

CSE 3442 and CSE5442: Embedded Systems I Spring 2016 - All Sections

Official Location of This Document:

<http://crystal.uta.edu/~zaruba/CSE3442/CSE3442-5442-syllabus.pdf>

Short Course Description:

This course focuses on the design of microprocessor based embedded systems. General schedule:

1. Course Introduction
2. Embedded System Concepts & Microcontroller Features
3. Lab Introduction and Resources
4. PIC Architecture & Assembly Language Programming
5. PIC Programming in C
6. PIC18F Hardware Connections
7. PIC Timers & Serial I/O
8. Interrupt Concepts
9. ADC, DAC, and Sensor Interfacing
10. Other concepts and applications

Prerequisites:

- CSE 2441 (Digital Logic)
- CSE 2312 (Computer Organization and Assembly Language)

Instructor: Gergely Záruba

- Office: 523 ERB
- Phone: (817) 272-3602
- Office hours: Thursdays 2:00pm-4:00pm (other consultations by appointment only.)
- Instructor's e-mail: zaruba@uta.edu
- GTA: Peter Sassaman
 - email: peter.sassaman@mavs.uta.edu
 - Office hours: During labs and TBA
 - Labs: Mondays 2:00pm-4:50pm or Wednesdays 2:00pm-4:50pm

Objectives:

This course focuses on the design of microprocessor based embedded systems. Specific topics include embedded PIC microcontrollers, concepts, programming, system components, architectures, I/O interfacing, and typical applications. A lab accompanies the lecture where basic interfacing and other design concepts are investigated and implemented.

Outcomes:

By finishing this course, students will possess the knowledge of architectural concepts of microcontrollers and microprocessor based embedded computing systems.

Details of Curriculum:

- Class meets Fridays 9:00am-11:50am in WH210
- Class WWW site: <http://crystal.uta.edu/~zaruba/CSE3442/>
Note: Please check WWW site for up to date information
- Class mailing list address: CSE3442-ZAR@LISTSERV.UTA.EDU

Note: students are strongly encouraged to sign up for the mailing list of the class; *Please either request membership via the listserv provided web interface OR send me an email within the first week of classes with the subject:CSE3442 and the body containing your email address.*

- Text Book: Mazidi, Mckinlay, and Causey, “**PIC Microcontroller and Embedded Systems,**” Prentice Hall, ISBN: 978-0131194045
- Lecture slides will be placed on the web.

Details of Class Policies:

Course Grades:

Tentatively, course grades will be based on the following:

- In class and outside assignments (20%)
 - Occasionally an ‘in class assignment’ or homework may be given. Only those in attendance will receive credit for any ‘in class assignment’.
 - There will be no make up for assignments/homework. The maximum grade given for assignments/homework will decline by 20% of the total grade each calendar day the assignment/homework is overdue starting razor sharp after the deadline.
- Two Midterms: (40% total; 20% each)
 - There will two midterm exams during the semester, on March 25, 2016 and April 29, 2016.
 - There will be no make up exams!
- Lab Assignments (40%)
 - Based on performance in the accompanying laboratory sessions.
 - One of the lab assignments is going to be an “ABET assessment” project. All undergraduate students must submit documentation sufficient to receive a passing grade in the course.

Pop-Quizzes may be possible throughout the semester; points received (or not received) will apply towards the grade in the “in class assignments” grading part. Tentatively, course grades are determined from the total points (100) earned as follows, (but the instructor reserves the right to “grade over the curve,” or even to give everyone the best grade):

90-100: A ; 75-89: B ; 60-74: C ; <60: F

Make-ups:

Make-ups for (non-exam) graded activities may be arranged if your absence is caused by illness or work/personal emergency. A written explanation (including supporting documentation) must be submitted to your Instructor. If the explanation is acceptable, an alternative to the graded activity will be arranged. Make-up arrangements must be arranged prior to the scheduled due date.

Attendance:

Students are not required but encouraged to attend all class sessions, however they are encouraged as class attendance is strongly correlated to the quality of grade received. In addition, some classes will take place in the lab. Students need to be present in the lab to complete them. No cell phones, loud talking, and sleeping in the classroom, please.

Notes:

- The Instructor reserves the right to modify course policies, the course calendar, and assignment or project point values and due dates.
- All students are expected to be responsible users of the computer systems used for this course.

Accepted file formats for papers/reports:

The Instructor requires students to turn in their papers and reports in *.pdf* (Adobe's portable document format. Source files (!) must be turned in along with the paper in a zip or a gzip (or tgz, .tar.zip) archive. Students are encouraged to use Microsoft Office products or the Latex language and its appropriate compilers (please see the Instructor if you intend to use anything else). If viruses are submitted along with the files a student turns in, the Instructor may degrade the grade of the assignment.

