

## Division of Natural Science

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

## Course Outline

NATS 1570 A, Exploring The Solar System  
Fall, 2018, 3.0 Credit Offering  
M, W, F 12:30 p.m. – 1:30 p.m., Vari Hall B (VH B)

## Course Instructor(s) and Contact Information

- **Professor:** **Dr. Jerusha Lederman**
  - Email: [Lederman@yorku.ca](mailto:Lederman@yorku.ca)
  - Course materials (notes, recorded lectures, etc.) posted on Moodle.
- **Office:** 1029 Victor Dahdaleh Bldg. (DB)  
(within the Teaching Commons office area at 1050 DB, phone: 416-736-2100, ext. 88770)
- **Office hours:** by appointment, please email in advance to arrange.

**Email Policies and Etiquette**

- To ensure your messages are answered promptly, when emailing me, please make sure:
  - “NATS 1570A” is ALWAYS included somewhere in your SUBJECT LINE.
  - Emails are sent from your official YU address, i.e. @my.yorku.ca. Other domains like yahoo, gmail, etc. may be flagged as spam and may not reach me.
  - I will always endeavour to reply to emails promptly but please allow up to 48 hours for a response before resending or emailing multiple times.

**Expanded Course Description**

Welcome to NATS 1570 A, “Exploring The Solar System.” This course will take students on a journey through our solar system. We will examine the planets and our sun, probing its nature and delving into the evolutionary and dynamical processes behind solar system formation. Study into the application of dedicated technologies used for space exploration along with an overview of the scientific method in general will be undertaken.

We will begin our journey by studying the geological principles which provide a foundation for the understanding of basic planetary science principles. This will include the rock cycle and its various elements, i.e. igneous, sedimentary and metamorphic rock processes along with a brief review of the techniques used by geologists to understand the dynamics of these structures. This will include looking at and gaining a basic ability to use such techniques as radioactive dating.

Next, we will turn our attention to the composition of our own planet, examining Earth's atmosphere and hydrosphere. We will look at how terrestrial factors such as convection, the Coriolis force and incident solar radiation, drive the processes in Earth's atmosphere and hydrosphere. Now armed with an understanding of our planet, we will apply this knowledge to compare and contrast the other planets in our solar system (Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune) to our own. Special attention will be given to seeing how the other planets have developed over time in ways that are distinctly different from Earth. This will include looking at results from recent space probes like MESSENGER, Venus Express and the many Mars Missions in the last decade but particular Spirit and Opportunity and the Phoenix Mission (to which faculty at York contributed,) as well as the result from the current Curiosity Mission.

We will look at how the Solar System is divided into two distinctly different groups of planets – the inner and outer planets. We will examine what the differences are between these two distinct groups. This knowledge will later be incorporated into our understanding of how our solar system formed.

Of importance to understanding the solar system are various moons of the planets within it. Consequently, we will explore some of the larger satellites of Jupiter and Saturn (Io, Europa and Titan.) These objects are comparable in size to the rocky inner planets and have many features in common, but also some notable differences. In particular, we will look at how being in close proximity to a large planet affects these objects. Io is the most volcanically active object in our solar system and this is a direct result of the gravitational effects of being so close to Jupiter.

Aside from planets and moons, we will have an overview of the smaller bodies that form our solar system - comets, asteroids and dwarf planets. We will learn about the composition and behavior of these objects, paying special attention to basic principles of physics and chemistry involved such as the role of temperature in many processes. Attention will be given to how the IAU (International Astronomical Union) formally defined a planet in 2006 and how this relates to all the different objects we have seen.

Finally, using our cumulative knowledge, we will cultivate an understanding of how all the different types of objects fit into the larger picture of our current solar system and its formation. No prior background beyond Grade 10 math and science is assumed. Mathematics involved in the course will be limited, if present. The instructor will walk students through any required calculations.

All lectures will be recorded and made available online via Moodle shortly after they occur. Lecture notes in pdf form will also be provided after each lecture (Moodle.)

