

Syllabus
TECH 3230
Embedded System Programming

Course Information

Instructor

Instructor: Daniel Kohn

Email: dekohn@memphis.edu

Office: ET 218

Class Website: <http://www.tech-uofm.info>

Lecture Meetings and Location

Classroom: ET 227

Class Meeting Schedule: Tuesday / Thursday 11:30am – 12:25pm

Lab Meetings and Location

Classroom: ET 227

Class Meeting Schedule: Tuesday 1:00pm – 3:45pm

Instructor Availability

I will be available during posted hours (see website) or by appointment for assistance, consultation and/or advisement

Course Information

Course Description and Purpose

Advance programming topics used for embedded systems and Internet of Things (IoT) devices. Two hours lecture; 3 hours lab per week. PREREQUISITE: TECH 1211.

Course Objectives

1. Reinforce student understanding of programming fundamentals.
2. Advance students proficiently in programming.
3. Demonstrate a knowledge of various programming techniques for embedded systems.
4. Demonstrate knowledge of arrays, strings, special variable types, pointers, and memory storage.
5. Introduce students to hardware and software interrupts
6. Introduce students to software libraries and software optimization.

Course Topics / Tentative Schedule

1. Review of programming fundamentals (2 weeks)
2. Special variable types and scope (1 week)
3. Bitwise operators and bit manipulation (1 week)
4. Functions (1 week)

5. Pointers (1 week)
6. Arrays (1 week)
7. Strings and string manipulation (2 weeks)
8. Programming Interrupts (1 week)
9. Storing to Ram, Rom, Flash Memory (1 week)
10. Creating C Libraries (2 weeks)
11. Code Optimization (2 week)

Course Requirements

Textbook

AVR Microcontrollers and ATMEL Studio for C Programming with Arduino by Warwick A. Smith ISBN 978-1-907920-46-2

Course Policies and Expectations

Communication

All assignments, handouts etc. will be distributed in electronic form from the instructor's website at:

<http://tech-uofm.info/> (under the TECH3230 Link)

Additionally, e-mails will be sent to your University of Memphis e-mail account on occasion. [if you wish to use an e-mail account other than that provided to you by the University, you need to set up forwarding of your University e-mail to another preferred address]

Emailing Instructor

If you need to email the instructor for any reason, please:

- Write professionally (no slang, text message shortcuts, etc)
- Put the Class Number in the subject (eg "TECHxxxx – Request a meeting")
- If you are referring to an assignment or lab, include the number (eg "I have a question on Lab #3.")
- If you are requesting an appointment, please check the instructor's online schedule and include at least 3 possible meeting times/dates in your 1st email this will cut down on the number of emails to set up the appointment)

Attendance and Participation

Class attendance is mandatory. Students are responsible for all materials presented in class whether they have attended or not. If a student misses a class, lecture notes should be obtained from a fellow classmate, not from the instructor.

Extra Credit

There will be opportunities for extra credit during the semester. Extra credit only applies once a student has proven proficiency in the class material by receiving a C- or above in the class.

Cell Phones

Disruptions to class meetings are to be avoided. For this reason, all cellular telephones are to be turned off before entering the classroom unless your equipment has an inaudible alert feature (vibratory alert). First infractions of this policy will result in a verbal warning; each subsequent infraction will result in a two-(2) percentage point penalty against your final course grade. If required, further action will be taken as outlined in the Student Handbook under the heading "Classroom Misconduct."

Disabilities

Any student who anticipates physical or academic barriers based on the impact of a disability is encouraged to speak with me privately. Students with disabilities should also contact Disability Resources for Students (DRS) at 110 Wilder Tower, 901.678.2880. DRS coordinates access and accommodations for students with disabilities.

Missed Tests and Quizzes

Quizzes cannot be made up for any reason. Tests can only be made up if the student contacts the instructor BEFORE THE START OF CLASS (via email, voicemail or phone) and only if the student provides a reason with proof (i.e. doctor's excuse, police report etc). The final exam cannot be made up for any reason. Failure to take a test is NOT grounds for a retest, and an F in the class will result.

Testing Policy

Before a test, students will be informed as to what resources will be available during the test such as calculators, notes, textbooks, formula sheets, etc. Using resources NOT allowed and will be treated as "Academic Misconduct."

Assignment Submission

Assignments are due at the beginning of the class period on the due date due (typically one week for labs, one class for assignments).

All assignments must be submitted as per instructions (ie: paper, electronic submission, or both).

- If an electronic submission is required, use the "Submit Assignment" link on the class website.
- If you need to resubmit an assignment, put a number after your name (eg Fred Smith 2) when resubmitting.
- If a technical issue occurs that prevents you from submitting an assignment via the web, please email it to me as an attachment and include in the message the reason (i.e. error message received) that prevented you from submitting it.

