CS 480: Special Topics, IoT
Spring 2022

Instructor: Michael P. Rogers
Office: Halsey 214
Office Hours: MW 3:45-4:45 PM, TuThF 3:00-4:00 PM, Other Hours By Appointment
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Class Times: MoWe 1:50-3:20 PM (M: Halsey 309; W: Halsey 101C (usually))
Credits: 3

Description (from the catalog): A topic of current interest in computer science will be investigated by faculty and qualified students. In addition to lectures by faculty, the students will be responsible for research and presentation of selected aspects of the topic. The course may be repeated for credit if the topic is different, and the student has the consent of department.

Course Details: In this version of CS 480, we will study the Internet of Things, IoT. Topics will include a study of electricity and electronics, including prototyping IoT devices**;** programming these devices; and analyzing data that these devices provide, using cloud computing.

Prerequisites: Junior-level standing; consent of instructor; CS 262 with a grade of C or better.

Course Website: if it happens in this course, it will be posted on UWO's Canvas site. Set up notifications to be alerted when announcements, grades, assignments, notes, etc., are posted.

Required Text: None. All materials for this course are free and available online.

Course Outcomes :
Upon successful completion of the course, students will be able to:

1. describe the origins and current state of IoT
2. explain the basics principles of electricity, electronics, and IoT
3. analyze existing and create new schematic diagrams
4. design, create and program IoT devices
5. understand the fundamentals of cloud computing technology
6. deploy cloud computing technology to store and analyze IoT generated data

Grading Criteria:

Category	%
Exams (2)	30
Lab Exam	15
Labs	20
Group Project	20
Student Presentations	5
Quizzes / Participation / Equipment Handling	10

Grade Scale:

%	≥ 92	90-92	88-90	82-88	80-82	78-80	72-78	70-72	68-70	62-68	60-62	< 60
Letter	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F

Exams: There will be 2 exams administered on or about

- **Monday, March 7 (week 6)**
- **Monday, May 9 (week 14)**

You will be permitted to bring in one 8.5x11 inch sheet of hand-written, double-sided notes for each, but no other resources.

Lab Exam: There will be a lab exam, administered on or about **Wednesday, April 6 (week 9).** Students will work in teams of 2 to analyze a problem, and build and program an IoT device to solve that problem.

Group Projects: Students, working in different teams of 2-4 (the exact number will depend on enrollment), will be expected to design an IoT project to solve some pressing problem. Projects are expected to be somewhat novel, and the selection of a suitable problem is the most important aspect of this project. Students may use any resources that they need to solve this problem.

Project Considerations:

- If extra electronic components are required, provide sufficient notice to ensure that the parts get ordered on time. This is especially important in this era of supply shortages.
- Students are invited to begin looking at suitable IoT projects now, and hackster.io is a fine place to start. Consult with other faculty and your peers to come up with ideas.

Student Presentations: As part of the requirement for CS 480, students will be need to research, and make a short, professional presentation, on some aspect of IoT. Presentations will be spread out over the semester, 2-3 per week, starting in week 7.

Late Work: Late work will not be accepted, unless the student has a note from the Dean of Students Office or a medical professional, or some other officially excused absence.

Coding Standards: All code must adhere to the coding standards as described on the website (under Helpful Resources): think of it as preparation for the workforce, where this is de rigueur. Points will be deducted for violations.

Equipment Handling: All electronic components used in this course must be returned, in good working order, at the end of the semester.

Absences: It has been scientifically proven that the most significant factor for predicting student success is attendance (although whether this is truly causation or merely correlation is another question). Students should attend each and every class as scheduled, and notify the instructor ahead of time if you will be absent. If you are unable to take an exam/quiz at the prescribed time a) let me know in advance, via email, and b) provide justification (a note from medical professional who treated you, or a representative from the Dean of Students Office).

Academic Integrity: The purpose of this course is to teach you in particular about data structures, and more generally how to think, how to *problem solve*. For that reason, the work

that you turn in must be your own. You may have *general* conversations with students to clarify the nature of an assignment, and you can ask for help with debugging, but that second-set-of-eyes-student should not be looking at their code while they assist you. Sometimes students are unaware of whether or not they have committed plagiarism, so here are some tips:

1. if your problem solving begins with ctrl-C and ends with ctrl-V, you have committed plagiarism.
2. if your problem solving starts at Google and ends at Chegg, you have committed plagiarism.
3. if your problem-solving involves surreptitiously glancing at the exam of the student next to you and doing a virtual copy-and-paste, you have committed plagiarism.
4. if that tiny voice inside your head, the same one that inconveniently shuts up entirely while you are working on a data structures assignment, starts making "ahem" noises, you have committed plagiarism.

Let us consider the pros and cons of committing plagiarism.

Pros:

1. You have completed the assignment.

Cons:

1. You will have missed that exhilarating, ego-boosting, delicious eureka! moment that everyone experiences when they have, on their own, solved a difficult puzzle.
2. You will be caught, receive a 0 on the assignment/exam, and may face disciplinary action in front of a bevy of grim-faced administrators who you do *not* want to meet.

So what do you do when you can't solve a problem? The answer is simple, ask your instructor (or lab assistant) for help. We will use the time-tested Socratic method, asking questions that will lead you to the correct answer. Failing that, just write "I have no idea" in bold letters in the comment block at the top of the assignment, turn it in, and you will gain *some* points (more than 0).

For more detailed information on what constitutes academic misconduct, please see the discussion of UWS Chapter 14, Student Academic Disciplinary Procedures.

Accessibility: Your instructor is committed to ensuring a fair playing field. If you have a disability and need assistance (e.g., a note taker, certain seating, extra time to take tests, adaptive technology, etc.), please register with the Accessibility Center, and we work hard to accommodate your needs.

Non-discrimination and Anti-harassment: Your instructor is committed to maintaining a harassment-free, welcoming classroom, and will not tolerate discrimination on the basis of race, religion, creed, color, gender, identity/expression, ancestry, national origin, age, marital status, relationship to other employees, sexual orientation, disability, veteran's status, membership in the military, arrest/conviction record, political affiliation, or any other protected status.

Class Participation and Feedback: Your instructor relishes class participation and feedback. If you are lost, please, please ask, during class. You do not need to worry about slowing down the class, and your fellow students, who probably were thinking the same thing but were afraid to ask, will silently or possibly aloud applaud your efforts, as will I.

Masks: All students are required to wear an appropriate mask that covers their mouth and nose when they are in the classroom. They must also adhere to additional expectations communicated by the instructor or posted in the classroom. Note: UWO procedure dictates

that, during the COVID-19 pandemic, an instructor cannot begin class until all students are wearing a mask properly. If a student is non-compliant with the masking policy and refuses to leave the classroom promptly when requested, the instructor is required to cancel class. Students responsible for class cancellation for these reasons will be referred to the Dean of Students office, and the student will be unable to attend class until they meet with the Dean of Students. The student may be dropped from the class by the Dean of Students.

Consumer Information: Students are advised to see the following URL for disclosures about essential consumer protection items required by the Students Right to Know Act of 1990: https://uwosh.edu/financialaid/consumer-information/

Note: In the event of any substantive changes to this syllabus, you will be notified in a timely manner.