AST 198 - Great Astronomical Issues
Course Outline Fall 2019

Instructor: Professor Hilding Neilson
Class: Mondays 3:10 — 5 pm
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Office hours: Tuesdays 2 - 5 pm (or by appointment)

Catalog Course Description: This seminar series aims at building up general scientific literacy, by discussing selected topics in current astronomy, cosmology, and space science. We will delve into the physical foundation behind the questions being asked and how the answers are being sought. Students will have an opportunity early in the course to select topics of particular interest to them and this will govern the choice of readings as well. Topics could include: formation of stars; lives and deaths of stars; stellar corpses: white dwarfs, neutron stars, and black holes; planets around other stars; recent results from Hubble and other telescopes; architecture of the solar system; exploration in the solar system; the invisible universe: dark energy and dark matter; first light; formation of galaxies; the age and future of the universe. Participants should be comfortable with basic mathematics and quantitative reasoning. Students will be expected to do independent research for essays, presentations, etc.
(from http://www.artsandscience.utoronto.ca/ofr/1617_199/pmu199h1.html#L0112F). Please note that the class was originally called PMU 199.

This course is one of the first-year seminar courses that are offered to introduce students to the excitement of discovery inherent in academic work at the University of Toronto. In addition, students are encouraged to develop their ability to think analytically and to express ideas and logical arguments clearly and coherently, both orally and in writing. These interactive seminars are intended to stimulate the students' curiosity and provide an opportunity to get to know a member of the professorial staff in a seminar environment during the first year of study.

This particular course: The goal of this course is to explore astronomy and the Universe through the knowledge of Indigenous peoples of the Americas, Australia and Oceania. In this course, we we learn about the Universe through observations of the night sky, development of calendars, tools for navigation and ceremony and how various Indigenous peoples connected to the sky. We will learn about the perspective of Indigenous science, which differs from how we typically learn about science in schools. Indigenous science views nature and natural phenomena as being connected to and developed in relation to people and a location. Our approach to this material is to honour and respect Indigenous knowledge and connect that knowledge to the understanding of the Universe.

Learning Outcomes that you should accomplish by taking this course:
L1: Acquire basic astronomical knowledge: be able to describe, assess, and appreciate what the Universe consists of, some of the great astronomical current and past issues and what our position in the Universe is.
L2: Be able to explain how we use the scientific method to develop new scientific knowledge, in particular applied to astronomy.

L3: Demonstrate critical thinking, the ability to extrapolate ideas, reasoning in developing ideas, and critical reflection. Develop critical assessment of reference sources. Learn to criticize constructively and perform peer review.
L4: Show clear and coherent communication skills, both orally and in writing.
L5: Demonstrate research skills.
L6: Learn to appreciate diverse perspectives of science in a broader, non-Eurocentric perspective and to respect other approaches to understanding the Universe.

How are we going to develop the learning outcomes? Half of the semester will be mostly dedicated to acquiring basic astronomical knowledge through reading assignments and class discussions. During this time we will be discussing the tools and skills you need in order to carry out bibliographic research in an academic setting. You will produce one written report of a topic related to theme of the course "Indigenous astronomy" or a report on a theme relating to the intersection of astronomy and another field, be it biology, computer science, fine arts, literature, etc. You will also be expected to complete one laboratory exercise.

This class has no prerequisites and no math and/or physics knowledge is required, and it is not a requisite for any other class.

Required Materials:

Textbook: We will be using the online textbook https://www.teachastronomy.com/textbook/ for reference and there will be assigned readings each week. You may want to have a reference introductory-level astronomy book. Two good references to basic astronomical concepts are "*The Cosmic Perspective*" (Bennett et al., Pearson, 7th edition or earlier editions up to 5th) and "*Astro*" (Backman et al., Nelson, Canadian edition). The library has both of them on short term loan (3 hours), and you are not required to buy them, but frequent access (and by frequent I mean at least 2 times a week to complete the readings assignments and whenever you have a question) to at least one of them will be necessary. Any other books of astronomy at an introductory level are also allowed, as long as you find they cover the material I am asking you to read. Feel free to ask me if you have any questions and to check the University of Toronto libraries for other sources:

http://onesearch.library.utoronto.ca/

Other additional course readings: will be posted on Quercus after each class. There WILL be readings every week that you will be responsible for. Remember to check it regularly.

Other materials: Please bring paper and pen/pencil. A basic calculator could be useful as well.

iClicker: We will not be using iClickers in the class, we will discuss various forms of assessment in class.

Quercus: you will need to have access to Quercus, the online course management system:

http://q.utoronto.ca

Your Responsibilities (besides Learning and completing assignments):

- Complete the readings before class. There might be pre-class assignments to assess you have read the material. Readings will be posted on Quercus at the end of each class so you will have six days to complete them.
- Monitoring the course on Quercus AND your @mail.utoronto.ca e-mail address regularly.
- Please arrive on time (3:10 pm).
- Please notify me in advance if you will miss class.
- Be courteous and respectful to the classroom community.
- While I encourage you to work in groups, and indeed some of the work will be performed that way (through in-class and out-of-class discussions), all of your written reports must be your own original work.
- Cell phones should be on mute and out of sight.

