Course Syllabus

CE 432 Microcontrollers (3-Credit)

1. Professor:

Yiyan Li: SFH 2755B, yiyanli185@gmail.com, yli@fortlewis.edu

Office Hours: Office hours will be on Microsoft Teams (virtual) for Fall 2020 due to the pandemic (the office area has limited access to students)
The Office hours will be MWF 9 am - 11 am, 8/24/2020 - 11/25/2020. The Microsoft Teams link: Join Microsoft Teams Meeting
Send me an email if you need to talk to me face-to-face, I'll come out to meet with you if I can.

Lecture Time: MWF 2:30 – 3:25 pm.

Lecture Location: BH570

2. Course Overview

This course focuses on the software/hardware for the development of robots. This course starts with an introduction to the power supply techniques for different types of robots and an introduction to sensors/actuators being used by robots. Three comprehensive robot projects will follow. Students will learn the state-of-the-art software and hardware for developing a robot. Student will be trained on the design of mechatronics for a robot arm, the PID control for a 2-wheel balanced car, and a computer vision system for object detection.

3. Schedule for Fall 2020 due to the COVID-19 pandemic

Fall 2020 Schedule:

M Aug 24 - begin classes

W Nov 25 - end classes

R Nov 26 thru Su Nov 29 - Thanksgiving break

M Nov 30 thru F Dec 4 - Finals

4. Course Topics and Schedule. Please visit www.yilectronics.com, under the tag 'Teaching' to find the instructions, homework assignments, and other information.

Week 1	Power Supply (AC – DC)
Week 2	Power Supply (DC – DC, Buck Converters)
Week 3	Power Supply (DC – DC, Boost Converters)
Week 4	Introduction to Sensors I
Week 5	Introduction to Sensors II

Week 6	Introduction to Actuators
Week 7-10	Design a Robot Arm
Week 11-14	Design a 2-Wheel Balanced Car

5. Course Learning Outcomes (with associated ABET criteria):

After completing CE432 students will be able to:

- Design power supply circuits for robots. (1, 2)
- Identify correct sensors and actuators for a robot. (1, 2)
- Design the software and the hardware of a robot arm or a robot car. (1, 2, 6)
- Design a feedback system using microcontrollers. (1, 2, 6)
- Perform product prototyping with PCBs. (1, 2)

6. Engineering Program Student Learning Outcomes (ABET criteria)

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural social, environmental, and economic factors.

3. an ability to communicate effectively with a range of audiences.

4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgement to draw conclusions.

7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

7. Prerequisite

CE 241/CE341 Fundamentals of Computer Logic, at least C- AND ENGR431 Introduction to Robotics, at least C-.

8. Textbook

No Textbook is required for this class. Visit www.yilectronics.com for tutorials and instructions.

9. Grading, Homework assignments, Quizzes, and Exams

Homework assignments and quizzes 60%, project report/presentation 20%, Final 20%.

A: 93-100, A-: 90-92, B+: 87-89, B: 83-86, B-: 80-82, C+: 77-79, C: 73-76, C-: 70-72, D+: 67-69, D: 63-66, D-: 60-62, F: <60

Homework assignments are lab reports that you should upload to the website. (Instructions for how to do this will be available to you).

Quizzes will be done in class. I'll notify you 1 week prior to the day that has a quiz.

There is only one final exam for this course. No midterm and other exams.

10. Policies

Regularly being tardy for lectures, leaving in the middle of lectures, or earlier from lectures is unacceptable without prior consent of the instructor.

Cheating or plagiarism will result in an automatic F grade in the course (so do your own homework and projects).

****"Fort Lewis College is committed to providing all students a liberal arts education through a personalized learning environment. If you think you have or you do have a documented disability which will need reasonable academic accommodations, and/or if you are a Veteran who may need services, please contact the Disability Services Office, 280 Noble Hall, 970-247-7383, disabilityservices@fortlewis.edu for an appointment as soon as possible."