

## Department of Science, Technology and Society

### NATS Course Outline

2024 NATS 1530 – Science of Space Flight and Exploration, 3.00

**Course Instructor:** Dr. Webb  [Hear my name](#)

**How to address me:** Professor Webb or Dr. Webb

**Gender Pronouns:** (he/him/his)

**Email:** [webbjj@yorku.ca](mailto:webbjj@yorku.ca)

Please use [webbjj@yorku.ca](mailto:webbjj@yorku.ca) for all course correspondence. It is important that you include your name and student number in the subject heading of your email.

Any email you send must come from your <my.yorku.ca> account as other addresses tend to go straight to junk mail.

If you send me an email, I will reply to it within 24-48 hours Mon-Fri. Emails will not be checked over the weekend. If you don't get a response, it means I did not receive your email in the first place.

Do not reply directly to any eClass announcements.

**Class Location:** LAS C, Tu/Th 1:00-2:30 PM

**Office Location:** Norman Bethune College 218

[Click here for visual directions.](#)

**Office Hours:** Monday @ 12:30-1:30 (Zoom)

Email [webbjj@yorku.ca](mailto:webbjj@yorku.ca) to schedule an in-person meeting if needed.

#### What are 'Office Hours'?

*Office hours are dedicated times through the week for the course instructor to meet with YOU. Pop in to introduce yourself, ask questions about the course, or discuss content from the course.*

**Study Spaces on Campus:**

<https://currentstudents.yorku.ca/study-spaces>

**Math Content:** There is a minimal amount of math done in this course. Generally, you will not need any more than a Grade 10 level proficiency (Ontario).

## Welcome to this Course!

Welcome! One of my favourite parts of studying the Universe is how almost everyone has some natural curiosity about outer space. I am excited to spend this year talking with you about the on-going history of space flight, the study of new worlds, and the search for life in our solar system. I truly want each of you to succeed in this course and leave with a sense of having gained knowledge that will stay with you long after the semester has ended. So please ask questions, attend office hours, and contact me for additional help. I am also happy to chat about astronomy issues not covered in class, including events in the news or even my research on exoplanetary systems and star clusters.

**Course Description:** This course explores the science and technology of space flight and the discoveries and expansion of our knowledge through space exploration. Topics include: a history of space exploration, space maneuvers, getting to know the planets, rocket science, gravity, orbital motion, and satellites.

**Course Format:** This course will feature a blend of on-line and in-person activities. In lieu of an in-person Tuesday lecture, a pre-recorded video will be posted every week on eClass for students to view. For students wishing to view the video while also having access to a teaching assistant (in-person) and the course instructor (online), the video will be livestreamed Tuesdays from 1:00-2:30 pm in LAS C. Thursday classes, which are also from 1:00-2:30 pm in LAS C, will feature a mix of lecture and tutorial style components with in-class assessments that utilize iClicker Student Polling Software. Note that some Thursday in-class assessments will be based on the pre-recorded video posted that week, so students should watch the video before Thursday's class.

The course's eClass page (<https://eclass.yorku.ca/course/view.php?id=90251>) will be broken up into modules based on topic. For a given week, the relevant learning goals, readings, videos, lecture slides, and assessment details will be posted within the module. During the term, out-of-class assessments will be submitted online. Three tests will also be completed in-person throughout the semester.

**Communication:** The primary platform for communication in this course will be eClass. General information, lecture specific or assessment specific information, and all course announcements will be made through eClass. Any student questions that are related to course administration or course content should be posted on the relevant eClass Forum. Email should be used for personal or urgent matters only.

**Prerequisites, Course Credit Exclusions:** None

**NCR:** This course is not open to any student enrolled in Lassonde's Earth and Space Science and Engineering program (ESSE).

