

## **EE P 536 A: Designing and Building Smart Internet of Things Devices (4cr)**

### **Summary:**

This course presents an introduction to the formulation, design, development, and testing of software for real-time embedded systems. It involves practical work on a modern embedded microcomputer or microcontroller, which serves as the target environment for a series of lab projects, culminating in a significant final project.

- **Instructor:**
  - **Sep Makhous**, [sosper30@uw.edu](mailto:sosper30@uw.edu)
    - **Office hours:** After Class or by appointment

**Main Communication Platform (mandatory for all students) : Slack** [CLICK HERE](#)

### **Class Meetings Information:**

- **Lecture and Lab Sessions:**
  - W 6:30p-9:50p
  - Room: [ECE](#) 037

### **Grading policy:**

- **ICTEs: 15%**
    - 5-7 assignments
  - **Labs: 50% (tentative)**
    - *Lab 1: 5%*
    - *Lab 2: 15%*
    - *Lab 3: 15%*
    - *Lab 4: 15%*
  - **Final Project: 35%**
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### **Class format:**

The class will be held **in person**. It is important that you attend the class meetings to increase your learning experience, especially during lab times. We will provide prefilled slides, recorded

lectures, and filled-out notes for you to review asynchronously. We will also provide a zoom option for those who can not make it in person; however, this is not a hybrid course, hence, the engagement through zoom will be limited. If you are joining the class remotely, you will need to make sure to collaborate with your team during labs to receive full credit.

## FAQ

- **Q:** *What should I do if I can't come in person to a class meeting.?*
  - **A:** Connect to the class Zoom: You will be able to listen to the lecture. Coordinate with your team and join them remotely during labs (only if you have to).
- **Q:** *Are office hours remote or in person?*
  - **A:** We will offer both zoom and in person office hours
- **Q:** *When can I demo and how?*
  - **A:** There will be a sign-up sheet provided, you choose a time slot and Demo to the TA who is present in the Lab

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## Overview

### Learning Outcomes [LO]

- Know how to break a real-world problem down into major functional blocks
- Design an embedded system with the proper specifications to meet design objectives
- Develop solutions using C language for SoC microcontrollers
- Debug and test solutions throughout the development
- Addressing performance issues and ways for improvement.

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## Course materials

We will provide lecture notes, homework assignments, and other materials using Canvas Home Page,

Here is a summary of all the course material:

- **Prefilled slides:** will be posted 12 hours prior to the lecture
  - **Filled-out Lectures and Recordings:** will be posted 12 hours after the lecture
  - **Labs:** will be posted at least 1 week prior and will be due on Saturday at midnight.
    - Keep in mind your lab demos should be done by the Friday before the deadline.
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## Labs

*You will work on six labs during this course individually*

*You will need to start on the labs as soon as possible; there will be no extensions on the labs, and late submissions will result in an automatic 0 (unless specified why).*

*Labs are an integral portion of class learning. Failure to make a good-faith effort at the labs is grounds for failing the class.*

**Here is some instructions on how and when to pick up your lab kits:**

You can pick up your lab kits during the first week of the classes or by coordinating with TAs afterward.

**Keep in mind that you only have 1 week for lab 1.**

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## Collaboration guidelines

**Done in teams:** ICTEs and Final Projects- Groups of 2

**Done Individually:** All Labs

***In addition, you are welcome (and encouraged) to:***

- Work together, synchronously and asynchronously, in study groups;
- Use analytical and numerical computational tools -- specify the tool(s) in source code and/or text;
- Reuse example source code and other materials provided in this course;
- Consult textbooks, websites, and other publicly-available materials -- include a full citation(s) with the URL and/or [DOI \(Links to an external site.\)](#).

## Submission guidelines

You will submit your homework write-up by uploading a .pdf on the Canvas Assignment. **We will only grade legible .pdf files**

Labs require your code files (.ino, .ini, or .c) to be:

- Commented according to the [Guidelines](#)
  - Suitably named (e.g. Lab1Part2.ino).
  - Zipped inside a folder containing your last name(s) and the lab number (e.g. LastNameLab1.zip).
  - Submitted through canvas.
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## Exams

No Exams

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## Due dates and extensions

Due date: ***Assignments are typically due by 11:59p on Saturdays.*** Submitting by this deadline will provide +5% bonus points.

Extensions: ***Everyone automatically receives an extension with no penalty*** on lab to midnight (11:59p) on Saturday immediately following the due date. Due to the fact that we will release solutions on Monday morning, **no further extensions will be considered -- please plan accordingly.**

Rationale: We want to incentivize you to start (or at least review) assignments/exams and to make use of scheduled class meeting times -- thus, the nominal due date is 11:59p Sat. However, we don't want to penalize you if other aspects of your professional or personal life take priority in any given week -- thus, the actual due date is 11:59p Sun.

