next Monday 2:00 pm.

If students want to verify the check-list in after-class hours, contact the TA for 1 10 minute slot to verify.

Students need to maintain group Markdown files to record all their lab work. The Markdown files should contain enough information so that a new set of students could recreate the implementation. The template can be found on Blackboard.

When submitting Markdown files to Blackboard, students need to:
Option 1: convert .md to .pdf and submit the pdf file to Blackboard.
Option 2: create a GitHub repo and upload the .md to it. Then just provide your GitHub repo link on Blackboard. (recommended)

The planned schedule will be:

- Week 3: Raspberry Pi set-up
- Week 4: Basic interface, such as GPIO, I2C
- Week 5: Raspberry Pi + Arduino
- Week 6: Raspberry Pi + Wifi / Bluetooth
- Week 6: Deploy large language models in Raspberry Pi
- Week 7: Deploy speech recognition models in Raspberry Pi
- Week 8: Deploy deep vision models in Raspberry Pi

4.2.2 Design Project Phase (After Spring Break)

In this phase, you need to work on your own design project and make a demonstration at the end of the semester. The design project will be graded by 4 components:

* Proposal (written document and presentation)
* Weekly Markdown (Markdown files recording your weekly progress)
* Final implementation
* Final poster and presentation

The details and rubrics will be later instructed on Blackboard.

5. Additional Lab Policy

5.1 Buying

Each group can request a certain amount of purchase for their junior design project. The buying order will be reviewed by the Prof. and department.

5.2 Lab environment

Your group will use the same desk for the entire semester. It is your duty to keep it clean.

No food or drink (except water) in the lab room space.

Food and drink must be left in the lecture room.

5.3 Lab equipment

All lab-owned equipment, including the lab-owned Raspberry Pi, must be kept inside the lab room. Students shouldn't bring any of these outsides.

Students can bring their self-purchased equipment and peripherals to the lab.

5.4 Network

NEVER create a hotspot using your phone or computer on SU campus, it is against University policy and I am demanded by University network administrators to police this activity. Do NOT do it!

5.5 Group

Students will be randomly separated into groups of 2 or 3 students.

The group grade may be overwritten with an individual grade if a student contributes very less to the work. (A student in a group of 3 contributes less than 25%; A student in a group of 2 contributes less than 35%)

This grade overwritten applies to student lectures, regular lab check-lists, regular lab markdowns, and the final project.

6. Grade

6.1 Grade Breakdown

The grade determination breakdown is as follows:

Student lecture:	10%
Worksheet:	10%
Regular lab check-list:	20%
Regular lab Markdown:	20%
Final Project:	40%

5.2 Grade Scale

94-100	A
90-93.99	A-
87-89.99	B+
83-86.99	B
80-82.99	B-
77-79.99	C+
73-76.99	C
70-72.99	C-
60-69.99	D
Below 60	F

** There is no extra curve adjustment to the final grade.

7. Late Policy

7.1 Late markdown submission

- -10% per business day. After 5 business-day-delay, grade will be zero.
- can be re-considered when a group encounters critical hardware issues such as SD card damage.

7.2 Late worksheet

- with Orange Success notification: email the instructor for situation-based delay.
- without Orange Success notification: not accepted

8. Attendance

Attendance in classes is expected in all courses at Syracuse University. It is a federal requirement that faculty promptly notify the university of students who do not attend or cease to attend any class. Faculty will use Early-Semester Progress Reports and Mid-Semester Progress Reports in Orange SUccess to alert the Registrar and Financial Aid Office on non-attendance. For more information visit:

https://registrar.syr.edu/students/non-attendance/

If a student is unable to participate in-person or virtually for an extended period of time (48 hours or more), the student may request an absence notification from their home school/college Dean's Office or through Student Outreach and Support office. Instructors will be notified via the "Absence Notification" flag in Orange SUccess.

Barnes Center at the Arch (Health, Counseling, etc.) staff will not provide medical excuse notes for students. When Barnes Center staff determine it is medically necessary to remove a student from classes, they will coordinate with Student Outreach and Support case management staff to provide appropriate notification to faculty through Orange Success. For absences lasting less than 48 hours, students are encouraged to discuss academic arrangements directly with their faculty.

9. Academic Integrity and Artificial Intelligence

As a pre-eminent and inclusive student-focused research institution, Syracuse University considers academic integrity at the forefront of learning, serving as a core value and guiding pillar of education. Syracuse University's Academic Integrity Policy provides students with the necessary guidelines to complete academic work with integrity throughout their studies. Students are required to uphold both course-specific and university-wide academic integrity expectations such as crediting your sources, doing your own work, communicating honestly, and supporting academic integrity. The full Syracuse University Academic Integrity Policy can be found by visiting class.syr/edu, selecting, "Academic Integrity," and "Expectations and Policy."

