

Division of Natural Science

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

Course Outline

**NATS 1570 A 3.00 Exploring the Solar System
F term 2019-2020**

Lectures: Tuesday & Thursday 10:00-11:30 in Lassonde A (LAS A)

Course Instructor(s) and Contact Information

Course Instructor: Prof. Patrick Hall, Petrie 337, nats1570@yorku.ca, x77752

Office hours: immediately after class, or by arrangement with Professor Hall.

Class Etiquette: when you choose to come to class, be ready to focus on learning. **If instead you engage in behaviour distracting to other students, you'll be asked to leave the classroom.** You're always welcome in class if you come to learn!

Email Policies and Etiquette:

- If you have a question, please read this syllabus carefully to see if it's already answered. **Prof. Hall WILL NOT ANSWER** E-mail questions already answered here, in the workbook, or on the course Moodle site and FAQ (you can still ask in person).
- **E-mail MUST include "NATS1570" in the subject to avoid spam filtering!**
- Please also include a topic in the subject line to enable a faster response.
- Please also include your name and/or student number in the subject or main body.
- Polite emails are always appropriate, and the use of full sentences is appreciated.

Expanded Course Description

Natural Science courses at York University are designed to help develop a basic understanding of science and scientific critical thinking in a thought-provoking manner. Astronomy shows that basic scientific principles can help us understand what we see in our solar system, and how it formed. NATS1570 will look at the solar system from our perspective on Earth, examine Earth as our template for a planet, and then look at the nature of the other planets. We will look at the various missions we have used to explore the solar system, and their results. We will look at the smaller solar system bodies like moons, asteroids and comets as well. We will look at the current models of how we think the solar system formed and how it has evolved over time.

For more info on the latest discoveries in our solar system and beyond, check out the **Allan I. Carswell Observatory at York University** (open online every Monday night at <https://observatory.info.yorku.ca/>, and in person every clear Wednesday night).

Course Learning Outcomes

Your mark after completing this course will reflect how well you are able to:

1. Explain how the scientific method is applied to understand our physical world.
2. Sketch or explain the origin of the seasons and the phases of the Moon.
3. Compare and contrast the basic features of the different planets with those of Earth. Key to this point is the process of contrasting and comparing which enables us to learn about the different objects in our solar system and gives us a better understanding of Earth in seeing how different geological systems have behaved over time.
4. Outline the cause of tides and discuss the effects of tides on Earth, on Jupiter's moon Io, and on Saturn's moon Enceladus.
5. Provide evidence for the heliocentric model of our solar system and for how our solar system formed that way, including how it explains the terrestrial planets, giant planets, and asteroids, Kuiper belt objects, and comets.
6. Recognize the different types of orbits and use orbital periods to calculate the relative masses of planets and moons.

Evaluation

36% In-class & Moodle activities (iClicker quizzes, collected workbook sheets, etc.)
10% Solar system scale model activity (Due Tuesday Dec. 3rd)
18% Midterm exam (during class on Thursday Oct. 24th)
36% Final exam (during the official final exam period)
100% Total

To be fair and consistent to the entire class, **deadlines and individual grades are not negotiable** and "extra credit" assignments are not provided to individual students.

- All grades will be posted on Moodle as soon as they are available.
- 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.**

Reading assignments: Reading assignments will be announced in class and posted on the course Moodle site. Your understanding of the activities (and of future exam questions) will be greatly improved by doing the readings before class.

In-class activities: Most lectures will feature an in-class activity, such as a workbook exercise or iClicker quiz, so class attendance is absolutely necessary. The lectures and in-class activities greatly enhance the textbook, and participation will help you get a good mark. *Also, many exam questions will be closely based on in-class work.* In-class activities will be drawn almost exclusively from the workbook, so **bring your workbook to every class.** Finished in-class activities are good study guides (activities will occasionally be collected and marked as either completed or not). No make-ups of in-class activities are permitted. **To allow for unavoidable absences, all students start with an score of 10% out of the 100% possible for in-class activities.**

To succeed in this class: do the readings before class; take notes; do the activities & quizzes in class; and, review the quizzes after class – all good practice for the exams.

Moodle activities and Solar System Scale Model activity: details of these activities will be announced in class and posted on Moodle.

Exams: The University will set the final exam schedule. **It is your responsibility to be available to take the exam as scheduled.** The exam material will be based upon work covered in class or in assigned textbook readings. **Exams missed (not skipped!) due to forces beyond your control can *only* be made up by petitioning for deferred standing within one week of the exam date.** Emergencies come in many forms; however, please note that only in very extreme circumstances will a make up be permitted. Events that could be conducted by another individual such as taking a friend to a doctor's appointment or your pet to a vet appointment are not considered acceptable reasons for a make-up exam.

Course Materials

Textbook: This course uses the free online Astropedia Textbook by Impey et al.: <https://www.teachastronomy.com/textbook>. We will cover selected sections of chapters 1-11, along with supplemental reading in the free online OpenStax Astronomy textbook by Fraknoi et al.: <https://openstax.org/details/books/astronomy/>

Workbook: *Solar System Activities Manual*, Patrick Hall, Kendall-Hunt Publishing, 2019. This workbook contains in-class activities. **You MUST bring this workbook to class!** You can purchase it either from the YU bookstore or online (payment in US\$) at <https://he.kendallhunt.com/product/solar-system-astronomy-activities-manual>

Polling software: in-class quizzes will be conducted using iClicker software. You can download this software from <https://its.info.yorku.ca/polling-student/>

Laboratory/Tutorial

This course does not have a laboratory or tutorial component.