## Course Level Learning Objectives

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

Content:

- Describe humanity's progress in space exploration to date
- Describe the planets in our solar system and identify each planet's value for space exploration
- Explain the physical laws that enable space flight
- Demonstrate fluency with terminology pertaining to space flight
- Comprehend and formulate informed positions on the risks, benefits, costs and limitations of space exploration

Skills:

- Use problem-solving tools such as graphs and simple equations to answer questions similar to those encountered by today's space scientists

## Important Dates

**The last date to add a course without permission of the instructor:** January 22, 2024

**The last date to add a course with the permission of the instructor:** January 31, 2024

**The last date to drop the course without receiving a grade:** March 11, 2024

**The course withdrawal period is:** March 12 – April 8, 2024

## Learning Materials

### Required iClicker Student Polling Software

- Use your laptop, tablet, or smartphone for this activity
- Available as a download via a free app (see eClass (link below) for instructions)

### Recommended:

There is no textbook to purchase for this course. Reading will be assigned from the open source textbook:






“Astronomy” by Andrew Fraknoi et al., Second Edition

(<https://openstax.org/details/books/astronomy-2e>)

Other readings may be assigned from freely available websites.

**Course Website (eClass):** <https://eclass.yorku.ca/course/view.php?id=90251>

**Technology Checklist:** While this is an in-person class, there may be situations that require online connectivity. To maintain flexibility, you should have the following resources available for use:

 <p>An internet-enabled computer</p>	 <p>Zoom software installed on computer</p>	 <p>Access to reliable internet</p>	 <p>Webcam</p>	 <p>Microphone</p>
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**Note:** *If you don't have access to a computer, webcam, or microphone, consider [borrowing a laptop from York U](#), [financial aid from York](#), [and single workspaces available for student use on campus at the library](#).*

## Community Guidelines

The following values are fundamental to academic integrity and are adapted from the International Center for Academic Integrity\*. In our course, we will seek to behave with these values in mind:

	As students, we will...	As a teaching team, we will...
<b>Honesty</b>	<ul style="list-style-type: none"> <li>Honestly demonstrate our knowledge and abilities on assignments and exams</li> <li>Communicate openly without using deception, including citing appropriate sources</li> </ul>	<ul style="list-style-type: none"> <li>Give you honest feedback on your demonstration of knowledge and abilities on assignments and exams</li> <li>Communicate openly and honestly about the expectations and standards of the course through the syllabus, and with respect to assignments and exams</li> </ul>
<b>Responsibility</b>	<ul style="list-style-type: none"> <li>Complete assignments on time and in full preparation for class</li> <li>Show up to class on time, and be mentally/physically present</li> <li>Participate fully and contribute to team learning and activities</li> </ul>	<ul style="list-style-type: none"> <li>Give you timely feedback on your assignments and exams</li> <li>Show up to class on time, and be mentally &amp; physically present</li> <li>Create relevant assessments and class activities</li> </ul>
<b>Respect</b>	<ul style="list-style-type: none"> <li>Speak openly with one another, while respecting diverse viewpoints and perspectives</li> <li>Provide sufficient space for others to voice their ideas</li> </ul>	<ul style="list-style-type: none"> <li>Respect your perspectives even while we challenge you to think more deeply and critically</li> <li>Help facilitate respectful exchange of ideas</li> </ul>
<b>Fairness</b>	<ul style="list-style-type: none"> <li>Contribute fully and equally to collaborative work, so that we are not freeloading off others</li> <li>Not seek unfair advantage over fellow students in the course</li> </ul>	<ul style="list-style-type: none"> <li>Create fair assignments and exams, and grade them in a fair, and timely manner</li> <li>Treat all students equitably</li> </ul>
<b>Trust</b>	<ul style="list-style-type: none"> <li>Not engage in personal affairs while on class time</li> <li>Be open and transparent about what we are doing in class</li> <li>Not distribute course materials to others without authorization</li> </ul>	<ul style="list-style-type: none"> <li>Be available to all students when we say we will be</li> <li>Follow through on our promises</li> <li>Not modify the expectations or standards without communicating with everyone in the course</li> </ul>
<b>Courage</b>	<ul style="list-style-type: none"> <li>Say or do something when we see actions that undermine any of the above values</li> <li>Accept a lower or failing grade or other consequences of upholding and protecting the above values</li> </ul>	<ul style="list-style-type: none"> <li>Say or do something when we see actions that undermine any of the above values</li> <li>Accept the consequences (e.g., lower teaching evaluations) of upholding and protecting the above values</li> </ul>

<sup>2</sup> This class statement of values is adapted from Tricia Bertram Gallant, Ph.D.

