Embedded Systems Design  
CSCE 3612, Section 001  
Spring 2015

Class Timings: Tuesday and Thursday, 11:30 AM – 12:50 PM, NTDP D201

Instructor: Robin Pottathuparambil (Email: rpotath@unt.edu, Office: NTDP F263)

Graders: Robert Tidwell (Email: RobertTidwell@my.unt.edu, Help Lab: Tuesday and Wednesday 4:00 PM to 6:00 PM) and Evan Rodrigues (Email: EvanRodrigues@my.unt.edu, Help Lab: Thursday 4:00 PM to 6:00 PM)

Course Webpage: All the course related material will be posted on the course webpage which is available through blackboard (https://learn.unt.edu).

Course Outcomes:

1. Understand the differences between embedded computing systems and general purpose computing systems, including constraints on performance, energy consumption, memory and physical dimensions.
2. Able to specify embedded systems using UML or other high level abstract models.
3. Able to use modern micro-controllers, including programming and interfacing such micro-controllers.
4. Understand the use of DSP processors and other Application Specific processors.
5. Understand trade-offs associated with using micro-controllers, DSPs, ASICs and FPGAs to meet embedded system requirements.


Office Hours: Monday and Wednesday 11:00 AM – 12:00 PM, Tuesday and Thursday 3:00 PM – 4:00 PM and by appointment.

Catalog Description: Prerequisite: CSCE 2610 and EENG 2710, or equivalent. Computer systems as embedded computing elements and micro-controllers. System specification using UML or other high-level abstract models. Issues and constraints on embedded computing systems, including power, performance, memory and size. Use of DSP, ASIC and micro-controllers in a single design.

Topics:

- Introduction to Embedded Systems and its design process
- Instruction sets for ARM, PIC, and DSP
- Introduction to CPUs, its performance and power consumption
- Computing platforms and its design
- Program design and analysis
- Processes and operating systems
- System design techniques
- Networks and multiprocessors
Grading:

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<tr>
<th>Assignment</th>
<th>Percentage</th>
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<tr>
<td>Homework</td>
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<td>Lab assignments</td>
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<td>Quizzes</td>
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<td>Final Project</td>
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<tr>
<td>Midterm Exam (03/26/2015)</td>
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<td>Final Exam (05/12/2015)</td>
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**Homework:** Homework is another example of learning by doing. Although not as exciting as a lab, homework is essential to learning the concepts in this course. Homework will be in the form of reading assignments and problem sets, with a due date 2-3 lectures after it is assigned. **No late homework will be accepted.** Homework must be done individually (you will learn the most from this). Any evidence of group participation will be interpreted as academic dishonesty. There will be six to seven homework assignments.

If you have a dispute with how an assignment is graded, you should follow this procedure:

> Get the solution to the assignment off the class web site and examine it. You may have just got the problem wrong. If you really believe that your answer is correct (matches the answer given in the solution), contact the grader and discuss it with him. The grader will listen to your concern, and act on it, at their discretion. In any case, they will sign the homework verifying that they saw it again.

We record all "disputed" points separately. We contend that "disputed" points never add up to a change in your final grade, and we will examine this when final grades are assigned. Note that instructor addition errors should follow the above procedure, but will not be figured in the "disputed" points.

**Lab Assignments:** The laboratory projects are an integral part of the course and are intended to provide experience in the application of the design techniques discussed in lecture. There will be six to seven lab exercises assigned. Lab exercises can be done in the Embedded Systems Lab (NTDP F243) or on your own PC. Lab grades will be based on lab write-ups and demonstrated functionality of problem requirements. A lab report is due at the time of demonstrating the lab. All lab assignments will require demonstrating the exercise working on the board.

**Quizzes:** There will be eight to nine pop quizzes given throughout the semester. These will be to reward students who consistently show up to class, but will be more than just attendance points. Quizzes can be made-up only under extraordinary circumstances and only when notification is given to me before the exam is administered. A no-show for a quiz without prior notification and a verifiable excuse results in a grade of 0 for that quiz.