Homework assignments may contain programming components. The choice of programming language is left to the student. However, in some assignments simulation and data generation components might be provided which will be implemented in C or C++. These components will not be provided in additional languages and thus interfacing with C or C++ (which is possible in most programming languages) might be necessary when a different programming language is used. In all cases, the following limitation will apply to the programming language chosen: All programs must compile and run on university machines (either university servers or the machines in the open OIT laboratories) and instructions regarding how to compile and run the code must be provided with the program submission. In case of doubts regarding the use of a particular programming language or software package, contact the instructor prior to its use.

Grievance Procedure:

Anyone feeling that a dispute exists after the grading of any assignment or exam may submit a written grievance. This grievance should identify the item in dispute and arguments supporting the student's position. Grievances must be submitted in writing within two class periods following the return of the assignment. The instructor or GTA agrees to return a written response to the student's grievance within two class periods from receipt of the grievance. If the error is due to wrongful calculation of points, then no grievance needs to be submitted. If a written grievance is received, the instructor and GTA reserve the right to re-grade the entire exam (not just the specific point in question). If the student finds the result unsatisfactory, then any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog.

Drop policy:

Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more

information, contact the Office of Financial Aid and Scholarships (<http://wweb.uta.edu/aao/fao/>).

Title IX:

The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit uta.edu/eos. For information regarding Title IX, visit www.uta.edu/titleIX.

Academic Integrity:

Students enrolled in this course are expected to adhere to the UT Arlington Honor Code: *“I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence. I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.”*

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents’ Rule 50101, §2.2, suspected violations of university’s standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University.

Any student found guilty of academic dishonesty will receive a -100% for that work (project, exam, homework, etc.) as well as having the course grade lowered one full letter grade - in addition to any other penalties assessed (suspension, expulsion, probation). These and other applying UTA rules, will be strictly enforced. Any case of academic dishonesty will be treated in accordance with the UTA *Handbook of Operating Procedures* or the Judicial Affairs website at <http://www2.uta.edu/discipline>. If you do not understand this policy, it is your responsibility to obtain clarification or any additional information you may require

Students are allowed to discuss homework with classmates, but are **not** allowed to copy the solutions of others or share solutions with others. All work turned in for grading must be the student's own work.

Students will be required to sign an academic honesty letter to be kept with the instructor. Failing to provide with such a letter by census day will result in the respective students’ withdrawal from the class.

Disability Accommodations:

UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA), and Section 504 of the Rehabilitation Act. All instructors at UT Arlington are required by law to provide “reasonable accommodations” to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a letter certified by the Office for Students with Disabilities

(OSD). Students experiencing a range of conditions (Physical, Learning, Chronic Health, Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting:

The Office for Students with Disabilities, (OSD) www.uta.edu/disability or calling 817-272-3364. Counseling and Psychological Services, (CAPS) www.uta.edu/caps/ or calling 817-272-3671.

Electronic Communication Policy

UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

Student Support Services:

UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at www.uta.edu/resources.

Student Feedback Survey:

At the end of each term, students enrolled in classes categorized as “lecture,” “seminar,” or “laboratory” shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

Final Review Week:

A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabus. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures:

Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exits which can be reached by taking the stairs one flight down after you exit room WH210 either to the left or to the right (a map with detailed red arrows showing the paths is located next to the classroom door). Detailed maps can also be found here: https://www.uta.edu/campus-ops/ehs/fire/Evac_Maps_All/Evac_WH/Evac_WH_210.pdf When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

Wk.	Date	First half of class	Second half of class	Labs that week
1.	01/22/16	Introduction; microcontrollers	PIC-18 basics	
2.	01/29/16	PIC-18 basics	PIC-18 assembly	Lab-1 (intro)
3.	02/05/16	PIC-18 assembly	Branching	Lab-2 (GPIO)
4.	02/12/16	Branching	Digital I/O	Lab-2 (GPIO)
5.	02/19/16	Digital I/O	Arithmetic	Lab-3 (LCD)
6.	02/26/16	Arithmetic	Banks, Tables	Lab-3 (LCD)
7.	03/04/16	Banks, Tables	Banks, Tables	
8.	03/11/16	Hardware Connections	Hardware Connections	Lab-4 (Hware)
9.	03/25/16	1. midterm	ADC/DAC	Lab-4 (Hware)
10.	04/01/16	ADC/DAC	ADC/DAC	Lab-5 (ADC)
11.	04/08/16	Timers/CCP	Timers/CCP	Lab-6 (DAC)
12.	04/15/16	Timers/CCP	Timers/CCP	Lab-6 (DAC)
13.	04/22/16	Communication	Communication	Lab-7 (Timers)
14.	04/29/16	2. midterm	Free Design	Make-up
15.	05/06/16	Free Design	Free Design	Make-up

Note, that “Labs that week” refers to the Friday labs. Wednesday labs will be one week behind.

As the instructor for this course, I reserve the right to adjust this schedule in any way I deem beneficial; this includes adding to or omitting topics listed above. – Gergely V. Záruba