Late Assignments and Excused Absence

The instructor will work with student who need to turn in an assignment late or will not be able to attend the day of a test in cases of family emergencies, illness, work related activities, job interviews, etc (with some reasonable proof).

If you know you will be missing a class, inform the instructor via email (with the subject “Missing TECHxxxx on mm/dd/yy”) before the class begins (and for scheduled absences, at least one week prior).

The instructor will not accept excuses such as “I work nights and overslept”, “My computer crashed” (that is what back up are for), did not have access to required software (we have computer labs with all the required software available for student use), etc.

Late assignments (if accepted by the instructor) or electronic submissions submitted under the WRONG assignment name or having the wrong file extension will incur penalty as deemed appropriate by the instructor.

Course Methodology

Students will be evaluated in the following manner:

Test and Final Exam (at least 3)	40%
Labs	50%
Homework, quizzes, attendance	10%

Labs assigned with formal write ups will be worth 3x as many points as informal labs.

All circuits must be demonstrated to the instructor for points to be awarded for completing the lab.

NO DEMONSTRATION will result in a ZERO for the LAB!

Grading

Final letter grades for the semester will be based on the standard plus/minus grading scale as follows:

Grade	Percentage	Quality Points
A+	00% - 98%	4.00
A	97% - 90%	4.00
A-	92% - 90%	3.84
B+	89% - 88%	3.33
B	87% - 83%	3.00
B-	82% - 80%	2.67
C+	79% - 78%	2.33
C	77% - 73%	2.00
C-	72% - 70%	1.67
D+	69% - 68%	1.33
D	67% - 60%	1.00
F	59% - 0%	0.00

Academic Misconduct

Academic Integrity

The Student Handbook of The University of Memphis states that students are expected to conduct themselves with personal and academic integrity. Regardless of these expectations, some students will still “cheat”.

Academic Misconduct

The University of Memphis, Code of Student Rights and Responsibilities, defines academic misconduct as all acts of cheating and plagiarism. The full Code of Student Rights and Responsibilities may be found on the University web site by selecting Student Handbook. Academic misconduct will not be tolerated and such acts will result in the pursuit of the strictest possible sanctions against the student

The term “cheating” includes, but is not limited to:

- a. Using any unauthorized assistance in taking quizzes or tests
- b. Using sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments
- c. Acquiring tests or other academic material before such material is distributed by the instructor
- d. Misrepresenting papers, reports, assignments or other materials as the product of the student’s sole independent effort
- e. Failing to abide by the instructions of the proctor concerning test-taking procedures (examples include talking, laughing, failure to take a seat assignment, failing to adhere to starting and stopping times, or other disruptive activity)
- f. Influencing or attempting to influence any University employee in order to affect a student’s grade or evaluation
- g. Any forgery, alteration, unauthorized possession, or misuse of University documents pertaining to academic scores, including late or retroactive “drop slips” and withdrawal application forms

The term “plagiarism” includes, but is not limited to, the use by paraphrase or direct quotation of the published or unpublished work of another person without full or clear acknowledgement. It also includes the unacknowledged use of materials prepared by another person or agency engaged in the selling of term papers or other academic materials.

It is important for the student to understand that not only is the person who receives unauthorized help guilty of cheating and/or plagiarism so is the party who provides this help. For this reason it is important that you protect your own work so that you do not become an unintentional victim of cheating. DO NOT give others access to your computer files, printouts, lab reports or any other information. Computer printouts that you do not plan to use should be destroyed so that they can not be retrieved from trashcans. In addition, DO NOT save files on the hard drives of lab computers.

Sanctions for Academic Misconduct

Several sanctions are available for cases of Academic Misconduct. These range from exercise of summary discipline in which the student may receive a grade of “F” for either the assignment or the entire course, up to and including expulsion from the University.

Use of Artificial Intelligence (AI)¹

Students are expected to use AI tools responsibly, ethically, and in ways that support their own learning. Misuse of AI not only raises concerns of academic fairness but can also undermine your

¹ Much of the text stated is from Cisco CCNA: Enterprise Networking, Security, and Automation (ENSA) Supplemental Modal 1.1.13 (6/10/26)

engagement with and understanding of course material. If you are unsure whether a particular use of AI is appropriate, please check with the instructor before proceeding.

Inappropriate use of AI is subject to the academic misconduct policies outlined above.

Students Repeating the Course

Students who are repeating the course will notice that some of the assignments, homework and labs are the same as previous years. Even if you have done the assignment before you are REQUIRED to redo the work FROM SCRATCH. Handing in previous semester's work will NOT BE ACCEPTED.

Note

The instructor reserves the right to make changes in the above as needed. The instructor also reserves the right to refuse any sloppy, unorganized papers, homework, labs, programs, exams, etc. Take pride in your work and show me that you care. Strive for professionalism at all times.