Simon Fraser University
School of Engineering Science
ENSC351: Real Time and Embedded Systems
Fall 2011

Facts Sheet

Instructor:
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Teaching Assistants:
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   Office Hours: Mondays, Wednesdays, & Fridays: 10:30-11:30am

Class:
Lecture: **Tuesday 8:30-10:20am, BLU10011; Thursday 8:30pm-9:30pm, AQ3003**
Tutorial:**Thursday 9:30am-10:20pm, AQ3003**
Labs: There will be a significant lab component to this course involving multi-threaded programming using an embedded version of the Linux operating system (Petalinux) available in the Real Time Lab ASB 10808. Each lab team will be comprised of two lab pairs of two individuals each for a total of four individuals to form a "quad" (unless specifically permitted by the instructor). No more than four people will be allowed to a team. ***You are responsible for treating the lab equipment with proper care and respect – the same as you would any of your own possessions!! Failure to do so will result in a final grade of an 'F'!***

The Course:
This course concentrates on the problems encountered when attempting to use computers in real-time (RT) and embedded applications where the computer system must discern the state of the real world and react to it within specified response-time constraints. Both design methodology and practical implementation techniques for RT systems are presented. Although students will interact with some custom hardware, it should be noted that this course concentrates on real time *software*; no hardware development skills are required.

Course Web Page:
The course web page is at http://www.ensc.sfu.ca/~lshannon/courses/ensc351/. Handouts will be posted. I will try to post lecture notes before each lecture so that you can print them out before class. We will be using WebCT, but only for the bulletin board postings. All other material can be found from the course web page.

Course Bulletin Board:
All students *must* regularly check the course bulletin board – in other words *at least* once a day. All course related questions *must* be posted to the bulletin board; neither I nor my TAs will answer technical emails. Postings are set to be anonymous, but if you sign your name it will count towards your class participation mark (see *Mark Breakdown* and *Class Participation* below). Announcements and hints regarding the labs and project will also be posted here. I have also created a class mailing list so that last minute announcements can be sent when necessary, however, students are not able to send to the list. Please use the bulletin board to communicate with each other.

Suggested References (*There is no course Textbook this year*):
A good book on C: There are plenty around (even on the web)
A good book on Linux: There are plenty around (even on the web). Check the course web page for suggestions.
Corbet et al. Linux Device Drivers, 3rd edition. A free pdf version is available online.
R.J.A. Buhr, R.S. Casselman, Use Case Maps for Object-Oriented Systems, Prentice Hall, 1996.
Andrew S. Tanenbaum, Modern Operating Systems, (3rd edition) Prentice Hall, 2008 (same as CMPT 300).

Prerequisites: CMPT 128; CMPT/ENSC 250; ENSC 151/215

Lab Component:

For the first part of the course, the lab component will consist of a series of fixed lab tutorials that will be used to introduce you to Petalinux and multi-threaded programming for Embedded Operating Systems. People will work in their lab groups of two individuals on these fixed labs after which they will be tested. The second portion of the lab component will consist of a multi-phase project that each team of four will be required to complete. For each phase of the project, the team will subdivide into their sub-groups to complete separate tasks. *Throughout the semester, students are required to follow the lab policies outlined by the School of Engineering Science along with those provided in the lab handouts. Please read them carefully.*

NOTE: **_All_** students are required to form into lab pairs and quads as soon **_as possible_** (remember **_you have limited time to do the tutorials_**). Please sign-up your lab groups on the sign up sheets on my lab door (ASB8803.1). After September 12th, the remaining unaffiliated students will be assigned to lab pairs and quads. [*Hint*: If you don't have a partner, post to the bulletin board that you are looking for one.]

Lab Test:

The lab test will comprise an oral examination and a demonstration of the material covered by the fixed lab component. This will include the in-lab experience of using Petalinux, the code that is written for the labs, and questions asked on the lab material. Lab groups will have to sign up for the lab test, which will be scheduled for the week of September 26th. Please see the lab test handout for more information.

Lab Project:

This is a team effort that will require demonstrations of progress (during the weeks of Oct 10th, Oct 24th, and Nov 7th) and a final demonstration (during the week of Nov 21^{rst}) as well as a report for the overall project (due on Nov 28th). Students will again be required to answer questions demonstrating their knowledge of the project during each demo. Further details will be given in a separate handout.

Quizzes (2), the Midterm, and the Final:

There will be two *pop* quizzes during the term, each of a 30 minute duration. You will receive between three and ten days notice to prepare for each quiz.

There will be a 1 hour and 50 minute in-class midterm scheduled for Tuesday, November 1^{rst} and a 3 hour final exam on Friday, December 9th from 3:30-6:30pm.

Mark Breakdown:

- Lab Component   35 %   *(Lab Test: 10 %   &   Lab Project: 25 %)*
- Quizzes (2)   10 %
- Midterm (Nov 7th)   20 %
- Final Exam (Dec 9th)   35 %
- Class Participation *Bonus*   5 %

Class Participation:

Finally, I feel that it is important that people work together – they learn more. In a design team, everyone needs to contribute to the group. That means speaking up when there's a problem or when you see a solution. Although the Bulletin Board will not be marked, good "citizenship" demonstrated through in-class participation, in-lab cooperation, and asking and answering each others questions on the bulletin board will be rewarded with a maximum of a *5% bonus* on a student's final mark.

Important Notes: While I promote team work and helping each other, code copying and plagiarism will **_NOT_ be tolerated. Any individual found copying code from other class members or the web will receive an automatic **_0_** on the **_entire_** lab component. Similarly, anyone found copying during quizzes, midterms, or the final will receive a **_0_** for the **_entire_** testing component. Any code copying or plagiarism will result in an automatic **_0_** for the class participation bonus.

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Finally, while lecture attendance is not mandatory, any information, assignments, deadlines, or updates given in lecture are binding on the entire class. (Also, don't forget the class participation bonus mark!)