Grades: we follow the University of Toronto Faculty of Arts and Science grading policy.

http://www.writing.utoronto.ca/advice/general/grading-policy

A+ > 90	B+ 77 - 79	C+ 67 - 69	D+ 57 - 59	F < 49
A 85 - 89	B 73 - 76	C 63 - 66	D 53 - 56	
A- 80 - 84	B- 70 - 72	C- 60 - 62	D- 50 - 52	

This is not an 'easy A' class. I consider that you will not have any problem getting a C. If you work, it is easy to get a B, but grades about B+ will only be granted if you demonstrate you have acquired the learning goals described at the beginning of this course outline and "strong evidence of original thinking; good organization; capacity to analyze and synthesize; superior grasp of subject matter with sound critical evolutions; extensive knowledge base."

Marking Scheme:

Activity	Points	Learning Outcomes
Written Report final submission	15	L1, L2, L3, L4, L5, L6
Outline of Written Report	10	L4, L5, L6
Review of Written Draft	10	L3, L4, L5
Proposed Bibliography/First Draft	5	L3, L5
Written Report Proposal	5	L1, L3, L4, L5, L6
Oral Presentation	15	L2, L3, L4, L5
Reflections	20	L1, L2, L3, L4, L6
Participation	10	L2, L3, L4

Activity	Points	Learning Outcomes
Final Exam (Oral)	10	L2, L3, L4, L6

Written Reports

One of the key projects for this class will be a written report describing a topic related to course. Students are not expected to create brand a new idea and do new science, but to describe an idea, how we understand a phenomenon and/or the process of gaining that understanding. Each written report will be broken into different components, mentioned in a forthcoming handout and briefly. **Please read the accompanying description carefully**.

Oral Presentation

The oral presentation will complement the written project. The presentation will be (tentatively) a 10-minute discussion of your topic for the written project. Presentations will take place during the second-half of the course.

Reflections

One of the main ways of learning in this class will be from regular readings. For each reading, students are expected to reflect on the readings and discuss their impact. Details of how to write these reflections will be discussed in class. The reflections will be posted to the Discussion Board on Quercus and additional questions may be asked. For students joining the course later in the term will be expected to contribute to and complete missed readings and reflections.

Final Exam

The final exam will be a 10-minute interview that will be scheduled around the final class of the semester. The exam will be a discussion between you and myself about the course material and your written project. While the knowledge of the subject should be at a first-year academic level, answers should be expressed in a manner understandable by an average person.

No extra-point activities will be offered. The course is designed so you need to perform well in the designed activities for you to acquire the learning outcomes. However, I might allow you to improve your performance (and hence your grade) by working more on some particular aspects if you find honest difficulties the first time. This is not mandatory, neither for you, nor for me: you might not want to do it, I might not want to offer it. You may be allowed to improve assignments **only if you discuss them with me during office hours.**

Class Calendar: If you require accommodation based on your religious holidays, please let me know so we can find an alternative that suits you. This course has weekly deadlines that will updated on Quercus.

Deadlines are final Written assignments are due at 11:59:00 pm on each given date. Reflections are due by 2:59:00 pm before class. I will take points off for every day the written report is late (1 point for each day late). Oral presentations are important and cannot be late. Please contact me immediately if there are any conflicts.

Writing Resources: one of the major goals of this course is to help you develop academic writing skills.

Writing Centres — Every college on campus has a writing centre, which provides free one-on-one and group consultations. For more information please check:

www.writing.utoronto.ca

If english is your second language please check:

http://www.artsci.utoronto.ca/current/advising/ell

Plagiarism, as described in the **Code of Behaviour on Academic Matters** (Appendix A, Item p), is ' "the wrongful appropriation and purloining, and publication as one's own, of the ideas, or the expression of the ideas … of another." This most common, and frequently most elusive of academic infractions is normally associated with student essays. Plagiarism is at once a perversion of originality and a denial of the interdependence and mutuality which are the heart of scholarship itself, and hence of the academic experience. Instructors should make clear what constitutes plagiarism within a particular discipline.'

How not to plagiarize: http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize

We will use Turnitin.com to help detect plagiarism. "Normally, students will be required to submit their course essays to Turnitin.com for a review of textual similarity and detection of possible plagiarism. The terms that apply to the University's use of the Turnitin.com service are described on the Turnitin.com web site".

Academic Honesty: "the University and its members have a responsibility to ensure that a climate which might encourage, or conditions which might enable, cheating, misrepresentation or unfairness not be tolerated. To this end, all must acknowledge that seeking credit or other advantages by fraud or misrepresentation, or seeking to disadvantage others by disruptive behaviour is unacceptable, as is any dishonesty or unfairness in dealing with the work or record of a student. (Code of Behaviour on Academic Matters, Section B)".

http://www.utoronto.ca/academicintegrity

Students with disabilities: the University provides accommodations for students with disabilities in accordance with the terms of the Ontario Human Rights Code. This occurs through a collaborative process that acknowledges a collective obligation to develop an accessible learning environment that both meets the needs of students and preserves the essential academic requirements of the University's courses and programs.

For more information on services and resources available to instructors and students, please contact Tanya Lewis, Director of Academic Skills and Accessibility Services at 416-978-6786, tanya.lewis@utoronto.ca