**Exams:** There will be one mid-semester exam and one final exam. Mobiles phones are not permitted. Exams will include material from the lecture, the readings, homework, and laboratories. Exam dates are:

- Mid-semester exam: Thursday, March 26, 2015 11:30 AM – 12:45 PM, NTDP D201
- Final exam: Tuesday, May 12, 2015 11:00 AM – 1:00 PM, NTDP D201

**Missed exams:** Attendance at all exams is mandatory. Only legal or debilitating medical excuses will be accepted (read: prison time, major blood loss, etc.), provided that they are accompanied by the appropriate official documentation. Makeup exams are more difficult than the exams they replace. Failure to satisfy these criteria will result in a zero grade for the exam.
**Missing Classes/Assignments:** Throughout the semester, a student may miss classes or assignments or exams due to many reasons. Most of the reasons will not be accepted as an "excused" absence. Plus, you can always email your homework. For example: Throughout the semester, a student may miss classes or assignments or quizzes or exams due to many reasons. Most of the reasons **will not** be accepted as an "excused" absence.

**Project:** There will be a final project in the semester. The project will be discussed in class. Your grader/instructor will ask you to demonstrate the project. **Late submission of project will not be accepted.**

**Syllabus Revisions:** This syllabus may be modified as the course progresses. Notice of such changes will be by email or announcement in class.

**Class Policies:** Please note that portable phones, pagers, and late arrivals are disruptive to the instructor and to your peers. The use of cell phones, beepers, or communication devices is disruptive and is therefore absolutely prohibited during class. Turn off your cell phone while in class. If I catch you using these devices, your final grade will be reduced by 10 points for each and every transgression and you will be asked to leave the class. Except in emergencies, students using such devices must leave the classroom for the remainder of the class period. This penalty will be at the sole discretion of the instructor. I know that some of you may wish to take notes directly on your computer and I have no problem with that. If however, you choose to access your email, search the web, play solitaire or other games, or instant messenger your friends during class, you will have 10 points deducted from your final grade for each and every transgression. This penalty will be at the sole discretion of the instructor. If I am late arriving to class, it will be because of circumstances beyond my control. You are expected to remain for 20 minutes past the scheduled class start time while I attempt to communicate my situation and relay instructions.

**Course Policies:** Keep all of your graded assignments, quizzes, and tests for study and review. You should track your own progress using Blackboard, and be aware of current grades throughout the term. Final grading will be done as follows. **A:** 90% - 100%, **B:** 80% - 89%, **C:** 70% - 79%, **D:** 60% - 69% and **F:** < 60%. Grades will be curved if necessary. Grades cannot be changed after they have been electronically entered into the university’s system except for instructor error. Any extenuating circumstances that may adversely affect your grade must be brought to my attention before the final course grades are recorded. To be considered, such circumstances must be unusual, unavoidable, and verifiable.

**Disability Services/Special Needs:** UNT complies with all federal and state laws and regulations regarding discrimination including the Americans with Disability Act of 1990 (ADA). If you have a disability and need a reasonable accommodation for equal access to education or services please contact the Office of Disability Accommodation. Please initiate this process and inform me during the first two weeks of class.

**Academic Dishonesty:** All the provisions of the University code of academic integrity apply to this course. In addition, it is my understanding and expectation that your signature on any test or assignment means that you neither gave nor received unauthorized aid. For homework and labs, and projects, while discussion is allowed, direct copying is not and students must turn in individual submissions. Realize that mastery of the material in the homework and lab assignments will be essential for a good performance on the exams! The only exception is that lab partners work closely on the lab assignment and turn in one lab report. All students are required to know, observe and help enforce the UNT Code of Student Academic Integrity. Cheating will result in disciplinary action according to UNT Policy 18.1.16. The penalty for a first offense can range from a formal warning to an ‘F’ for the course. Regardless of the penalty imposed, a record of the offense will be kept in the Office of the Dean of Students.