



Syllabus: BIO 232

Course Information

Course Title: Principles of Research in Natural Science

Course Prefix/Number: BIO 232

Semester: Spring 2022

Class Days/Times: T 4-5:45 via Zoom and online

<https://us06web.zoom.us/j/89093934783?pwd=TWdwam5Jbit4N2FkZm56Y3hPMURhdz09>

Credit Hours: 3 credit hours

Instructor Information

Name: Dr. Teresa Newberry

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Office location: [Ha-Mascamdam Ha-Ki: Room 107](#)

Office hours: TTh 12:30-2:00 p.m. via Zoom:

<https://us06web.zoom.us/j/87361747610?pwd=dkluaVpjUHRESFUxTVVGaVQ2VjNpQT09>

Course Description

This course provides students with the basics of conducting scientific research in the natural sciences. It also includes an introduction to Indigenous research methodologies, community-based participatory research, and action-research. Specific topics include the scientific method, ethical protocols in the research process, comparison of Western and Indigenous ways of knowing, use of scientific literature sources, experimental design, critical article review and analysis, presentation of experimental data, and case studies of research in Indigenous communities. It will include an exploration of Indigenous research protocols and paradigms and incorporation of cultural worldviews and values in the research process. Students will engage in a class research project to gain first-hand experience in research.

Course Prerequisites

WRT 101, MAT 151 and 2 science courses



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Student Learning Outcomes

1. Describe the research process, including its guiding principles and experimental design.
2. Distinguish between Western and Indigenous Ways of Knowing
3. Demonstrate knowledge of common data collection procedure, written fundamentals, proper presentation of experimental data and corresponding statistics.
4. Conduct comprehensive scientific literature review and analysis.
5. Summarize the history of research in Indigenous communities in pre-colonial, colonial and post-colonial eras including examples of case-studies.
6. Articulate the role of communities, relationship and traditional ecological knowledge in Indigenous research protocols and paradigms.
7. Explain ethical protocols in the scientific research process including the strengths and limitations of Institutional Review Boards especially in the context of Indigenous communities.

Course Structure

This course consists of weekly units covering each topic in the course outline. Each week there will be one chapter assigned from one of the two textbooks and the students will complete the end-of-chapter review questions as well as short assignments. This course is very interactive and students will lead one class discussion on an article and present on a case study from "Decolonizing Methodologies". There are two major projects in the course a research project using an online dataset and the creation of a research project for a Native Community using principles of Community Based Participatory Research for their community. As part of this course, students will complete a National Institute of Health research certificate. Students will also create a Research Model and Agenda for their respective communities which incorporates cultural worldviews and values.

This is a hybrid virtual and online course in which 70% of the course will take place during our scheduled Zoom time (~105 minutes) and 30% of the course will be conducted independently via online course work (~45 minutes).

Synchronous (Live) Zoom Sessions [70%]. This **synchronous online** course meets on Tuesdays from 4 to 5:45. Learners are required to read/watch/listen to introductory materials before live Zoom classes and be actively engaged. Please expect a 30 to 45-minute lecture followed by instructor-led and student-led class discussions and student presentations.

Asynchronous (Online) Tasks and Assignments [30%]. This course is designed so that approximately 30% of the course time will be asynchronous online. This means that outside of the Zoom sessions, learners will be expected to participate in asynchronous discussions, complete reading and reading assignments, and complete other learning activities.



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Course Learning Materials and Textbook Information

Smith, Linda Tuhawai. Decolonizing Methodologies: Research and Indigenous Peoples. Zed Books Ltd. 2012.

