



**Anthropology 4012  
Science in the Indigenous Americas  
Winter 2021**

**Class Times:** Mondays and Wednesdays, 11:30 am – 1:00 pm  
**Location:** Zoom

**Instructor Information**

**Instructor:** Dr. Jessica Metcalfe  
**E-mail:** [jmetcal1@lakeheadu.ca](mailto:jmetcal1@lakeheadu.ca)  
**Office Hours:** Wednesdays at 1:00 pm (Zoom link on course website), or by appointment.

Please ask questions by email, attending my office hours, or scheduling a Zoom meeting. Note that I do not regularly answer emails on evenings or weekends.

**Course Description:** This course will begin by exploring the definition of science and the ways in which Western science has been (and is) employed as a tool of colonialism. We will examine contradictions and complementarities between Western science and Indigenous knowledge by studying examples of community-based research. Drawing on research by archaeologists and Indigenous scholars, we will explore the many ways in which Indigenous peoples have sophisticated empirical knowledge of scientific topics such as climate and environmental science, ecology, zoology, resource management, geology and paleontology, astronomy, mathematics, chemistry, and engineering. In many cases, this Indigenous science developed and persisted over millennia.

**Prerequisites:** Third year standing or higher, or permission of the Chair of the Department of Anthropology.

**Format:** This is a **seminar course** based on synchronous Zoom classes and asynchronous online discussions. The class is reading-intensive and discussion-based. This means that you must take leadership for your own learning in order to succeed. You are expected to complete the readings before class and actively engage in discussions both in class and online.

**Course Learning Objectives:** By the end of this course, students will be able to

- Compare and contrast different perspectives on science and scientific knowledge
- Discuss problems with and possibilities for combining Western science and Indigenous ways of knowing, drawing on case studies
- Describe archaeological evidence for a deep history of sophisticated scientific knowledge in the ancient Americas
- Critically analyze scholarly articles

- Translate academic knowledge of Indigenous science and technology into a form accessible to school-aged learners

### Required Texts:

James, K., 2001. *Science and Native American Communities: Legacies of Pain, Visions of Promise*. University of Nebraska Press, Lincoln, Nebraska.

Kimmerer, R.W., 2013. *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants*. Milkweed Editions, Minneapolis, Minnesota.

*Other readings (e.g., journal articles, book chapters) will be posted on the course website and are listed at the end of this document.*

### Grades Breakdown

Item	Value (%)	Due Date
Participation	10	Mondays & Wednesdays
Weekly Discussion Posts	15	Wednesdays at 9 am
Student-Led Seminar	10	See sign-up sheet
Project Step 1: Proposal	10	March 1
Project Step 2: Presentation/Demonstration	10	March 29 or 31
Project Step 3: Lesson Plan	20	April 12
Final Exam (take home)	25	April 16
<b>TOTAL</b>	<b>100</b>	

**Participation** includes attendance, active listening, and contributing to **in-class and online discussions** (i.e., weekly comments on other students' discussion posts, due each Monday at 9 am).

**Weekly Discussion Posts.** Once a week the instructor will post a discussion question (or questions) relevant to the week's readings. You are expected to post direct response to these question by **Wednesdays at 9 am** each week. You are also expected to comment on other peoples' responses (see participation category, above). Comments should be posted by the following **Monday at 9 am**. Your direct responses and comments should demonstrate **self-reflexivity, critical thinking, and comprehension of the readings**. The goal with these posts is to have an active online conversation about the readings and course themes in advance of our Zoom-based discussion.

**Student-Led Seminar.** Each student will lead one class discussion during the term. A sign-up sheet with assigned dates will be made available early in the term. Seminars will follow a 'study circle' format, in which the student leader stimulates and facilitates discussion among the participants. Further details will be provided.