## Assessment in this Course

Research about learning strongly suggests that the most important factor in learning is doing the work of reading, writing, recalling, practicing, synthesizing, and analyzing. Learning happens best when people actively engage material on a consistent basis, and that is why we have high standards in this course. We are confident that, with appropriate effort, you **all** can meet those standards.

When possible, we also try to reduce unintentional bias in grading by, for example, grading assignments one question at a time, have the same TA mark one specific question, and using rubrics. These also help improve consistency in marking.

## Grade Breakdown

COMPONENT	GRADE VALUE	DUE DATES
<b>ICLCIKER QUIZZES</b> (50% PARTICIPATION / 50% PERFORMANCE)	10 %	Thursdays (in-class)
<b>ASSIGNMENTS</b>	15 % (7 x 2.14 % each)	Jan 15, 2024 @ 11:59 pm Jan 22, 2024 @ 11:59 pm Jan 29, 2024 @ 11:59 pm Feb 12, 2024 @ 11:59 pm Mar 4, 2024 @ 11:59 pm Mar 18, 2024 @ 11:59 pm Apr 1, 2024 @ 11:59 pm
<b>PROJECT</b>	30%	Part 1: Feb 16, 2024 @ 11:59 pm Part 2: March 15, 2024 @ 11:59 pm Part 3: Apr 8, 2024 @ 11:59 pm
<b>TESTS</b>	45 % (20 % - highest, 15% second highest, 10% lowest)	Feb 1, 2024 (in-class) Mar 7, 2024 (in-class) Apr 4, 2024 (in-class)

### Academic Accommodations:

Students with physical or learning challenges who require reasonable accommodations in teaching style or evaluation methods should discuss this with me early in the term so that appropriate arrangements can be made (see university policies section for further information)

## **iClicker Quizzes (10 %)**

Pedagogical studies have shown that formative assessments (assessments taken while you learn) improve student understanding of course material. Therefore, each Thursday lecture will consist of several in-class quiz-style questions for students to complete with iClicker based on that week's previously recorded and in-class content. These quizzes are meant to be low stakes assessments that help facilitate learning. Hence 50% of each quiz grade is based on participation and the other 50% is based on performance. In other words, if you get every question wrong on a quiz you will still receive a grade of 50% for attempting the quiz. Furthermore, you may consult your notes and classmates while completing the questions.

**Policy for missed iClicker Quizzes:** iClicker questions from up to two missed lectures will be automatically dropped from your grade. No email or documentation is required. If you miss more than four lectures, documentation must be provided for all missed lectures in order to have additional lectures dropped from your grade. No make-up opportunities will be provided for missed iClicker questions.

## **Assignments (15 %)**

Online assignments will be posted on select Mondays and will cover the current week's material (in some cases the previous week's material will also be covered). These assignments are open book and you will have one week to complete each assignment, as they are due the following Monday at 11:59 pm after being posted. Assignments will be slightly more difficult than the Weekly Lecture Quizzes, as they will sometimes require you to make connections to other course materials or apply what you have learned in class to new concepts.

**Policy for late or missed Assignments:** No late assignments will be accepted. One missed assignment will be automatically dropped from your grade. No email or documentation is required. If you miss more than one assignment, documentation must be provided for all missed assignments in order to have additional assignments dropped from your grade. No make-up opportunities will be provided for missed assignments.

