

ECSE 421: Embedded Systems Course Outline

Winter 2012

An embedded system is any computer system embedded in a larger product for the purpose of monitoring or controlling some part of the larger system. Embedded systems, unlike general-purpose computer systems, are highly optimized to deliver the best application-specific performance possible under a wide and varying set of constraints. In this course, we will cover the basic elements of embedded system design, including system specification and modeling, the components of embedded hardware and software, and techniques for system validation, evaluation, and optimization. The goal of this course is to familiarize students with each of these aspects of embedded system design and both their relationship with one another and with design and optimization as a whole.

Staff

Instructor Professor Brett H. Meyer, brett dot meyer at mcgill.ca, x4210
OH: Mondays 3-4 PM, Tuesdays 5-6 PM, and by appointment, in MC525

Assistant Md Muminul Chy, md.chy@mail.mcgill.ca

Hours and location

Lectures	TR	7:05-8:25 PM, MDHAR G-10
Tutorial	R	5:05-5:55 PM, MD 280

Prerequisites

ECSE 322: Computer Engineering, ECSE 323: Digital System Design

Text

Peter Marwedel, *Embedded System Design: Embedded System Foundations of Cyber-Physical Systems*, 2nd edition, Springer, 2011.

The text is available for free download and hard copies are available at a reduced priced (courtesy the McGill University Library). See the WebCT course site for details. The text is also on reserve at the Schulich Library.

Topics

1. System Specification and Modeling
2. Embedded System Hardware
3. System Software
4. Evaluation and Validation
5. Application Mapping
6. Optimization
7. Test (time permitting)

Grading

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/students/srr/honest for more information).

In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded.

If you have a disability please contact the instructor to arrange a time to discuss your situation. It would be helpful if you contact the Office for Students with Disabilities (www.mcgill.ca/osd) at 514-398-6009 before you do this.

There are six homework assignments, one midterm exam, and a final exam. The approximate grading breakdown is:

- Homework 10%
- Midterm 20%
- Project 30%
- Final 40%

We reserve the right to change these weights based on class performance.

Homework: Homework sets are due at the start of class on their due date. No credit will be given for late work without prior permission. Homework grades will be assigned based on the grading of one question per assignment, selected at random.

Exams: The midterm exam will be held in class, on **February 28, 2012**. The final will be a 3-hour exam, administered according to the University's calendar. All exams are closed book. A crib sheet is allowed (one page, both sides, for the Midterm; two pages, both sides, for the Final) and will be collected with each exam. This crib sheet may be produced in *any fashion* provided that aids (such as a magnifying glass) are not necessary to read it.

Project: The final project will be to specify, model, design and test an embedded system. This project will require you to work in groups of four and meet periodic design milestones spaced throughout the semester.

Re-grading: Students must submit any re-grading request in writing, making a comparison of their work and the solutions, and justifying their request for additional marks. At the instructor's discretion, either the problem in question or the entire assignment or exam may be re-graded.

Course Website

Consult the WebCT course site for updates to this outline, the course schedule, as well as to download lecture notes, assignments, and project files.