Keep in mind this rule is for lab assignments only, and not the other course assignments.

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## Canvas and Slack

We will use Canvas (i.e. this site) extensively for course materials and **Slack for all communications.**

The instruction team will provide homework, example code, etc. through Canvas; you will submit homework electronically through Canvas as described above.

If you have a question -- about a concept, ICTE problems, Labs, etc. -- it's likely someone else in the class does as well. **Please use our Slack channel to post questions (rather than emailing or messaging the instruction team directly) so that**

- **Others get to propose answers and**
- **Others get to see the definitive answer (if any).**

If you send questions via email to the instruction team, we will direct you to ask it on Slack so others can benefit from our answers.

If you are unfamiliar with Canvas, here are some links to help you get started:

<https://www.tacoma.uw.edu/canvas/getting-started>[Links to an external site.](#)

<https://www.tacoma.uw.edu/canvas/how-do-i>[Links to an external site.](#)

<https://community.canvaslms.com/community/answers/guides> [\(Links to an external site.\)](#)

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### **Diversity, Equity, and Inclusion**

I consider this classroom to be a place where you will be treated with respect, and I welcome individuals of all ages, backgrounds, beliefs, ethnicities, genders, gender identities, gender expressions, national origins, religious affiliations, sexual orientations, abilities – and other visible and non-visible differences. All members of this class, including instructors, are expected to contribute to a respectful, welcoming, and inclusive environment for every other member of the class.

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### **Disability and access accommodations**

Your experience in this class is important to me. If you have already established accommodations with Disability Resources for Students (DRS), please communicate your approved accommodations to me at your earliest convenience so we can discuss your needs in this course.

If you have not yet established services through DRS, but have a temporary health condition or permanent disability that requires accommodations (conditions include but are not limited to;

mental health, attention-related, learning, vision, hearing, physical or health impacts), you are welcome to contact DRS at 206-543-8924 or [uwdrs@uw.edu](mailto:uwdrs@uw.edu) or [disability.uw.edu](http://disability.uw.edu) ([Links to an external site.](#)). DRS offers resources and coordinates reasonable accommodations for students with disabilities and/or temporary health conditions. Reasonable accommodations are established through an interactive process between you, your instructor(s) and DRS. It is the policy and practice of the University of Washington to create inclusive and accessible learning environments consistent with federal and state law.

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### **Religious accommodations**

Effective July 28, 2019, [Washington State Senate Bill 5166 \(Links to an external site.\)](#) required that UW develop a policy for the accommodation of student absences or significant hardship due to reasons of faith or conscience, or for organized religious activities. I am proud that my UW ECE colleague [Rania Hussein \(Links to an external site.\)](#) contributed to drafting and promoting this legislation.

The UW's policy, including more information about how to request an accommodation, is available at Faculty [Syllabus Guidelines and Resources \(Links to an external site.\)](#).

Accommodations must be requested within the first two weeks of this course using the Religious Accommodations Request form available

at: <https://registrar.washington.edu/students/religious-accommodations-request> ([Links to an external site.](#))

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### **Safety**

Call SafeCampus at 206-685-7233 anytime – no matter where you work or study – to anonymously discuss safety and well-being concerns for yourself or others. SafeCampus's team of caring professionals will provide individualized support while discussing short- and long-term solutions and connecting you with additional resources when requested.

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### **Academic Integrity**

Integrity is at the heart of engineering—and of this course. You're here to learn, grow, and challenge yourself, and that only works in a community built on trust and honesty.

If you're ever unsure whether something crosses the line, **ask first**. It's always better to clarify than assume.

Examples of academic misconduct include (but aren't limited to):

- **Cheating** – sharing or receiving answers on exams, quizzes, or individual assignments.
- **Plagiarism** – submitting work that isn't yours or failing to properly credit sources.

As future engineers, you are expected to uphold the **College of Engineering's Statement of Principles**, which emphasizes honesty, responsibility, and respect for the profession and each other.

Suspected violations (e.g., cheating, plagiarism, falsification) will be reported to the **College of Engineering Dean's Office** and the **University's Office of Community Standards and Student Conduct**. Students found responsible may:

- Receive a **zero** on the affected assignment or exam,
- Face academic penalties,
- And in severe cases, risk **expulsion**.

While a case is under review, a temporary **"X" grade** will be recorded. Once resolved:

- If **responsible**, a zero is assigned for that work.
- If **not responsible**, your grade will be updated based on your original performance.

Let's keep this a class—and a community—where everyone earns their success the right way.

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**Credits:** I would like to acknowledge and thank Professor Sam Burden for providing me with the inspiration and framework for this syllabus