EXPANDED COURSE DESCRIPTION
Lassonde School of Engineering
Earth and Space Science and Engineering
LE / PHYS 4350 6.0 SECTION A
SPACE HARDWARE
FALL 2018 / WINTER 2019

Last Modified Date: 08/20/2018

COURSE CALENDAR DESCRIPTION
Explores the theoretical, practical and experimental techniques needed to acquire and manipulate typical
signals used in spacecraft system operations or integration and testing. Prerequisites: SC/CSE 1540 3.00 or
SC/CSE 2031 3.00, or equivalent programming experience; SC/PHYS 3150 3.00; SC/PHYS 3250 3.00.
Corequisite: SC/ENG 4330 3.00 and SC/PHYS 4330 3.00.

Course Listed Courses: ENG 4350

INSTRUCTOR(S)

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<tr>
<th>Name</th>
<th>Section / Format / Term</th>
<th>Contact Email</th>
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<tr>
<td>Chesser, Hugh</td>
<td>Sec. A / LECT / Y</td>
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ADDITIONAL INFORMATION

TOPICS AND CONCEPTS
The course provides a review of electrical/electronic circuit and signal theory, which is applied to the
analysis and measurement of analog, digital and RF circuits in the weekly labs. The course provides
additional hands-on experience with laboratory equipment used in previous courses such as oscilloscopes,
but additional equipment is also introduced such as spectrum and network analyzers and others.

Students are also exposed throughout the course to various related software tools. Software applications
include data acquisition (such as LabVIEW), FPGA design and simulation (such as Altium Designer),
programming and/or simulation languages (such as Python, C, Java, VHDL, Open Modelica, etc).

COURSE SYLLABUS
The course is divided into 4 sections: Analog, Digital, RF and Programming. Each section is a half-semester
in length. Assessments for each section vary somewhat, but generally consist of 5 short lab write-ups for
each lab, handed in each week, 2 mini-quizzes (or assignments) and a final written quiz.

Students are also asked to write the Beginner and Advanced Amateur Radio Operator exams and to take one
of the STK Certification tests as part of the course. The final section of the course on programming
culminates in a field trip to the Algonquin Radio Observatory to test the student-developed code for tacking
navigation satellites.

COURSE OVERVIEW
Normally on any space or development project various hardware components are brought together and
tested. This course provides you with the experience to understand how the testing is conducted. In order to
interpret the measurements being made correctly, the underlying theory should be understood. To help with
this lectures will review and in some cases expand on previous courses in signals and systems as well as
electrical circuits and RF communications.
The experiments performed in the course roughly correspond to systems one would encounter in data acquisition on a spacecraft or ground system.

**GRADED ASSESSMENT**

Student achievement is assessed based on lab write-ups, mini-quizzes or assignments and a final quiz in each of the 4 sections of the course.

**MARKS**

Each of the 4 section is given equal weight towards the final mark for the course. A rough breakdown of marks for each section is as follows:

- **Section Quiz** – 30%
- **Mini-Quizzes, Assignments** – 30%
- **Lab Write-ups** – 40%

There is some variation between the sections. For example in the programming section a write-up of the code performance achieved during the field trip replaces the section quiz component for that section.

**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.


**ACADEMIC INTEGRITY LINKS**

- Senate Policy on Academic Honesty - [http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/](http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/)
- Academic Integrity - [http://lassonde.yorku.ca/academic-integrity](http://lassonde.yorku.ca/academic-integrity)

**STUDENT LINKS**

- Student Rights and Responsibilities - [http://oscr.students.uit.yorku.ca/student-conduct](http://oscr.students.uit.yorku.ca/student-conduct)
- Religious Observance - [https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/wa/regobs](https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/wa/regobs)
- Counselling and Disability Services - [http://cds.info.yorku.ca/](http://cds.info.yorku.ca/)
- York University’s Policies on Gender/LGBTQ*/Positive Space - [http://rights.info.yorku.ca/lgbtq/](http://rights.info.yorku.ca/lgbtq/)

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

*Moodle @ York University*