Faculty of Science

Division of Natural Science

http://natsci.info.yorku.ca/

Course Outline

NATS 1580 A, Sun, Space Weather and Life on Earth
Fall 2018
T, R, 13:00, CLH F

Course Instructor(s) and Contact Information

Instructor: Dr. Jagruti Pathak
Email:nats1580@yorku.ca
Office Location: 318 CB
Office Hours: Thursdays 2:30 to 3:30 pm (By appointment only)

You can refer to me as Dr. Pathak or Prof. Pathak. Please send emails from @my.yorku.ca as others including yahoo, Hotmail or gmail may be filtered. Please include NATS 1580 in your email subject. I will try my best to reply typically in 24 hours.

Email Policies and Etiquette

Please send emails from @my.yorku.ca as emails from other accounts such as yahoo, Hotmail or gmail may be filtered. Always include NATS 1580 in your email subject as I teach other course too. I will try my best to reply typically within 24 hours.

Student behavior in the classroom is governed by York's Code of Student Rights and Responsibilities: http://www.yorku.ca/oscr/studentconduct.html .

There is no attendance mark. If you are coming to the class that means you are there to learn. Please respect the need of others to learn without any distractions. If you arrive late please try to get seated without much disruption or if you plan to leave early sit accordingly near the exit door so as not to disturb others.
Please try and refrain from having a conversation with someone while I am lecturing.

Rules of Etiquette on Moodle Forums:

Allowed: Discussion relevant to course material, tests, assignments, and course events/schedules.

NOT allowed: Resist the temptation to post negative personal comments about others, be they students in the class or TAs or Professor

Where to go to complain: the Professor and/or the class representative.

Expanded Course Description

The term "Space Weather" refers to variations of near-Earth space conditions originating in Solar activity which could potentially cause damage to astronauts, critical technology and infrastructure. This course introduces students to the science of Sun-Earth interactions, the magnetic field of the Earth, how natural variations of the Sun can affect society and technology on Earth and in the near- Earth space environment. Students are exposed to a subject of intense recent interest and of high potential impact to future policy makers and society at large. Students will learn to make connections made between natural phenomena such as Earth as a magnet and how this magnetic field sustains life on Earth as we know it.

Course Credit Exclusion: None

Course Learning Outcomes

Upon successful completion of this course students should be able to:

1. Define Space weather and identify various phenomena such as aurora, geomagnetic field, sunspots and solar cycle.
2. Demonstrate an understanding of Earth's magnetic field, magnetosphere, the Van Allen radiation belt, magnetic reconnection, and geomagnetic storms.
3. Describe atmospheric drag, radiation effect on satellites, radio wave propagation and Faraday's law of induction
4. Outline the historical impacts of major space weather events.
5. Identify the hazards of extreme space weather on life on Earth as well as to astronauts and equipment in space.
6. Recognize the threat to communication and navigation system such as GPS in an event of solar storm.
7. Prepare themselves for emergency situations such as power outages and the consequent effect on life.
8. Identify various disaster scenarios and the policies in place to protect people and systems from extreme space weather effects.

Evaluation

Two assignments	(2 x 10%)	20%
Two quizzes	(2 x 10%)	20%
Midterm test	(1 x 30%)	30%
Final test	(1x 30%)	30%

Assignments/Quizzes/Test Schedule:
Quiz 1 October 04, 2018
Assignment 1: Due October 16, 2018*
Midterm test: October 25, 2018
Assignment 2: Due November 08, 2018
Quiz 2: November 22, 2018
Final test: December TBA

*Give Assignments to the instructor at the beginning of the lecture period. Late Assignments to be submitted in a drop box outside the NATS office (218 Bethune).

The midterm and Final test will consist of multiple choice questions (70%) and few short answer questions (30%).

The two Quizzes are only multiple choice questions.

In order to be fair and consistent to the entire class, individual grades are not negotiable and "extra credit" assignments are not provided at any point during or after the course. Please contact the instructor about a grade **only** if there is a clear error (calculation, clerical, etc.) within two weeks of the grade being made available to you.

Course Materials

Recommended Text book: Introduction to Space Weather by Mark Moldwin (Cambridge University Press) (ISBN: 978-0-521-86149-6)

This textbook introduces the reader to the emerging field of space weather using an approach that is both descriptive and quantitative.

