

A2020: Two-Eyed Seeing and Astronomy

Course Outline: 2019 – 2020

Etuaptmumk or Two-Eyed Seeing (TES) is the guiding principle from Mi'kmaw Elder Albert Marshall¹. It refers to simultaneously learning from the strengths of Indigenous knowledge and ways of knowing from one eye and from the strengths of Eurocentric/Western knowledge and ways of knowing with the other eye. In this course, we will apply the principle to astronomy – and through this disciplinary content we will also discuss the wider framework of decolonizing and Indigenizing the academy. We are all treaty people, we are all at different places in this journey of reconciliation, and we can and need to learn from one another to move forward.

1. Course description

Course title: Two-eyed seeing and astronomy
Section: 001
Description: An introduction to the intersection between Indigenous and Eurocentric/Western astronomy, particularly as it relates to naked-eye observations of the night sky; using astronomy as a gateway to learn more about Indigenous culture, history, and the process of decolonization and reconciliation.
Prerequisites: None
Antirequisites: None
Course hours: 2 lecture hours plus 1 tutorial hour per week, September-December
Units: 0.5-unit course
Lecture times: Mondays 7-9 pm
Tutorial times: Mondays 9-10 pm
Location: Arts and Humanities Building, room AHB 1B02;
https://wts.uwo.ca/ctg/classrooms/arts_and_humanities_building/ahb_1b02.html; via Google <https://goo.gl/maps/szQDnoyFQcrFar7y5>, and also on the official campus map: <http://www.geography.uwo.ca/campusmaps/>.

2. Instructor and course coordinator contact information

Instructor and course coordinator: Dr Robert Cockcroft
Physics and Astronomy Building, Office PAB 232
519-661-2111 ext 87991
robert.cockcroft@uwo.ca (Note: three c's in the surname)

¹ Elder Marshall generously gave his permission for his term TES to be used in the name of this course and his colleague Prof Cheryl Bartlett kindly provided links with further information on TES: <https://www.edcan.ca/articles/the-best-of-both-worlds/>, <https://www.edcan.ca/articles/learning-together-learning-listen/>

- Email: I will generally respond as soon as possible (within 24 hours), but please allow 2-3 business days for a reply during busy periods.
- Office hours: See OWL's "Course Info" tab. If these times are not convenient, you can make an appointment for another day/time. You are also welcome to see me before or after class (once I have finished setting up or closing down). If you prefer an appointment with a TA, please contact them directly to arrange.
- Important note: I am not Indigenous. I am from the UK with heritage from northern England, around Yorkshire and Lancashire, and I moved to Turtle Island in 2005. I acknowledge that there is potential for concern by having a non-Indigenous faculty member teach Indigenous content. Indigenous faculty members are underrepresented at Western University (and across Canadian higher education institutes in general), and those few who are on campus are overburdened with requests to help fulfill the university's drive to "Indigenize the academy." By offering courses such as this one I hope not only to help increase Indigenous content in the university's curricula, but I also aim to make the university more attractive and inclusive for all students including Indigenous students – and, ultimately, therefore enabling an increase of Indigenous peoples throughout all academic levels, including Indigenous faculty members who can then teach Indigenous courses such as these (should they want to do so). Until this underrepresentation can be fully addressed, we must further help the upward spiral and I would like to use my current privilege as a faculty member to raise Indigenous voices (with Indigenous guest speakers and course readings by Indigenous authors) in the field where I think I can contribute the most: astronomy. This course has not been produced in isolation; I have consulted/collaborated and will continue to consult/collaborate frequently with various Indigenous stakeholders including on campus (Candace Brunette-Debassige, Special Advisor to the Provost, Indigenous Initiatives; Dr Janice Forsyth, Director, Indigenous Studies (formerly First Nations Studies), and; Sasha Doxtator and Brianne Derrah, Indigenous undergraduate students) and off campus (Tom Deer, Dr Juan Sanchez-Martinez, Dr Annette S Lee, Dr Andrew Judge, and Dr Kevin White).

3. Required course materials

- Textbooks: Free Eurocentric/Western astronomy textbook by Fraknoi, Morrison, and Wolff: <https://openstax.org/details/books/astronomy>
Indigenous astronomy books, literature, and online sources: there are many hundreds of unique Nations recognized across Canada; accordingly, there is no single resource but rather many resources that are appropriate for this class (see "Resource List" document)
- Stellarium: Freely downloadable software: <https://stellarium.org/>

4. Course website

The secure OWL course shell is used for the following:

- Posting all instructional materials (slides are posted the day before class in both PowerPoint and PDF formats)
- Announcements
- Accessing marks for various course components
- Discussion forum
- Calendar containing important dates for this course
- Links to useful resources

For technical issues accessing this course shell or OWL in general, please check the information at the ITS website: <http://www.uwo.ca/its/> and contact ITS services if problems persist.