## Course Learning Outcomes

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

- Describe the basic structure of Earth and processes occurring in the body of the planet, the hydrosphere and the atmosphere.
- Use some basic graphical and statistical techniques to study Earth.
- Explain what the basic features of the different planets are and how they compare to Earth. Key here is the process of contrasting and comparing which allows us to learn about the different objects in our solar system but also gives us a better understanding of Earth in seeing how different geological systems have behaved over time.
- Understand some of the processes that have shaped the bodies in the solar system including various moons, asteroids and comets. This will include looking at what gravity is and how it has shaped our solar system.
- Examine how there are two distinctly different groups of planets as well other objects within our solar system and how this relates to the structure of our solar system.
- Describe how we think our solar system formed and how the orbital and other characteristics of the bodies of our solar system fit in with this model.

## Evaluation

Course Component	Weighting (% of Final Grade)
3 Smartwork5 Assignments (online)	18%
2 Moodle Assignments (online)	25%
Midterm Test	18%
iClicker Participation	4%
Final Exam	35%

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.
- All grades will be posted on Moodle as soon as they are available.
- Please notify the Professor immediately if there is a discrepancy in any grade.

## Course Materials

- The required textbook for this course is a special e-package distributed through the York Bookstore, retailing at \$84.95 CAD. More details as to how to obtain the package will be given in class and a link to obtain it through the York bookstore is posted in Moodle. This is a special package for this course which includes an etextbook and associated 'Smartwork5' assignment software. The name of the text is "Earth Science" by Stephen Marshak & Robert Rauber, published by W.W. Norton Inc. Additional information will be provided in the first week of classes.
- Required readings will be posted as links to websites or specific sections of the eBook.

#### iClicker and In-Class Interaction / Participation:

As of the 2017/18 academic year, York has formally introduced the use of a new software system, iClicker, for the first time across the University. iClicker enables students to use their personal **mobile devices**, i.e. cell phones, laptops and tablets, as clickers. To enhance their own comprehension of the material, students will be asked to respond to questions using their **iClicker enabled mobile device** during the lecture periods.

Responding to a total of 80% of these questions either correctly or incorrectly (it is participation that matters) contributes to a 4% participation mark. Students will be asked to respond to questions using their **iClicker enabled mobile device** during the lecture periods in order to earn these marks.

**It is recommended that students practice for test and exam style multiple choice questions by testing their knowledge through the iClicker questions posed in class and available subsequently in recordings.**

More details will be available on the Moodle course webpage and in discussion at our first class. For students who do not have a mobile device, please contact the Professor.

Students are encouraged to view the following video as an introduction to iClicker (formerly called 'REEF')

<https://youtu.be/PFwF5jMi6H0>

#### Laboratory/Tutorial

This course does not have a laboratory or tutorial component

#### Course Content and Format

**All course material can be found on Moodle.**

Lecture notes, covering the main course content, will be made available as .pdf files in Moodle. All attempts will be made to post these lecture notes in advance of each class (up to 1 day), so that students are able to bring them to lectures to supplement with their own commentary. It may not, however, always be possible to post the notes in advance and some lecture notes may not get posted until just shortly after the class. Please stay patient. These lecture notes are carefully designed and created for you to derive the maximum benefit possible. They will all be made available for you within a reasonable timeframe to enable comprehensive studying, along with full recordings of each class.

Please also note that small changes and/or corrections may be made to the lecture notes following class presentation – make sure to check in with Moodle to download the most up-to-date version.

Materials posted on Moodle on a week by week basis and will include:

- An audio-visual recording of each lecture session (slides included)
- pdfs of lecture slides covered in class
- links to required textbook readings, videos and websites of interest, as appropriate
- links to required Smartwork5 Assignments (included as part of your text)
- links to Moodle Assignments

**IMPORTANT:** I will frequently make important course announcements and reminders using Moodle's announcement system. This will send individual emails to all students formally registered in the course. An example of what kind of information you can expect to receive in your email from me includes:

- notification of the posting of new course materials on Moodle
- notification of the posting of marks on Moodle
- date and time announcements for scheduling of exams and tests
- submission reminders approaching assignment due dates

To ensure you don't miss important course info, PLEASE CHECK YOUR EMAIL REGULARLY.

