EXPANDED COURSE DESCRIPTION
ELECTRICAL ENGINEERING AND COMPUTER SCIENCE
Lassonde School of Engineering
Electrical Engineering Computer Science
LE / EECS 2032 4.0 SECTION E
INTRODUCTION TO EMBEDDED SYSTEMS
FALL 2019 / WINTER 2020

Last Modified Date: 08/07/2019

COURSE CALENDAR DESCRIPTION
This course introduces students to embedded systems. The students will learn basic features of embedded system architecture, as well as how to design, implement, and test programs for embedded systems. Topics include microcontrollers architectures, peripherals and communication protocols, interfacing, and program development, and testing. Prerequisites: Cumulative GPA of 4.50 or better over all major EECS courses (without second digit "5"); LE/EECS 1021 3.00, or LE/EECS 1022 3.00 ;and LE/EECS 2021 4.00. Co-requisites: LE/EECS 2030 3.00

INSTRUCTOR(S)

<table>
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<tr>
<th>Name</th>
<th>Section / Format / Term</th>
<th>Contact Email</th>
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<tbody>
<tr>
<td>Aboelaze, Mokhtar</td>
<td>Sec. E / LECT / F</td>
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ADDITIONAL INFORMATION

TOPICS AND CONCEPTS
The course covers embedded system programming. The students are expected to design, implement, and test programs for embedded systems. The students also use the development tools to run the program on a microcontroller board. Topics include:
1. Microcontroller architecture: basic architecture, timers and counters, interrupts and interrupt service routines, and memory map.
2. Microcontroller peripherals: ADC, DAC, PWM, and communication protocols
3. Program development using C: loops, conditional statements and control flow, bit manipulation, pointers, functions, and I/O.
4. Shell scripts: Linux directory structure, commands, pipes, shell variables, conditional statements, and loops
5. Testing: simple testing techniques and shell scripts to automate testing.

COURSE LEARNING OBJECTIVES
Upon successful completion of the course, students are expected to be able to:
• Explain the architecture of a simple microcontroller
• Choose the appropriate microcontroller for a specific application.
• Design, implement, and test programs for embedded applications in C
• Design and implement shell scripts

COURSE LEARNING OUTCOMES
• Explain the architecture of a simple microcontroller.
• Use the microcontroller peripherals to communicate with the outside world.
• Design, develop and test embedded applications in C.
• Design and implement shell scripts.

EVALUATION SCHEME
Attendance and quizzes: 10%
Labs: 30%
3 lab tests: 3*20%

ACADEMIC INTEGRITY LINKS
• Senate Policy on Academic Honesty -
  http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/
• Academic Integrity - http://lassonde.yorku.ca/academic-integrity

STUDENT LINKS
• Student Rights and Responsibilities - http://oscr.students.uit.yorku.ca/student-conduct
• Religious Observance - https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/wa/regobs
• Academic Accommodation for Students with Disabilities -
  http://secretariat-policies.info.yorku.ca/policies/academic-accommodation-for-students-with-disabilities-policy/
• Student Accessibility Services (SAS) - https://accessibility.students.yorku.ca/
• York University Racism Policy and Procedures -
  http://secretariat-policies.info.yorku.ca/policies/racism-policy-and-procedures/
• York University’s Policies on Sexual Violence -
  http://secretariat-policies.info.yorku.ca/policies/sexual-violence-policy-on/
• York University’s Policies on Gender/LGBTQ*/Positive Space - http://rights.info.yorku.ca/lgbtq/

LAND ACKNOWLEDGEMENT
• We acknowledge our presence on the traditional territory of many Indigenous Nations. The area known as
  Tkaronto has been care taken by the Anishinabek Nation, the Haudenosaunee Confederacy, the
  Huron-Wendat, and the Métis. It is now home to many Indigenous Peoples. We acknowledge the current
  treaty holders, the Mississaugas of the New Credit First Nation. This territory is subject of the Dish With One
  Spoon Wampum Belt Covenant, an agreement to peaceably share and care for the Great Lakes region.
• The Indigenous Framework for York University: A Guide to Action can be found here:
  http://indigenous.info.yorku.ca/
• Meaning of a land acknowledgement: http://healthydebate.ca/opinions/indigenous-land-acknowledgements

Many courses utilize Moodle, York University’s course website system. If your course is using Moodle,
click here to access it.
Moodle @ York University