

**CECS 262 - Syllabus**  
**Introduction to Embedded System Programming**  
**Spring 2023**  
**Instructor: Eric Hernandez**

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<b>Office Hours:</b>	M/W 11:00-12:00 P.M. VEC-403 or by appointment
<b>E-mail Address:</b>	eric.hernandez@csulb.edu
<b>Course Website:</b>	<a href="http://www.engreric.com/">http://www.engreric.com/</a>
<b>Lecture:</b>	Sec: 1, Class #: 8990, Fri., 8:00 A.M. to 9:40 A.M. ECS-308
<b>Laboratory:</b>	Sec: 2, Class #: 8991, Fri., 10:00 A.M. to 12:45 P.M. ECS-411

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### **A. Description**

This is an introduction to the world of Embedded Systems using C as the programming language. At the heart of every Embedded System is the Microcontroller. This class will focus on the 8051 microcontroller architecture and on the proper procedural programming techniques for real world interfacing.

### **B. Organization**

This is a lecture and lab based course in which topics are presented in the lecture and demonstrated in the lab through a series of projects that build upon each other. It is very important that each lab is completed as most labs will rely on the knowledge gained from the previous one. Successful completion of the course is reliant upon completion of the labs.

**Note on Online Format** - This semester we are continuing in an online format due to the ongoing Covid pandemic. Classes will be done synchronously, meaning that we will meet and be responsible for all course information during our scheduled lecture and lab time via Zoom. The Zoom link is always available on Beachboard by going to the class of interest and clicking on zoom across the top.

### **C. Course Objectives**

1. To introduce students to microcontrollers and embedded systems with C on the 8051.
2. To learn proper procedural coding techniques.
3. To learn the architecture and memory organization of the 8051.
4. To learn real world interfacing schemes and peripherals to create a full embedded system.
5. To gain hands-on skills from design to implementation, soldering and making circuits.

## D. Course Topics

Embedded Systems	8051 Architecture	C Programming
Special Function Registers	I/O Programming	In System Programming
Software Debugging	Timers	Interrupts
Motor Control	Sensor Interfacing	Data Acquisition

## E. Text and Required Materials

**“C and the 8051”**, 4th Edition (March 1, 2008), by Thomas Schultz. ISBN: 158961237X, Publisher: Wood Island Prints. Other Useful Books and Resources:

**“The 8051 Microcontroller and Embedded Systems Using Assembly and C”**, 2nd Edition, by Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay. ISBN: 0-13-119402-X, Publisher: Pearson Prentice Hall, Copyright: 2006.

**“Embedded System Design with the 8051”**, by Han-Way Huang. ISBN: 978-0495-47174-5, Publisher: Cengage Learning, Copyright: 2009.

**“C Programming for the Absolute Beginner”**, 2nd Edition, by Michael A. Vine. ISBN: 978-1-59863-480-8. Publisher: Course Technology, a part of Cengage Learning, Copyright: 2009.

### Development Board:

8051 based microcontroller development board – EFM8BB1, or similar: MDE 8051 Trainer, Lab Pro51 Board.

### Other Supplies:

Multimeter, Oscilloscope Probes/FG Cable, Breadboard, Wire, Resistors (various values) and other discrete components as required.

Keil uVision 8051 IDE and Simulator.

## F. Copyright Notice

All materials for this class: syllabus, website, lecture/lab/tutorial videos, lab documents and all other documents pertaining to this class are Copyright © 2021 Eric Hernandez. These materials are protected by U.S. and International copyright laws. Reproduction and distribution of these materials without written permission of the creator is prohibited.

## G. Grading Plan

Coursework will be weighted as follows:

1. Midterm 1	20%	
2. Midterm 2	20%	
3. Final Exam	20%	
4. Labs and Homework	20%	Late work will lose 10% per <b>day</b> .
5. Weekly Submitted Notes	10%	No Late Submissions
6. Quizzes, Participation, Attendance	10%	Lowest Quiz Dropped

A – 100%-90%

B – 89%-80%

C – 79%-70%

D – 69%-60%

F – 59%-0%

Grades will be curved once at the end of the semester. “Curving” will never cause you to receive a grade lower than the scale above.

### G1. Midterm 1 & 2

There will be two midterm exams around week 5 and week 11, the specific dates of which to be determined during class and announced at least 1 week before. It will consist of all material up to that point of class. Preparatory materials including sample exams that are already available on the website. For makeups, please refer to the makeup policy.

### G3. Final Exam

There will be one final exam during our scheduled final exam date and time, this is posted later in the semester by the school and is viewable on my.csulb.edu. The Final Exam is cumulative and will consist of approximately 2/3<sup>rd</sup> new material and 1/3<sup>rd</sup> pre-midterm material. Preparatory materials including sample exams are already available on the website.

### G4. Labs and Homework

Topics presented during the lecture are demonstrated in the lab through a series of projects that build upon each other. It is crucial that each lab is completed as the lab progression will rely on the knowledge gained from the previous one. Successful completion of the course is reliant upon completion of the labs.

### G5. Weekly Submitted Notes

Your notes taken during the lecture and lab are vital to your success. By taking notes as topics are presented you are actively engaging with the lecture, the class and with the material. It is for this reason that I am requiring that all your notes for every lecture and lab be submitted once a week in the dropbox on beachboard. The format will be in PDF and may be done as pictures of your handwritten

notes or as any electronic format that is converted and uploaded as a PDF. If the class is on TTH or MW then the notes must be uploaded by that week's Friday 11:59PM, alternatively if the class is held once a week on Friday then you may upload the notes by Sunday 11:59PM. Notes are to be taken by every student on an individual basis. You may not submit another student's notes as your own. If I see multiple submissions of the same work, then the work in question would be considered plagiarized, both students would receive no credit and receive a reduction of one letter grade from their final course grade.