**Project.** The major assignments for this course are sequential stages in developing a **knowledge-translation** project: a school science lesson that demonstrates Indigenous

science and/or technology. **Step 1 is a project proposal**, in which you will outline your preliminary plans for the project. **Step 2 is a presentation/demonstration**, in which you will explain and test your school science lesson on our class. **Step 3 is a detailed lesson plan** with background information for teachers (i.e., a lesson outline and mini-essay with references). Further details will be posted on the course website.

**Why a knowledge translation project?** Archaeologists are increasingly called upon to give back to the communities they work with and to present their research in community-accessible formats. Furthermore, there is increasing demand for Indigenous education resources in the classroom but a lack of available materials. Archaeologists and anthropologists can and should take an active role in translating research results for the public education system and the general public.

**Final Exam.** Take-home, essay-answer format.

### **Lateness Policies**

- **Late Discussion posts** will receive a grade of zero. These posts are intended to promote active engagement and interaction and to prepare students for in-class discussions, which is only possible if posts are made on time.
- **Late Assignments** will receive deductions of 5% per calendar day (including weekends and holidays). Assignments more than one week (7 days) past a deadline will not be accepted without prior permission from the instructor and will receive a grade of zero.
- **Late Final Exam:** The final exam is due during exam period, on Friday April 16 (noon). However, there will be an automatic 3-day grace period to Monday April 19 (noon). After this date, late exams will receive a deduction of 5% per calendar day, including weekends and holidays. Final exams submitted more than one week (7 days) past the original due date will not be accepted without prior permission from the instructor and will receive a grade of zero.

**Video/Audio Recording:** In the context of remote instruction and participation, video and audio recordings of class activities may be made to ensure access by students who were unable to attend class. The recordings are confidential and are intended only for the use of the course students and instructors. They may otherwise not be used or disclosed. During recording, to protect others' privacy, each student should ensure that no one else is present in the location where they are being recorded without that non-student's consent. The recordings are made under the authority of sections 3 and 14 of *The Lakehead University Act, 1965*. Questions about the collection of the images and sounds in the recordings may be directed to Dr. Todd Randall, Dean of Science and Environmental Studies, Lakehead University, 955 Oliver Rd, Thunder Bay, Ontario.

## Course Schedule (subject to modification)

Readings must be completed before class on the dates indicated.

Week	Date	Topic	Readings & Assignments due
<b>Module 1: Science and Scientific Colonialism</b>			
1	M Jan. 11	Introduction to the course	None
	W Jan 13	What is science & who are scientists? (Part I)	Brown (2020) Schiebinger (2000) Wong & Hodson (2009)
2	M Jan 18	What is science & who are scientists? (Part II)	Dyck (1996) Kawagley et al. (1998) Snively & Williams (2016) ch. 9
	W Jan 20	Recognizing Indigenous science	Kidwell (2002) Snively & Williams (2016) ch. 6 - 7
3	M Jan 25	Colonizing knowledge	Smith (2012) ch. 3 First Nations Centre (2007)
	W Jan 27	Worldviews colliding	Little Bear (2000) Podcast: Hynes & Kimmerer (2020)
<b>Module 2: Science in Indigenous Communities</b>			
4	M Feb. 1	Indigenous science education	James (2001) pp. 1 – 44
	W Feb. 3	Science & Indigenous cultures	James (2001) pp. 45 – 68
5	M Feb. 8	Economic & Indigenous community development	James (2001) pp.71 – 104
	W Feb. 10	The land, the people, & science	James (2001) pp.107 – 134
6	M Feb. 22	Science & Indigenous self-governance	James (2001) pp.137 – 166
	W Feb. 24	Cross-cultural science education	Snively & Williams (2016) ch. 5 Snively & Williams (2016) ch. 8
<b>February 15 – 18 Study Break – No classes</b>			
<b>Module 3: Braiding Indigenous and Western Knowledge</b>			
7	M Mar. 1	Problems with knowledge integration	Nadasdy (1999) <b>Project Step 1: Proposal</b>
	W Mar. 3	Planting sweetgrass	Kimmerer (2013) pp. ix – 59
8	M Mar. 8	Tending sweetgrass	Kimmerer (2013) pp. 61 - 117
	W Mar. 10	Picking sweetgrass	Kimmerer (2013) pp. 119 - 201
9	M Mar. 15	Braiding sweetgrass	Kimmerer (2013) pp. 203 - 300
	W Mar. 17	Burning sweetgrass	Kimmerer (2013) pp. 301 - 384
10	M Mar. 22	Decolonizing archaeology	Nicholas & Hollowell (2016) Video: Gonzalez et al (2020)
<b>Module 4: Case Studies</b>			
	W Mar. 24	Buffalo science	Barsh & Marlor (2003) Video: Little Bear (2019)
11	M Mar. 29	Indigenous science in the classroom	No assigned readings <b>Project Step 2: Presentation/Demonstration</b>