Course Content and Format

Outline of Lecture Course (approximate guide only)

1. The Night Sky: What things change in the night sky over time, and how do these changes occur? What causes the seasons and the phases of the moon? How can we understanding the slowly changing positions of the planets in the night sky?
2. History of Astronomy: How did ancient cultures see the skies? How did the Greeks see the universe? How did Kepler and Newton help us understand how the universe works?
3. Light, Telescopes and Space Probes: How is astronomy done? How do light and

matter interact, and how do we use light to understand objects in the sky? How do telescopes work? Why (and how) do we send probes to explore the solar system?

4. Mercury, Venus, Earth and Mars: What are the features of these worlds, and how do they compare to those of the Earth? What missions have been sent to explore them, and with what results to date? Why is only one of these planets apparently hospitable to life?
5. Jupiter, Saturn, Neptune, Uranus: How do these gas giants differ from the inner rocky worlds? What missions have visited the outer solar system? What can we learn from their many moons? What's the latest from the Juno mission to Jupiter?
6. Other objects in our solar system: asteroids & the asteroid belt; comets & the Oort cloud; Pluto & the Kuiper belt. Did an asteroid impact kill the dinosaurs? Are there other killer asteroids out there? Why are objects far from the Sun relicts from the time when the solar system was forming?
7. Solar Systems: Formation of the Sun and the objects orbiting it. What are the basic properties of those objects? How does our solar system compare to others? What do we know about planets around other stars? Can we find other Earths? What are the conditions for life - where might we find it and how are we searching?
8. Our Sun: What is the power source of the Sun and other stars? How can solar weather affect us on Earth? What is the final fate of the Sun and the Solar System?

Math Content

The course is not taught at an advanced mathematical level. Occasional use of high school math is all that is necessary (basic principles of geometry and algebra). Key mathematical concepts are discussed in lectures and practiced in in-class activities.

Course Policies

Course Credit Exclusions:

SC/NATS 1740 6.00, SC/NATS 1880 6.00, SC/NATS 1750 6.00. No credit will be retained if this course is taken after the successful completion of SC/PHYS 1070 3.00. Not open to any students enrolled in the Astronomy Stream.

Important Dates and information:

Last day to **ENROL** without Course Director permission is **Tuesday Sep. 17, 2019**.
Last day to **ENROL even with** Course Director permission is **Tuesday Oct. 1, 2019**.
Last day to **DROP** without a grade being submitted is **Friday Nov. 8, 2019**.
Course **Withdrawal** Period ("W" on transcript): **Nov. 9 - Dec. 3, 2019**.
See the Office of the Registrar website at <https://www.registrar.yorku.ca/enrol/dates/>

All questions should be directed to the instructor at nats1570@yorku.ca. Concerns with the course can be directed to the class representatives (contact info on Moodle).

Copyright and Intellectual Property

Numerous students in Faculty of Science courses have been charged with academic misconduct when materials they uploaded to third party repository websites (e.g. Course Hero, One Class, etc.) were taken and used by unknown students in later offerings of the course. The Faculty's Committee on Examinations and Academic Standards found in these cases that the burden of proof in a charge of aiding and abetting had been met, since the uploading students had been found in all cases to be wilfully blind to the reasonable likelihood of supporting plagiarism in this manner.

Whenever a student submits work obtained through a repository site, the submitting student will be charged with plagiarism and the uploading student will be charged with aiding and abetting. To avoid this outcome, students are urged not to upload their work to these sites.

Copyrighted materials used as part of this course have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. It is illegal to share or distribute copyrighted materials. Exams, tests, and other assignments are the copyrighted works of the professor assigning them, whether copyright is overtly claimed or not (i.e. whether the © is used or not). Scanning these documents constitutes copying, which is a breach of Canadian copyright law, and the breach is aggravated when scans are shared or uploaded to third party repository sites.

Students who violate copyright law are at risk of being sued by the owners of the material.

University Policies

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 <https://registrar.yorku.ca/exams/tipsheet>

Please familiarize yourself with the full Senate Policy on Academic Honesty, found at <https://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 <https://secretariat-policies.info.yorku.ca/policies/academic-accommodation-for-students-with-disabilities-policy/>

Note: Students should submit accommodation letters from Student Accessibility Services (SAS) to the course instructor within the first two weeks of the course or as soon as issued.

Student Accessibility Services - <https://accessibility.students.yorku.ca/>

York Accessibility Hub - <https://accessibilityhub.info.yorku.ca/>

A student registered with SAS, and choosing to write with Alternate Exams, is responsible for making the appropriate writing arrangements within the timeframe outlined by Alternate Exams.

Alternate Exams - <https://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 https://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 (<https://secretariat.info.yorku.ca/>).

Division of Natural Science Resources

NATS-AID: Free peer tutoring for students enrolled in NATS Courses. Questions about course content? Write to natsaid@yorku.ca with subject NATS1570A and a peer tutor will be assigned to you. Questions about assignments? Ask Prof. Hall! See <http://natsaid.blog.yorku.ca/> for more information.

M-AID in NATS (Math Aid): Free math help for students enrolled in Natural Science Courses. See <https://natsci.info.yorku.ca/m-aid-in-nats/> (schedule will be posted there during the term)

Other Resources

Learning Commons: The Learning Commons brings together key supports for your learning: writing, research, learning skills and career services. <https://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 & South, 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. <https://www.yorku.ca/goSAFE/>

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

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