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# SYLLABUS CMPE 311

## C PROGRAMMING AND EMBEDDED SYSTEMS

### COURSE DESCRIPTION

In this course, students learn about hardware and software aspects of embedded systems. Students learn C programming language through use in an embedded platform. The course builds on CMPE 310, introducing advanced topics including communication interfaces, advanced IO devices and other peripherals, multitasking, firmware, real-time operating systems/embedded operating systems and device drivers. The course will provide a hands-on experience in designing and programming an embedded system using a microcontroller-based development platform.

### INSTRUCTOR

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Professor Tinoosh Mohsenin  
ITE 323  
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410-455-1349

### TEXTBOOK

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You may not need a text book for this class, all lecture notes provide all details. This book is recommended:  
Embedded Systems: A Contemporary Design Tool by James K Peckol 7th edition  
ISBN: 9780471721802

### COURSE MATERIALS

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All materials will be posted to my website at  
<http://www.csee.umbc.edu/~tinoosh/cmpe311/>

Check frequently for class news, lecture notes, discussions, and assignments.

### PREREQUISITES

REQUIRED: CMPE 310 – Systems Design and Programming

## MAJOR LEARNING OBJECTIVES

At the conclusion of this course, students will:

- Have developed programming skills in the C language
- Understand the hardware and software requirements for a microcontroller-based embedded system
- Be familiar with , and be able to use built-in microcontroller peripherals including coding and building external hardware
- Be able to develop code for multi-tasking applications, and be familiar with process synchronization, resource sharing, and task scheduling
- Be able to install and use a real-time operating system on embedded hardware
- Be able to design and build a real-time system performing data-capture, communications, and user interface

## GRADE DISTRIBUTION

Grading will be based on the following scheme, though I reserve the right to make minor changes to the distribution as I see fair and appropriate during the semester. All changes will be announced in class and reflected in a syllabus change

- In Class Quizzes, Assignments, and Exams: 30%
- Projects: 50%
- Class Participation: 5%
- Discussion Section Participation: 15%

Final grades will be assigned according to the following scores:

- A: 90% or greater
- B: 80%-89.9%
- C: 70%-79.9%
- D: 60%-69.9%
- F: 59.9% and below

I reserve the right to change this scale as I see fair, but I guarantee that you will earn at least the grade given by these scores.

## PROJECTS

Five projects will be assigned throughout the semester. These projects are long, and require a significant effort on the part of the student. I suggest starting them when they are assigned and getting help from the TAs and instructor whenever necessary. This is not a software class, hacking a solution together at the end of the homework period will likely run you into hardware issues which you cannot resolve in time.

The distribution of the grades across the projects will be based on their length, and are not necessarily 10% for each project.

## DISCUSSION SECTION

Discussion section grades are based off of attendance and performance in the discussion sections, with grades assigned by the TA of that section. Each meeting will be assigned with a pass/fail grade according to meeting a certain criteria for that meeting. The final grade for this section will be the number of passes earned divided by the number of meetings.

If you must miss for a good reason, contact the TA and ask how you may make it up. Unexcused absences will receive a fail for that meeting.

## QUESTIONS AND FORUM

We will be using Piazza for this class. You can sign up for the course forum per instructions by the TAs. Look for and post questions here first so that the TAs or instructors can answer them without redundancy.

**\*\*DO NOT** post code on this site. If you post code for a project/homework on this site, I will treat it as an academic integrity issue. **DO NOT** post your code on other sites where it may be grabbed by the class (stackoverflow, googlegroups, etc...). Try to come to instructor or TAs with direct code questions, or ask single line/pseudocode questions if the need arises.

## LATE POLICY

If the solution for the assignment is reviewed in the class or posted in the website no credit will be given for late submission. Otherwise If assignment was not reviewed in class, there will be a 1/3 reduction of remaining credit per day (i.e., 100% -> 67%, 44% -> 30% ...). This policy is rigid and will not change excepting extreme circumstances

## COLLABORATION POLICY

Unless otherwise given in the project/assignment statement, all homework, quizzes, assignments, and exams are to be completed alone. This includes the sharing of code. Any code taken from websites must be CITED according to policy on the website. Discussion of projects among the class is expected and you may minimally discuss approaches to projects.

## ACADEMIC INTEGRITY AND MISCONDUCT

By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Conduct Policy, consult UMBC policies, or [http://www.umbc.edu/undergrad\\_ed/ai/students.html](http://www.umbc.edu/undergrad_ed/ai/students.html)