EXPANDED COURSE DESCRIPTION
EARTH, SPACE SCIENCE AND ENGINEERING
Lassonde School of Engineering
Earth and Space Science and Engineering
LE / ESSE 2030 3.0 SECTION M
GEOPHYSICS AND SPACE SCIENCE
FALL 2019 / WINTER 2020

Last Modified Date: 07/18/2019

COURSE CALENDAR DESCRIPTION

Seismic waves, earthquake fault plane solutions, tectonics on a sphere, geochronology, paleomagnetism, Earth’s magnetic field, its origin and deformation by solar winds. VLBI measurements of fluctuations of Earth rotation, gravitational perturbations of satellite orbits, planetary exploration and communications issues. Prerequisites: SC/MATH 1014 3.00; SC/PHYS 1800 3.00 and SC/PHYS 1801 3.00 or SC/PHYS 1010 6.00 or a minimum grade of C in SC/PHYS 1410 6.00. PRIOR TO SUMMER 2014: SC/MATH 1014 3.00; SC/PHYS 1010 6.00, or a minimum grade of C in SC/PHYS 1410 6.00.

INSTRUCTOR(S)

<table>
<thead>
<tr>
<th>Name</th>
<th>Section / Format / Term</th>
<th>Contact Email</th>
<th>Contact Phone</th>
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</thead>
<tbody>
<tr>
<td>Smith, Isaac B</td>
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ADDITIONAL INFORMATION

LEARNING OUTCOMES:

The overarching goals of this course are for you to understand the nature of science through the eyes of geophysics and remote sensing. At the end of this course, you should be able to understand the science of geophysics as a process (i.e., how it is done, what skills are involved, and how it is used to learn about the universe) and to understand and apply basic physics concepts to problems in geophysics.

Specifically, upon completion of this course you will be able to:

1. Understand the basic structure of Earth as a planet in space and how it has evolved
2. Understand how surface features on the spherical Earth are projected onto 2D maps
3. Recognize how plate tectonics operates as a rigid rotation of spheres
4. Understand the concept of isochrons in determining the ages of rocks on Earth and beyond
5. Apply principles of geomagnetism to magnetic fields on other planets
6. Understand the principles of the tools geophysicists use to study the earth and other planets - topics may include radar, gravimetry, magnetics and paleomagnetics, seismology and others

REQUIRED COURSE MATERIALS:

2. Scientific calculator (cell phones are not permitted to be used in its place.)
3. Matlab skills

DESCRIPTION OF COURSE ELEMENTS:

Homework Assignments are educational tasks meant to be completed outside of lectures and lab periods and are related to current instruction in the classroom. They are a means to reinforce understanding gained during lecture and prepare for texts and final exam. All assignments must either be submitted through Moodle or turned in by hand before the beginning of lecture. No email or hard copies will be accepted unless
advertised at the time of the assignment. You may work in groups to answer homework problems; however, copying answers is considered plagiarism and subject to penalties outlined below. Please keep in mind that group will not be permitted for mid-term exams or the final exam, so understanding the material is critical to passing this course. Assignments are due one week after the they are assigned

**Laboratory Exercises** are TA-led exercises that take place outside of regular lectures. They are intended to supplement learning that happens in the classroom and at home. Many will use MATLAB software (available on Web FAS). Laboratory Exercises may be completed alone or in groups, and each lab is due one week from the day it was assigned. Copying assignments is considered plagiarism and subject to penalties outlined below.

**Extra Credit** opportunities may become available during the semester at the direction of the professor. They will be available to all students equally, and individuals will not be given opportunities outside of those that are announced for everyone in class. These opportunities are not mandatory and can only help the final grade. Some possibilities for redeeming extra credit may include bonus points on a homework, lab, or exam.