## **Projects (30 %)**

There will be one large project in this course. The project is meant for you to apply what you have learned in class to real-world scenarios. The details of each project will be released at the appropriate time.

For convenience, the project has been broken up into parts, with each part to be submitted on eClass by the appropriate due date (Feb 16, Mar 15, Apr 8). It is every student's responsibility to ensure they have uploaded the correct document and the document is readable by eClass. Do not upload any corrupt files, photos, or other files that will not be readable by eClass. Doing so will result in your project being subjected to late penalties (see policy below). Once graded projects are handed back to the class, no further submissions will be allowed (no exceptions will be made).

**Policy for late or missed Projects:** All students automatically receive a one week extension on all components of the project, but the marking of late components will be delayed. If you submit your project within the one week extension, no email or documentation is required. Projects submitted beyond the one week extension will receive a penalty of 20% per day.

If a project component is missed, complete the Missed Project Form on eClass where you will be asked to submit valid documentation (as per the York University Senate Policy) that explains why both the due date and extension date were missed. This form must be submitted **within 24 hours of the extension date**. There are no make-up projects. The weight of missed projects will be redistributed amongst the other assessments.

## Tests (45 %)

Three tests will occur in-class on February 1, March 7, and April 4 2024. The tests will cover Weeks 1-3, 5-7, and 9-11 respectively. For the second and third test please note that concepts covered during the appropriate weeks of the course require an understanding of and the ability to make connections to material covered in previous weeks. Further details (e.g. the number and type of questions, etc.) will be provided prior to each test.

**Policy for a missed exam:** If the an exam is missed, you must fill out the Missed Exam Form within 24 hours of the exam. If rationale and/or documentation are accepted, an alternate test or grading scheme will be arranged.

\*Note: if you know in advance that you will miss the exam due to an event, travel, religious observances, etc. you must contact me before at least 10 business days prior to the test.

## Regrading/Reappraisal Procedures

If you require a reappraisal of work that has been submitted and marked, an email must be sent to [webbjj@yorku.ca](mailto:webbjj@yorku.ca) including the following information: (1) Your Name and Student Number, (2) A summary of the request (e.g. the total was miscounted), and (3) a copy of the assessment (if necessary). All regrading/reappraisal requests must be made within 1 week from when the grade was made available to you. All regrades are final, regardless of whether it resulted in an increase or decrease in your mark.

## Office of Student Community Relations (OSCR)

If you are struggling academically because of a critical incident or personal crisis and don't want to share these details with me (your course director), please contact York's Office of Student Community Relations for further assistance. They can provide you with the support and help you require. The website is: <https://oscr.students.yorku.ca/>



## University Policies

In accordance with the York University Undergraduate Calendar Regulations, the letter grades assigned in this course will have the following percentage equivalents:

GRADE	GRADE POINT	PER CENT RANGE
A+	9	90-100
A	8	80-89
B+	7	75-79
B	6	70-74
C+	5	65-69
C	4	60-64
D+	3	55-59
D	2	50-54
E	1	(marginally below 50%)
F	0	(below 50%)

### Academic Honesty and Integrity

Academic misconduct undermines the values of honesty, trust, respect, fairness, and responsibility that we expect in this class. York University provides supports such as academic integrity workshops to ensure, as far as possible, that all students understand the norms and standards of academic integrity that we expect you to uphold.

York students are required to maintain the highest standards of academic honesty and they are subject to the Senate Policy on Academic Honesty (<http://secretariat-policies.info.yorku.ca/policies/academic-honesty-senate-policy-on/>). The Policy affirms the responsibility of faculty members to foster acceptable standards of academic conduct and of the student to abide by such standards. Please review and familiarize yourself with the policy.