Each chapter is divided into two parts: the main text describing space weather topics and supplements describing important physical concepts behind each topic.

Optional book: The Sun from Space (Astronomy and Astrophysics Library) by Kenneth R. Lang, Springer (ISBN: 978-540-76592-1)

Laboratory/Tutorial

This course does not have a laboratory or tutorial component.

Course Content and Format

Our class is scheduled to meet on Tuesdays and Thursdays from 1 to 2:30 p.m. Classes will begin with a lecture followed by a time for question/answers and discussion

Topics covered in the term:

1. Introduction to Space Weather
2. Brief history
3. The variable Sun
4. The heliosphere
5. Earth's Space environment
6. Earth's Upper atmosphere
7. The technological impacts of space storms
8. Other space weather phenomena

Lecture slides (in ppt and pdf format) will be posted on the course moodle (https://moodle.yorku.ca/moodle/course/view.php?id=103384) at least 2-3 days before the class.

Math Content

The mathematical sophistication of the student is assumed to be at the level of high-school algebra (e.g. Ontario Grade 10 Math)

Course Policies

Questions and Concerns should be directed to the Course Director: Dr. Jagruti Pathak (nats1580@yorku.ca)

Policy for Late Assignments:

10% is deducted for EACH CLASS PERIOD that an assignment is late and each can be handed in up to and including the following dates:

- Assignment 1 will not be accepted for marking after Oct 23, 2018.
- Assignment 2 will not be accepted for marking after Nov 15, 2018.
- Go past either of these due dates, and your assignment grade will be ZERO.

Policy for Missed Tests:

If you miss a test due to medical reasons, you are required to inform the Course Director via email within 48 hours about your situation. You will then be asked to fill out York's Attending Physician's Statement and submit it before you are allowed to write your test at an alternate date and time.

Depending on your situation, you may also be asked to fill out a Deferred Standing Form as well. Further information about missed exams and the required forms can be found at: http://myacademicrecord.students.yorku.ca/deferred-standing#request-deferred-standing.

If you miss a test for a non-medical emergency, please contact your Course Director via email within 48 hours and outline your situation. If your explanation is accepted, you will be asked to provide further documentation. After examining your documentation, the Course Director will decide whether to grant or deny you permission to write your test. Please note that if you miss more than one test, your request for deferred standing for the second test you missed will automatically be denied and you will have to proceed straight to petitions. Please note that only ONE makeup test will be provided, students who missed the original scheduled test are required to show up for the makeup test.

Copyright and Intellectual Property

If you would like to record lectures, speak to the Course Director. You may be asked to sign a document which states that you only intend to use the recordings for personal purposes and do not intend to sell them to another party or post them onto a commercial website. In addition, all lecture notes posted on Moodle are the intellectual property of the Course Director. While you can view and print these notes for your personal use, it is against the law to repost these documents on any commercial website. If we discover that you have done so, you will be asked to remove these documents immediately. Finally, please note that it is a violation of York's academic integrity policy to buy course assignments, tests answers, essays and other materials from a commercial website. These sites (e.g. Course Hero) are monitored frequently by the department and you will be subject to academic penalty (see the academic honesty and integrity section below) if you are a caught using someone else's work. Conversely, if you attempt to repost past course materials for the purposes of re-selling this work to other students, you can still be penalized under York's academic integrity guidelines even if you have already completed the course.

University Policies

Important Sessional Dates

Includes sessional start and end dates, drop deadlines, and withdrawal dates.
See the Office of the Registrar website at http://www.registrar.yorku.ca/enrol/dates/

The last date students can enroll in this course without the permission of the instructor is: Sept. 18, 2018.

The last date students can enroll in this course with the permission of the instructor is: October 02, 2018.

The last date students can drop the course without receiving a grade is: November 09, 2018.

The course withdrawal period for NATS 1580 is: November 10 – December 4, 2018*

*During this period of time you can withdraw from the course and receive a "W" on your transcript.

Academic Honesty and Integrity

Academic honesty requires that persons do not falsely claim credit for the ideas, writing or other intellectual property of others, either by presenting such works as their own or through impersonation. Similarly, academic honesty requires that persons do not cheat (attempt to gain an improper advantage in an academic evaluation), nor attempt or actually alter, suppress, falsify or fabricate any research data or results, official academic record, application or document. Finally, academic honesty requires that persons do not aid or abet others to commit an offence of academic dishonesty, including intentional acts to disrupt academic activities.