## **G6. Quizzes, Participation, Attendance**

There will be approximately 8 or more quizzes throughout the semester. Quizzes may or may not be announced before hand and they may occur at any time during the lecture or the lab time. It is the responsibility of the student to be available during our scheduled class time for any quiz. Attendance is vital for success in this class and will be checked periodically throughout the semester.

## **H. Exam/Assignment Makeup Policy**

Make-up exams are provided for any excused absence. Excused absences include, but are not limited to:

- Illness, injury to the student, or medical conditions, including those related to pregnancy
- Death, injury, or serious illness of an immediate family member. An immediate family member is defined as a close relative, or a person residing in the immediate household of the student.
- Religious reasons (California Education Code section 89320)
- Jury duty, military service, or other government obligation
- University-sanctioned or -approved activities (examples include but are not limited to artistic performances, participation in scholarly conferences and presentations, intercollegiate athletic activities, student government, required class field trips, etc.)

Anticipated Absences require advanced notification (minimally one week in advance) as well as verification. These absences may include the following reasons:

- Religious reasons,
- Jury duty, military service, or other government obligation
- University-sanctioned or -approved activities

Non-anticipated absences are usually a type of emergency and cannot be anticipated. These absences may include the following reasons:

- Illness, injury to the student, or medical conditions, including those related to pregnancy
- Death, injury, or serious illness of an immediate family member. An immediate family member is defined as a close relative, or a person residing in the immediate household of the student.

A make-up exam will be given for any excused absence with documentation. For example in the case of a medical emergency, documentation may take the form of a doctor's note or if the emergency was an vehicular accident then an accident report would serve as documentation.

*To learn more about the University policy on Attendance, visit:*

<https://www.csulb.edu/academic-senate/policy-statement-17-17-attendance-policy-supersedes-01-01>

## **I. Cheating/Plagiarism/Academic Integrity Policy**

There is **zero tolerance** for cheating, plagiarism, or any other act of violation of Academic Integrity policy. Work that you submit is assumed to be original unless your source material is documented appropriately, using proper citation. Using the ideas or words of another person, even a peer, or a web site, as if it were your own, is plagiarism. Any individual or group caught cheating on homework, lab assignments, or any exam/quiz will be subjected to full extent of academic actions allowed under University regulations.

**At a minimum**, any student caught *violating the Academic Integrity Policy* will receive no credit for the work concerned, and will receive a reduction of one letter grade from their final course grade.

To learn more about the University policy on Cheating and Plagiarism, visit:

<http://catalog.csulb.edu/content.php?catoid=5&navoid=369#cheating-and-plagiarism>

## **J. Class Prerequisites**

CECS 174 and 201 with a grade of "C" or better.

## **K. COE Tutoring Services Available for Major Classes**

The College of Engineering Tutoring Center offers free tutoring for many lower and upper division engineering courses in MAE, CECS, CECEM, CHE and EE. Tutors are available Monday through Friday during the fall and spring semesters between the hours of 9:00am-6:00pm in EN2-300.

Visit the following website for detailed tutoring schedules:

[http://web.csulb.edu/colleges/coe/views/essc/academic\\_success/engineering\\_tutor.shtml#asp\\_ETP](http://web.csulb.edu/colleges/coe/views/essc/academic_success/engineering_tutor.shtml#asp_ETP)

## **L. Accommodations:**

Students with disabilities who need reasonable modifications, special assistance, or accommodations in this course should promptly direct their request to the course instructor. If a student with a disability feels that modifications, assistance, or accommodations offered are inappropriate or insufficient, he/she should seek the assistance of the Director of Disabled Student Services on campus.

## **M. Sexual Assault, Rape, Dating/Domestic Violence, & Stalking**

Title IX prohibits gender discrimination, including sexual harassment and sexual misconduct. If you have experienced sexual harassment, sexual assault, rape, dating/domestic violence, or stalking, the campus confidential Victim's Advocate is available to help. Jaqueline Urtez (e: [advocate@csulb.edu](mailto:advocate@csulb.edu), p: (562) 985-

2668) can provide free and confidential support, accommodations, and referrals for victims without having to report the assault to campus authorities. While students are welcome to discuss assaults with faculty, both faculty and teaching assistants are mandatory reporters who are required to report all incidents of sexual harassment/misconduct to the Title IX office for follow-up and possible investigation. Students who do wish to report the assault for possible investigation may contact the confidential victim's advocate, who can help them through the reporting process, or they can report the assault directly to the Title IX Office by completing an online reporting form at <https://www.csulb.edu/equity-diversity/title-ix> or contacting the Office of Equity & Diversity at [OED@csulb.edu](mailto:OED@csulb.edu).

## **N. Food and Housing Assistance**

Any student who is facing academic or personal challenges due to difficulty in affording groceries/food and/or lacking a safe and stable living environment is urged to contact the CSULB Student Emergency Intervention & Wellness Program. The website outlining the resources available is [www.csulb.edu/basicneeds](http://www.csulb.edu/basicneeds). Students can also e-mail [supportingstudents@csulb.edu](mailto:supportingstudents@csulb.edu) or call 562/985.2038. If comfortable, students may reach out to the professor as they may be able to identify additional resources.