There is also an academic integrity website with comprehensive information about academic honesty and how to find resources at York to help improve your research and writing skills, and cope with University life. Students are expected to review the materials on the Academic Integrity website:

#### Examples of actions that do not adhere to York's Academic Integrity Policy include:

- Plagiarism (passing off someone else's work as your own)
- Accessing unauthorized sites for assignments or midterms
- Unauthorized collaboration on assignment and exams

- Uploading work to third party repository sites (e.g., Course Hero, One Class, etc.)
- Scanning, sharing, uploading, or publishing exams, midterms, or scholarly work

For more information on what academic integrity is and why it is important see:

<https://spark.library.yorku.ca/academic-integrity-what-is-academic-integrity/>. Information on the process of investigations into breaches of academic honesty:

<https://spark.library.yorku.ca/academic-integrity-breach-of-policy-on-academic-honesty/>

## Academic Integrity and Generative Artificial Intelligence Technology

Students are not authorized to use text-, image-, code-, or video-generating AI tools when completing their academic work unless explicitly permitted by a specific instructor in a particular course. Otherwise, using AI tools to aid in academic work (in whole or part) that is submitted for credit constitutes one or more breaches under York's [Senate Policy on Academic Honesty](#) ("Senate Policy"). As an example, any **unauthorized** use of ChatGPT is considered to be a breach of academic honesty.

### Important Note from the FSc Committee on Examinations & Academic Standards (CEAS):

Numerous students in Faculty of Science courses have been charged with academic misconduct when materials they uploaded to third party repository sites (e.g., Course Hero, One Class, etc.) were taken and used by unknown students in later offerings of the course. Whenever a student submits work obtained through an external site (e.g., Course Hero, Chegg), the **submitting student will be charged with plagiarism** and the **uploading student will be charged with aiding and abetting**. To avoid this risk, students are urged not to upload their work to these sites.

## Assistance for Students

**Academic Advising\***: <https://www.yorku.ca/science/academic-advising/>

\* Departments also offer program-specific advising. Check with your Department's Undergraduate Office.

**Writing Services**: <https://www.yorku.ca/colleges/bethune/get-help/writing/>

**Peer Assisted Study Sessions (PASS)**: <https://www.yorku.ca/colleges/bethune/get-help/pass/>

**Peer Tutoring**: <https://www.yorku.ca/colleges/bethune/get-help/peer-tutoring/>

**Learning Commons (general academic learning supports including library research, time management, study skills, career planning, etc.)**: <https://learningcommons.yorku.ca/>

## Access/Disability

York University is committed to principles of respect, inclusion, and equality of all persons with disabilities across campus. The University provides services for students with disabilities (including physical, medical, learning, and psychiatric disabilities) needing accommodation related to teaching and evaluation methods/materials. These services are made available to students in all Faculties and programs at York University.

Students in need of these services are asked to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Please note that registering with disabilities services and discussing your needs with your professors is necessary to avoid any impediment to receiving the necessary academic accommodations to meet your needs.

**Additional information is available at the following websites:**

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

**York Accessibility Hub:** <http://accessibilityhub.info.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. Should any of the dates specified in this syllabus for an in-class midterm or examination pose such a conflict for you, contact the Course Director within the first three weeks of class. Similarly, should an assignment to be completed in a lab, practicum placement, workshop, etc., scheduled later in the term pose such a conflict, contact the Course Director immediately. To arrange an alternative date or time for an examination scheduled in the formal examination periods (December and April/May), students must complete and submit an accommodation request form at least 3 weeks before the exam period begins.

<https://secure.students.yorku.ca/pdf/religious-accommodation-agreement-final-examinations.pdf>

### **Student and Instructor Conduct in Academic Situations**

Students and instructors are expected to maintain a professional relationship characterized by courtesy and mutual respect. Moreover, it is the responsibility of the instructor to maintain an appropriate academic atmosphere in the classroom and other academic settings, 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. The policy and procedures governing disruptive and/or harassing behaviour by students in academic situations is available at - <http://secretariat-policies.info.yorku.ca/policies/disruptive-andor-harassing-behaviour-in-academic-situations-senate-policy/>

York University is committed to providing access to the educational experience to promote academic accessibility for all individuals.