Suspected breaches of academic honesty will be investigated and charges shall be laid if reasonable and probable grounds exist.

Academic Honesty and electronic devices during assessments (*e.g.* exams)

- Internet capable and personal storage devices of all kinds must be turned off, including vibrate. These and any other unauthorized material must be placed under the student's chair and should not be accessed at any point during the exam. Failure to comply with directive may be considered a break of academic honesty.
- See http://registrar.yorku.ca/exams/tipsheet

Please familiarize yourself with the full Senate Policy on Academic Honesty, found at http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/

Please also familiarize yourself with the SPARK Academic Honesty tutorial found at https://spark.library.yorku.ca/academic-integrity-what-is-academic-integrity/

Academic Accommodation for Students with Disabilities

York University shall make reasonable and appropriate accommodations and adaptations in order to promote the ability of students with disabilities to fulfill the academic requirements of their programs.

The nature and extent of accommodations shall be consistent with and supportive of the integrity of the curriculum and of the academic standards of programs or courses.

Please familiarize yourself with the full Senate Policy on Academic Accommodations for Students with Disabilities, found at http://secretariat-policies.info.yorku.ca/policies/academic-accommodation-for-students-with-disabilities-policy/

Note: Students should submit accommodation letters from Counseling and Disability Services (CDS) to the course instructor within the first two weeks of the course or as soon as issued.

Counseling and Disability Services - http://cds.info.yorku.ca/

York Accessibility Hub - http://accessibilityhub.info.yorku.ca/

Note: A student registered with CDS, and choosing to write with Alternate Exams, is responsible for making the appropriate writing arrangements within the timeframes outlined by Alternate Exams.

Alternate Exams - http://altexams.students.yorku.ca/

Religious Observance Accommodation

York University is committed to respecting the religious beliefs and practices of all members of the community, and making accommodations for observances of special significance to adherents.

https://w2prod.sis.yorku.ca/Apps/WebObjects/cdm.woa/15/wo/kmHGekTpzKLX6XYKBXYc8M/0.3.4.62.0

Note: Students who will have an academic conflict as a result of a religious observance, at any point in the term, should make the instructor aware of such at least three weeks prior to the conflict.

For conflicts occurring during an official examination period, please complete the Examination Accommodation Form available at http://www.registrar.yorku.ca/pdf/exam_accommodation.pdf and submit to your instructor at least three weeks prior to the final exam.

Student Conduct in Academic Situations

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect and to refrain from actions disruptive to such a relationship. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and the responsibility of the student to cooperate in that endeavour. Further, the instructor is the best person to decide, in the first instance, whether such an atmosphere is present in the class. A statement of the policy and procedures regarding disruptive and/or harassing behaviour by students in academic situations is

available on the website of the University Secretariat (http://secretariat.info.yorku.ca/).

Division of Natural Science Resources

NATS-AID
Free peer tutoring for students enrolled in Natural Science Courses.
See http://natsci.info.yorku.ca/nats-aid/

M-AID in NATS (Math Aid)
Free math help for students enrolled in Natural Science Courses (TA tutors)
See http://natsci.info.yorku.ca/m-aid-in-nats/

Other Resources

Learning Commons
The Learning Commons brings together key supports for your learning: writing, research, learning skills and career services. http://www.library.yorku.ca/cms/learning-commons/

goSAFE
goSAFE is a complimentary service provided to the York Community. At the Keele campus, goSAFE has two routes: North Route & South Route which will safely transport community members by vehicle from one specified hub to another on campus. goSAFE operates seven days a week, all year round, including University closures (with the exception at Glendon during the Christmas holiday closure).

Call the goSAFE office at 416-736-5454 or extension 55454 during hours of operation. Please give your name, location and destination. http://www.yorku.ca/goSAFE/

Mental Health and Wellness at York University
Outlines a variety of resources available to support mental health and wellness
http://mhw.info.yorku.ca/resources/resources-at-york/students/

Good2Talk
Post-Secondary Student 24 hour Helpline
http://www.good2talk.ca/ 1-866-925-5454