5. Course overview and objectives

Astronomy 2020 provides an introduction to the intersection between Indigenous and Eurocentric/Western astronomy. The points below give a summary of general learning outcomes. At the end of this course, you should be able to:

- recall and describe many examples where Indigenous and Eurocentric/Western knowledge about the night sky overlap and intersect;
- practice naked-eye astronomy to identify various objects (e.g., constellations, asterisms, clusters, the Moon, and planets) and how their position in the sky changes over different timescales and in different locations locally, across Turtle Island and internationally
- supplement naked-eye observations with investigations with software to predict past and future changes of the sky
- know by name, define and characterize the main structural elements of the Solar System via relative sizes and distances
- compare similarities and differences between Indigenous and Eurocentric/Western cosmologies;
- analyze how different astronomical concepts relate to one another;
- create a resource to respectfully (and with permission) share what you have learnt about in this course;
- evaluate the larger framework and purpose of reconciliation and discuss Indigenous priorities and concerns.

6. Course components, grades and requirements

Your final grade in this course is obtained from the marks of various course components and calculated according to the scheme below. Grades for various components will be posted on OWL regularly; it is your responsibility to check these grades regularly. Any errors, or appeals to your scores, must be reported to your instructor within two weeks of their initial posting. Unless otherwise stated, deliverables that are submitted past the deadline will incur a penalty of 20% of the full value of the deliverable. An additional 20% penalty will apply for each additional day that the deliverable is late.

Component	Weighting
6 assignments	60%
1 group project	25%
1 essay	15%

See “Assignments and Rubrics” document for further details.

7. Make-up policy

Please be aware of the following University regulations:

- If you are unable to meet a course requirement due to illness or other serious circumstances, you must seek approval for the absence as soon as possible. Approval can be granted either through a self-reporting of absence or via the Dean’s Office/Academic Counselling unit of your Home Faculty. If you are a Science student, the Academic Counselling Office of the Faculty of Science is located in NCB 280, and can be contacted at scibmsac@uwo.ca.
- For further information, please consult the university’s policy on academic consideration for student absences: https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf.
- It is the student’s responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed.

8. Cheating (scholastic offenses)

Scholastic offenses are taken seriously. Carelessness or ignorance is not a defense for scholastic offences. For example, "I didn't mean to cheat" does not absolve you of the offence. Therefore, you are directed to read the appropriate policy, specifically the definition of what constitutes a scholastic offense, here:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

It is a scholastic offense to cheat on a test or exam, to plagiarize a course project, and to modify marked material to falsely justify additional credit. Cheating also includes having available any electronic devices on your person during a test or exam. Committing a scholastic offense is attended by academic penalty, which may include expulsion from the program. Computer-marked multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may

indicate cheating. If you are caught cheating, there will be no second warning. Any student caught engaging in this behavior will (1) receive a mark of zero on the course component in question; and (2) may be subject to a further, and often quite severe, penalty.

9. Student and classroom conduct

The lectures in this course are intended to provide you with an opportunity to learn, in a safe, welcoming and inclusive environment. We (students and instructors) have a collective responsibility to ensure this happens. If there are ways that your instructors can improve this environment, please let them know. As a student, your responsibilities to respect the rights of your classmates to benefit from the lectures include but are not limited to the following:

- Limiting your conversations to those essential to the class;
- Arriving on time (if you are late, please use the back doors and be as quiet as possible on entering);
- Switching off your cell phones;
- Do not leave during lectures; and,
- Do not use your electronic devices except for note-taking or as requested by your instructor. Your screens are a distraction to those around you and research studies show student grades are lowered when surrounded by other peoples' devices when those devices are not being used for course work. If you go against this advice to use devices in appropriate ways, please sit at the back and don't distract others!

Disruptive behaviour in class or on OWL will not be tolerated. Students in class who persist in loud, rude or otherwise disruptive, inappropriate, and/or non-inclusive behaviour will be asked to leave.

For further information on the Code of Student Conduct, please see:

<https://www.uwo.ca/univsec/pdf/board/code.pdf>

10. Accessibility

Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. Please also contact the course instructor if you have any difficulty with stairs; the telescopes at the observatory are usually only accessible by stairs (i.e., no elevator) but arrangements can be made in advance to move the telescopes should this be needed. You may also wish to contact Student Accessibility Services (SAS) at 519-661-2147 and the link below for any specific questions regarding an accommodation:

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic%20Accommodation_disabilities.pdf

11. Accommodation for religious holidays

Please see the link below for the University's policy on accommodation due to religious holidays:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

12. Support services

Learning-skills counsellors at the Student Development Centre (<http://www.sdc.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered September-April in the drop-in Learning Help Centre, and year-round through individual counselling.

Students who are in emotional/mental distress should refer to Mental Health@Western http://uwo.ca/health/mental_wellbeing/ for a complete list of options about how to obtain help. Additional student-run support services are offered by the University Students' Council, <http://westernusc.ca/services>.