Upholding Academic Integrity includes the protection of faculty's intellectual property. Students should not upload, distribute, or share instructors' course materials, including presentations, assignments, exams, or other evaluative materials without permission. Using websites that charge fees or require uploading of course material (e.g., Chegg, Course Hero) to obtain exam solutions or assignments completed by others, which are then presented as your own violates academic integrity expectations in this course and may be classified as a Level 3 violation. All academic integrity expectations that apply to in-person assignments, quizzes, and exams also apply online.

Students found in violation of the policy are subject to grade sanctions determined by the course instructor and non-grade sanctions determined by the School or College where the course is offered. Students may not drop or withdraw from courses in which they face a suspected violation. Any established violation in this course may result in course failure regardless of violation level.

Syracuse's academic integrity expectations extend to the fast-growing realm of artificial intelligence (AI). For this course, **the usage of generative AI tools is:**

- **Not allowed in finishing the worksheets. The worksheet is intended to test your fundamental knowledge.**
- **Not allowed in generating a "fake" Markdown. The Markdown must be the record of your actual lab work.**
- **Encouraged to use to assist programming and troubleshooting embedded systems.**

10. Disability Syllabus Statement

Syracuse University values diversity and inclusion; we are committed to a climate of mutual respect and full participation. There may be aspects of the instruction or design of this course that result in barriers to your inclusion and full participation in this course. I invite any student to contact me to discuss strategies and/or accommodations (academic adjustments) that may be essential to your success and to collaborate with the Center for Disability Resources (CDR) in this process.

If you would like to discuss disability-accommodations or register with CDR, please visit Center for Disability Resources. Please call (315) 443-4498 or email disabilityresources@syr.edu for more detailed information.

The CDR is responsible for coordinating disability-related academic accommodations and will work with the student to develop an access plan. Since academic accommodations may require early planning and generally are not provided retroactively, please contact CDR as soon as possible to begin this process.

11. Discrimination or Harassment

Federal and state law, and University policy prohibit discrimination and harassment based on sex or gender (including sexual harassment, sexual assault, domestic/dating violence, stalking, sexual exploitation, and retaliation). If a student has been harassed or assaulted, they can obtain confidential counseling support, 24-hours a day, 7 days a week, from the Sexual and Relationship Violence Response Team at the Counseling Center (315-443-8000, Barnes Center at The Arch, 150 Sims Drive, Syracuse, New York 13244). Incidents of sexual violence or harassment can be reported non-confidentially to the University's Title IX Officer (Sheila Johnson Willis, 315-443-0211, titleix@syr.edu, 005 Steele Hall). Reports to law enforcement can

be made to the University's Department of Public Safety (315-443-2224, 005 Sims Hall), the Syracuse Police Department (511 South State Street, Syracuse, New York, 911 in case of emergency or 315-435-3016 to speak with the Abused Persons Unit), or the State Police (844-845-7269). I will seek to keep information you share with me private to the greatest extent possible, but as a professor I have mandatory reporting responsibilities to share information regarding sexual misconduct, harassment, and crimes I learn about with the University's Title IX Officer to help make our campus a safer place for all.

12. Faith Tradition Observances

Syracuse University's Religious Observances Policy recognizes the diversity of faiths represented in the campus community and protects the rights of students, faculty, and staff to observe religious holy days according to their traditions. Under the policy, students are given an opportunity to make up any examination, study, or work requirements that may be missed due to a religious observance, provided they notify their instructors no later than the academic drop deadline. For observances occurring before the drop deadline, notification is required at least two academic days in advance. Students may enter their observances in MySlice under Student Services/Enrollment/My Religious Observances/Add a Notification.

13. Health & Wellness Considerations

Mental health and overall well-being are significant predictors of academic success. As such it is essential that during your college experience you develop the skills and resources effectively to navigate stress, anxiety, depression, and other mental health concerns. Please familiarize yourself with the range of resources the Barnes Center provides (https://ese.syr.edu/bewell/) and seek out support for mental health concerns as needed. Counseling services are available 24/7, 365 days, at 315-443-8000.

14. Emergency Situations

In the event of an emergency, please use one of the following numbers to reach ORANGE ALERT:

From any phone: 315.443.2224

From your cell phone: #78 (#SU)

Campus landline: 711