**Math Content**

- This course emphasizes the physical and conceptual bases of important equations (like the relation between gravitational force between objects and their relative distance from one another.)
- Simple calculations (with basic arithmetic, exponents and basic geometry) may be discussed and demonstrated in class.
- Any calculations you are asked to do in class or for assignments will be thoroughly explained and illustrated in the most simple, basic terms. Consequently, a background in math above the grade 10 level is not required.

- Students should be familiar with scientific notation, however, this will be reviewed prior to being used in the course.
- Graphs commonly used by scientists are discussed and will be used to enhance understanding of core course concepts.
- There will be NO calculations on tests and exams.

#### About Test and Exam formats

All test and exams are entirely **multiple choice**.

### Course Policies

#### Questions and Concerns

Please direct all inquiries and comments to the Professor by email:

[Lederman@yorku.ca](mailto:Lederman@yorku.ca)

- when emailing, put “NATS 1570 A” in the header (so I know it isn’t spam)
- include your full name and student number in the email

#### iClicker Policies – using your mobile devices in-class

**PLEASE NOTE:** It is optional for students to make

Laptops, tablets and phones can be used beneficially by students during lectures to help facilitate note-taking and the use of other course tools like Moodle. Use of your personal mobile device (laptop, phone or tablet) as a clicker to respond to entertaining and interactive, in-class multiple choice style iClicker questions is highly encouraged.

When these devices are used in-class for other purposes like chatting in live messengers, emailing, shopping online and watching movies, this can be extremely disruptive to effective learning by yourself and others around you. Please be cognizant and respectful of others in your technological behaviours.

When using mobile devices, always ensure that:

- usage of mobile devices in the classroom is for course purposes.
- You must use your own iClicker student account and associated mobile device.

#### Assignment Policies

- You will be required to complete 3 Smartwork5 Assignments and 2 Moodle Assignments which will be submitted online.
- Where applicable, proper references and citations must be given in all assignments. For information on style guides, see <http://www.yorku.ca/caitlin/wstudies/style.htm>
- Please familiarize yourself with the Academic Honesty Policy at: <http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>

- Note that plagiarism of any sort (direct copying of websites, presenting another's material as your own) is not tolerated and will be dealt with according to York University's Senate Policy (see link in "University Policies" section below on Academic Integrity)
- Penalties for academic misconduct can range from 0 for an assignment, to expulsion from the University in the case of a second offense.
- LATE ASSIGNMENTS NOT ACCEPTED

#### Exam Policies

- All students must show valid student card during exams.
- Dictionaries, cell phones and other electronic items are not allowed in exams. (Cell phones must be turned off and stored in students' bags during exams.)
- Only pens, pencils, erasers and a student card are permitted on the desk during an exam.

#### Policy for Missed Exams

- If due to illness or unforeseen emergency, a student must miss a scheduled exam, the Professor (lederman@yorku.ca) must be notified by the day the exam is to be written in order to arrange a make-up.
- If sufficient notice is not given, the student will receive a mark of 0 for the test.
- If exam is missed due to illness, please use the York University Attending Physician's statement form. A link is provided for you on the course MOODLE page.

#### Re-Grading Policy

- Work may be re-submitted for consideration to the Professor, provided a student has a clear reason for the request (not just an attempt at extra marks).
- The Professor may re-grade the entire test or assignment, and the overall grade may go UP or DOWN accordingly.

#### Student Conduct

Both in-class and online, students are required to maintain courteous and respectful communication with all members of our course at all times.

Please see the University's Student Code of Conduct at

<http://oscr.students.yorku.ca/csrr/standards>

## COPYRIGHT LAWS:

Most of the material shown in the lecture videos is protected by copyright law, which states that it is illegal for students to share or distribute copyright materials. Students who violate copyright law are at risk of being sued by the owners of the material.

Some examples of illegal distribution include:

- posting videos of a lecture on a web site, either your own or someone else's
- posting photographs or screen captures of lecture slides on a web site
- posting notes, assignments and other intellectual property to web sites

## 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/>

### **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](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