**Mid-term Exams** will take place during a regularly scheduled lecture period and will cover course topics related to lectures, homework assignments, and laboratory exercises. They are intended for the professor and each student to evaluate progress made by the student in understanding course materials. Mid-term exams will be comprehensive, in that material for a previous mid-term may be included to work a current problem. Mid-term exams must be completed by individuals, and group work is not allowed. Items such as approved calculators and a single index card with notes may be brought in at the discretion of the professor. Laptop computers and devices that connect to the internet are not permitted during exams.

**The Final Exam** will cover the entire course, and all course elements and material are possible subjects for examination. The Final Exam must be completed by individuals, and group work is not allowed. Items such as approved calculators and a single sheet with notes may be brought in at the discretion of the professor. Laptop computers and devices that connect to the internet are not permitted.

**COURSE EVALUATION:**
Assignments - 6 x 3% - 18%
Midterms - 3 x 10% - 30%
Labs - 6 x 3% - 18%
Final exam - 34%

**COURSE POLICIES:**
Submission of Work - Problem assignments and lab exercises will be posted on Moodle and must be completed and submitted on Moodle.

Working in Groups - Students may work in groups to answer homework assignments and laboratory exercises. Mid-terms and the Final Exam will be completed independently and are worth 64% of the grade, so students are responsible for learning the course material even if working in a group.

Review of Evaluations - Every effort will be made to grade fairly and consistently, especially for partial credit. If you detect an error in the totaling of your mark or have other questions, these can be discussed during office hours or by appointment - not during lecture - for up to 2 weeks after receiving the marks. Requests for modification of marks for term materials may not be submitted after the course is complete.

Plagiarism and Academic Honesty - Group work is permitted as outlined above; however, no student may copy the work of another student on any test, exam, lab exercise or assignment or quote from any external source without attribution. Such plagiarism is a significant breach of academic honesty and is both unethical and unacceptable. The penalty for such offences range from a failing grade on the submitted material to expulsion from the University. The full policy is available at: http://www.yorku.ca/secretariat/legislation/senate/acadhone.html

Timely Evaluations - Due dates for assignments, labs, and exams are fixed. Assignments received after they are due will receive 50% reduction in points automatically and an additional 10% per day after that. Assignments received more than one week after the due date will not be considered for evaluation. Requests for delays in evaluation for health concerns, religious exemptions, or extracurricular performances causing a student to be absent during an exam must be accompanied by documentation proving the legitimacy of the
reason. If an absence is expected, please notify the professor at least two weeks in advance so arrangements can be made for alternative exam periods.

**Office Hours** - Office Hours will take place between 1 PM and 2 PM on Tuesdays and Thursdays after the class period in Petrie office 110. Appointments can be made by emailing ibsmith@yorku.ca.

**Classroom Etiquette** - Disruptions to the classroom are not permitted. This may include, but not be limited to, verbal outbursts unrelated to the lesson plan or distractions caused by electronic devices. Students who break this etiquette will be warned once, and if the behavior continues, he or she will be asked to leave. Teaching assistants in the classroom on behalf of the lecture are empowered to ask students for identification as well as to ask a student to stop the disruption or leave. People attend class to learn, so please be considerate of them.

**Academic accommodation for students with physical, medical, systemic, learning or psychiatric disabilities** - Students who feel that there are extenuating circumstances which may interfere with the successful completion of the exams or other course requirements and students with physical, learning or psychiatric disabilities who require reasonable alternate accommodations in teaching style or evaluation methods should consult with the Counseling & Development Centre AND the Course Director early in the term to make appropriate arrangements.

**Drop/withdrawal deadlines**: Per university policy, the last day to drop this course without record is March 8, and the last day to withdraw from the course is April 3rd.

**Counselling**: During the semester, if you find that life stressors are interfering with your academic or personal success, consider contacting Student Counselling & Development (SCD). All full-time York University students are eligible for counseling services at no charge. SCD is located at N110 Bennett Centre for Student Services and can be contacted by phone 24/7 at 416-736-5297. For more information, see https://counselling.students.yorku.ca/

**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
- Student Accessibility Services (SAS) - https://accessibility.students.yorku.ca/
- 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