	W Mar. 31	Indigenous science in the classroom	No assigned readings <b>Project Step 2: Presentation/Demonstration</b>
	M April 5	<b>Easter Monday holiday</b>	
12	W April 7	Ojibwe climate change narratives	Nelson (2013)
	M April 12	Archaeologies of the heart (Final class)	Atalay (2020) <b>Project Step 3: Lesson Plan</b>
	April 16 - 25	Exam period	<b>Final Exam (due Fri. Apr. 16)</b>

### Required Readings, Podcasts, and Videos

*Note: James (2001) and Kimmerer (2013) books must be purchased. Other readings will be posted to the course website's content folder.*

Atalay, S., 2020. An archaeology led by strawberries. In: Supernant, K., Baxter, J.E., Lyons, N., Atalay, S. (Eds.). *Archaeologies of the Heart*. Springer, Switzerland, pp. 253-269.

Barsh, R.L., Marlor, C., 2003. Driving bison and Blackfoot science. *Human Ecology* 31, 571-593.

Brown, M.J., 2020. Is science really value free and objective? From objectivity to scientific integrity, in: McCain, K., Kampourakis, K. (Eds.), *What Is Scientific Knowledge? An Introduction to Contemporary Epistemology of Science*, Routledge, pp. 1-20.

Dyck, L.E., 1996. An analysis of Western, Feminist and Aboriginal science using the medicine wheel of the Plains Indians. *Native Studies Review* 2, 89-102.

First Nations Centre, 2007. *OCAP: Ownership, Control, Access and Possession*. Sanctioned by the First Nations Information Governance Committee, Assembly of First Nations. Ottawa: National Aboriginal Health Organization.

Gonzalez, S., Kretzler, I. Edwards, B.R., Nov. 20, 2020. Video: Indigenous heritage futures: Caring for the past in a Grand Ronde way. UBC Indigenous/Science Research Cluster Working Tools Seminar Series. Accessed from [Working Tools | indigenousscience.ubc.ca](http://WorkingTools.indigenousscience.ubc.ca)

Hynes, M. & Kimmerer, R.W., Nov. 27, 2020. Podcast: Why is the world so beautiful? An Indigenous botanist on the spirit of life in everything. Tapestry, CBC Radio Podcast. <https://www.cbc.ca/radio/tapestry/why-is-the-world-so-beautiful-an-indigenous-botanist-on-the-spirit-of-life-in-everything-1.5817787>

James, K., 2001. *Science and Native American Communities: Legacies of Pain, Visions of Promise*. University of Nebraska Press, Lincoln, Nebraska.

Kawagley, A.O., Norris-Tull, D., Norris-Tull, R.A., 1998. The Indigenous worldview of Yupiaq culture: its scientific nature and relevance to the practice and teaching of science, *Journal of Research in Science Teaching* 35, 133-144.

Kidwell, C.S., 2002. Native American systems of knowledge. In: Deloria, P.J., Salisbury, N. (Eds.), *A Companion to American Indian History*, Blackwell Publishers, Oxford, pp. 87-102.