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

13. Diversity and Inclusion

In an ideal world, according to the Eurocentric/Western definition of science, science would be objective. However, much of science is subjective and is historically built on a small subset of privileged voices. In this class, we will make an effort to acknowledge a diverse group of scientists, but limits still exist on this diversity. We acknowledge that it is possible that there may be both overt and covert biases in the material due to the lens with which it was written, even though the material is primarily of a scientific nature. Integrating a diverse set of experiences is important for a more comprehensive understanding of science. We will discuss issues of diversity in science as part of the course from time to time. Please contact us, your instructors, (in person or electronically) or submit confidential feedback if you have any suggestions to improve the quality of the course materials. Furthermore, we would like to create a learning environment for everyone that supports a diversity of thoughts, perspectives and experiences, and honours your identities (including race, gender, gender identity, class, sexuality, religion, ability, etc.) To help accomplish this: If you have a name and/or set of pronouns that differ from those that appear in your official Western University records, please let us know. If you feel like your performance in the class is being impacted by your experiences outside of class, please don't hesitate to come and talk with us. We want to be a resource for you. Remember that you can also submit confidential feedback (which will lead to us making a general announcement to the class, if necessary, to address your concerns – but without identifying you). If you prefer to speak with someone outside of the course, your academic counsellors are an excellent resource. We (like many people) are still in the process of learning about diverse perspectives and identities. If something was said in class (by anyone) that made you feel uncomfortable, please talk to us about it. (Again, your feedback will always be confidential.) As a participant in course discussions, you should also strive to honor the diversity of your classmates.

14. Feedback and suggestions

If you have a concern about something, please let me (your instructor) know. I rely on your feedback. As always, you may give me feedback in person or via email. You may also wish to speak with the Physics & Astronomy Department Chair or the Associate Chair of Undergraduate Studies (for contact information see <http://www.physics.uwo.ca>).

15. Your grade

You earn your grade for completing course requirements, and for having gained a good knowledge and understanding of the course material. To maximize this grade, you should:

- read the assigned readings before each class;
- attend class regularly, discuss the material, and ask questions;
- review past lectures regularly;
- successfully complete all of the course assignments on time, and;
- seek regular help for material that you do not understand.

On average, this should take up about 6-9 hours per week. If you don't frequently already use a calendar/organizer, it would be beneficial to start doing so. Follow discussions on the forum. Helpful tips are provided on the website of the Student Development Centre: <http://www.sdc.uwo.ca/learning/index.html?mcwrit>.

If you find that you are falling behind or are having difficulties with the course material, please contact your instructor or a TA immediately. A lot can be done in September or October, much less can be done in November or December.

The Department of Physics and Astronomy may, in exceptional circumstances, adjust the final course marks in order to conform to Departmental policy.

16. Lecture topics and course content 2019-2020

Wk	Class	Topic	Readings	Notes
1	Sep 9	Introduction, perspectives, scales, Stellarium		Relates to ch 1 of Fraknoi
2	Sep 16	Kevin White – Six Nations cosmology	1	Reading summary due
3	Sep 23	Dana Desiderio and Daniella Scalice – Navajo and NASA collaboration		
4	Sep 30	Andrew Judge – Indigenous land-based education	2	Reading summary due
5	Oct 7	Timescales in the sky and Cronyn Progress report 1		1 st +2 nd C layer assignments due Relates to ch 4 of Fraknoi
Thanksgiving (Oct 14) – no classes				
6	Oct 21	Sasha Doxtator – Oneida astronomy The Moon and the Milky Way	3	Reading summary due Relates to ch 4&25 of Fraknoi
7	Oct 28	Brianne Derrah – Language, ceremony, identity Basic cosmology and the TMT Progress report 2		3 rd +4 th C layer assignments due Relates to ch 29 of Fraknoi
Reading week (Nov 4-8) – no classes				
8	Nov 11	Tom Deer – Six Nations astronomy (TBC)	4	Reading summary due
9	Nov 18	Te Kahurati Painting – Maori astronomy Progress report 3		5 th +6 th C layer assignments due
10	Nov 25	Annette Lee – Ojibwe and Lakota/Dakota astronomy	5	Reading summary due 29 th Nov: B layer assignment due
11	Dec 2	Presentations		6 th Dec: A layer assignment due

Readings:

- 1) Simpson, L. 2014 *Land as pedagogy: Nishnaabeg intelligence and rebellious transformation* <https://jps.library.utoronto.ca/index.php/des/article/view/22170>
- 2) Iwaniszewski, S. 2015 *Concepts of Space, Time, and the Cosmos* <https://ui.adsabs.harvard.edu/abs/2015hae..book....3I/abstract> (full text, not just abstract)
- 3) National Museum of the American Indian (especially “The Invention of Thanksgiving”) <https://americanindian.si.edu/americans/#gallery>
- 4) Hawai’i law professor provides clarity of dispute on Mauna Kea to University of Hawai’i Board of Regents: <https://hawaiiankingdom.org/blog/hawaii-law-professor-provides-clarity-of-dispute-on-mauna-kea-to-uh-board-of-regents/>
- 5) Beyond the trend of decolonizing science: https://www.ucsusa.org/action/science_network/beyond-trend-decolonizing-science