Academic accommodation refers to educational practices, systems and support mechanisms designed to accommodate diversity and difference. The purpose of accommodation is to enable students to perform the essential requirements of their academic programs. At no time does

academic accommodation undermine or compromise the learning objectives that are established by the academic authorities of the University.

University rules regarding registration, withdrawal, appealing marks, and most anything else you might need to know can be found on the university's website, here:

<https://calendars.students.yorku.ca/2021-2022/policies-and-regulations>

## **Decolonizing, Equity, Diversity, Inclusion**

York University is continuing to advance an inclusive, diverse, and equitable environment, where everyone belongs. This commitment extends to our classroom, where it is my goal that every student has an equal and inclusive course experience. If you have any concerns with respect to decolonizing, equity, diversity, and inclusion related to this course or otherwise, please do not hesitate to contact me. Additional information, as well as support of anyone experiencing discrimination or harassment, can be found at <https://www.yorku.ca/dedi-strategy/>.

## **Division of Natural Science (NATS) Student Resources**

**NATS-AID – A free peer tutoring service for students enrolled in NATS courses**

<http://natsci.info.yorku.ca/nats-aid/>

**M-AID in NATS (Math Aid) – Free math help for students enrolled in NATS courses**

<http://natsci.info.yorku.ca/m-aid-in-nats/>

## **Other Resources**

### **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. 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

## **Land Acknowledgement**

York University recognizes that many Indigenous Nations have longstanding relationships with the territories upon which York University campuses are located that precede the establishment of York University. York University acknowledges its 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, and the Huron-Wendat. It is now home to many First Nation, Inuit, and Métis communities. We acknowledge the current treaty holders, the Mississaugas of the 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.

## Keys to Success

- Have an open mind:
  - The Universe is a rather abstract concept, and we often don't have any natural intuition for understanding some of its properties and its components. Do not worry if certain concepts seem “out of this world”. Embrace the craziness! Be curious! Be patient! As more and more pieces fall into place we will develop our own astrobiology-based intuition together. You will be surprised at how much of the Universe can be understood using Earth-bound physics and biology.
- Reading:
  - To be successful in this course and achieve the learning goals discussed above, student's need to look no further than this Syllabus. In the Course Syllabus each week's topic and the sections of the textbook that corresponding to the topic are listed. I highly recommend reading the textbook BEFORE class, so you have a general understanding of each topic before we discuss the finer details. Furthermore, reading the text also offers a different approach to introducing you to course material.
- Understand the Quizzes, Assignments and Projects:
  - This one may seem like a no-brainer, these assessments are worth 50% of your final mark, but the keyword here is UNDERSTAND. Quizzes, Assignments and Projects are where you learn by doing, which for many of us is the most effective method of learning anything. So don't just work to get an answer that looks right. Don't just “do the steps” or “do the math”. Make sure, from an astrobiology perspective, that you really know what's going on. If you do not, see the next key to success.
- Utilize your resources:
  - This class has a professor who wants every single student to come away from this course with a newfound passion and interest for all things astrobiology. This professor also has office hours and doesn't mind sticking around after class to answer questions. USE YOUR PROFESSOR! If anything from class is not clear to you, then chances are it's your professor's fault. So come ask me about it, and let's work things out together.
  - This class has a large number of students. Use each other! Studies have shown that students learn best from their own classmates. So talk after class and post questions on eClass. Chances are at least one fellow student has the same question as you and another student has an explanation that will help things “click”.
- Time Management
  - One of the most difficult aspects of online learning, and university life in general, is time management. The Course Schedule below will let you know when every assessment will be posted and when every assessment is due. Plan to review each assessment soon after it is posted to get a sense of how long it will take and what aspects you might need extra help on. Get extra help early and don't leave anything to the last minute. It never hurts to be done early and then make minor changes close to the date.