Kimmerer, R.W., 2013. *Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge, and the Teachings of Plants*. Milkweed Editions, Minneapolis, Minnesota.

Little Bear, L., 2000. Jagged worldviews colliding. In: Battiste, M. (Ed.), *Reclaiming Indigenous Voice and Vision*, UBC Press, Vancouver, pp. 77-85.

Little Bear, L. and the Climate Atlas of Canada (2019). Video: Bringing Back the Buffalo. <https://youtu.be/6ySHFnwtNQ4>

Nadasdy, P., 1999. The politics of TEK: Power and the "integration" of knowledge. *Arctic Anthropology* 36, 1-18.

Nelson, M.K., 2013. The hydromythology of the Anishinaabeg: Will Mishipizhu survive climate change, or is he creating it?, in: Doerfler, J., Sinclair, N.J., Stark, H.K. (Eds.), *Centering Anishinaabeg Studies: Understanding the World through Stories*, Michigan State University Press, East Lansing, pp. 213-233.

Nicholas, G., Hollowell, J., 2016. Ethical challenges to a postcolonial archaeology: The legacy of scientific colonialism. In: Hamilakis, Y., Duke, P. (Eds), *Archaeology and Capitalism: From Ethics to Politics*, Routledge, pp. 59-82.

Schiebinger, L., 2000. Has feminism changed science? *Signs: Journal of Women in Culture and Society* 25, 1171-1175.

Smith, L.T., 2012. *Decolonizing Methodologies: Research and Indigenous Peoples*, 2nd ed., Zed Books, London.

Snively, G., Williams, W.L., 2016. *Knowing Home: Braiding Indigenous Science with Western Science*, Book 1, University of Victoria Press, Victoria, B.C.

Wong, S.L., Hodson, D., 2009. From the horse's mouth: What scientists say about scientific investigation and scientific knowledge, *Science Education* 93, 109-130.

## General Information

### Students in this course are expected to:

- Take ownership of their learning by
  - Actively engaging with course materials and activities
  - Keeping track of deadlines and expectations
  - Reaching out to the instructor early on if struggling
- Be respectful toward the instructor and peers

### Regulations – from the Lakehead University [Academic Calendar](#)

“It is the responsibility of each student registered at Lakehead University to be familiar with, and comply with all the terms, requirements, regulations, policies and conditions in the Lakehead University Academic Calendar. This includes, but is not limited to, Academic Program Requirements, Academic Schedule of Dates, University and Faculty/School Policies and Regulations and the Fees and Refund Policies and Schedules.”

**Plagiarism** is defined in [University Regulation IX](#) with additional examples in Article I, Section 1 of The Code. Sanctions associated with Academic Misconduct are defined in Article II of The Code and Enforcement Procedures are outlined in Article III of The Code. Students wishing to learn more about Academic Misconduct are encouraged to read the [University and relevant Faculty Regulations](#) and The Code (noted above) and access other resources on the [Teaching Commons](#) website.

**Support for Students** – there are many resources available to support our students. These include but are not limited to:

- [Health and Wellness](#)
- [Student Success Centre](#)
- [Student Accessibility Centre](#)
- [Library](#)
- [Academic Support Zone](#) (Writing and Math Tutoring Centre)

Lakehead University is committed to achieving full accessibility for persons with disabilities. Part of this commitment includes arranging academic accommodations for students with disabilities and/or medical conditions to ensure they have an equitable opportunity to participate in all of their academic activities. If you are a student with a disability and think you may need accommodations, you are strongly encouraged to contact Student Accessibility Services (SAS) and register as early as possible. For more information, please contact Student Accessibility Services <http://studentaccessibility.lakeheadu.ca> (SC0003, 343-8047 or [sas@lakeheadu.ca](mailto:sas@lakeheadu.ca))