Montello, D. and Sutton, P.R. An Introduction to Scientific Research Methods in Geography and Environmental Studies Second Edition

Course Outline

I. Introduction to Western & Indigenous Research

- Introduction to Scientific Approaches

- Fundamental Scientific Concepts

- Indigenous Ways of Knowing & TEK

- Characteristics of Indigenous Research

- History of Research on and in Indigenous Communities

- Community-based Participatory Research & Science to Action

- Case Studies of Collaborative Research with Indigenous Knowledge

II. Literature Review

- Primary vs. secondary sources

- Search and accessing primary literature

- Reading and critiquing peer-reviewed articles

II. Research Methods

- Formulating a research question and hypothesis

- Experimental Design

- Data collection, presentation and analysis

III. Indigenous Research Protocols

- Introduction to Indigenous Protocols

- Examples of Indigenous Protocols

IV: Indigenous Research Paradigms & Agendas

- Elements of an Indigenous Research Paradigm

- Articulating a Research Agenda

- Case Studies of tribally centered Indigenous Research

V: IRBs & Research Ethics

- Intro to Institutional Review Boards

- NIH Training (on-line)

- Research Ethics

- Decolonizing Research Ethics



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Course Schedule (see Canvas for updated schedule & assignment due dates)

		Topic	M&S	Smith	Other Readings
WK 1	1/18/22	Indigenous Ways of Knowing & TEK			Berkes Ch 1
WK 2	1/25/22	Epistemological Foundations	1		Wilson,
WK 3	2/1/22	Fundamental Research Concepts	2		Wilson, Research Methodology
WK 4	2/8/22	Native Science/The Indigenous Mind Rising		3	Cajete Native Science, Deloria Traditional Technology, IK goes to Washington
WK 5	2/15/22	Scientific Communication & Literature Review	3		
WK 6	2/22/22	Community based Participatory Research		7	Thomas et al. paper
WK 7	3/1/22	Data Collection	4		
WK 8	3/15/22	Protocols for Indigenous Research		6	
WK 9	3/22/22	Research Design	8		
WK 10	3/29/22	Sampling	9		
WK 11	4/5/22	Data Display	11		
WK 12	4/12/22	Reliability & Validity	12		
WK 13	4/19/22	Ethics in Scientific Research	14		Kovach, Chapter 2
WK 14	4/26/22	IRBs & Decolonizing Research Ethics		9	Curley & Lister ; IDSE Ch 9
WK 15	5/4/22	Student Presentations			



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Evaluations and Grading & Assignments:

90 and above is an A

80 – 89 is a B

70 – 79 is a C

60 – 69 is a D

Under 60 is Failing

Your grade will be determined by the following:

Grades	Total	Percentage
Weekly Reading Assignments	280	19%
Course Assignments	270	18%
Indigenous Research Model & Agenda	100	7%
Online Discussions	100	7%
NIH Training	200	13%
Phenology Research Project	200	13%
CBPR Case Study Project & Presentation	200	13%
Attendance & Participation	150	10%
	1500	

Himdag Cultural Component

Tohono O'odham traditions and cultural beliefs will be discussed as relevant course topics, and only as appropriate to the Tohono O'odham Nation's traditional standards for sharing information as determined by the Himdag committee.

This course includes Indigenous ways of knowing and Indigenous research paradigms as well as the history of research in and on research communities. The course explores research ethics as well as decolonizing methodologies. The students will create a research model and agenda for their respective communities which incorporates cultural worldviews and values.



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Policies and Expectations

Attendance Policy

You are expected to arrive to class on time and be prepared to participate in each class period. Four unexcused absences may result in a letter grade of "F" or an instructor withdrawal "FW" (see 45th-Day Instructor Withdrawal policy). You may request to be excused from class for religious observances and practices, for illness, for school or work-related travel or for personal or family emergency. If you will be absent, please notify the instructor as soon as possible.

Make-up policy:

Late assignments that can be made up will be accepted but will be penalized 10% for each day of tardiness. Failure to submit a project results in a grade of zero (0). An F is a better grade! At the instructor's discretion, extra credit opportunities and optional activities may be provided. No work will be accepted after the last day of class.

Incomplete Policy

Incomplete (I) grades are not awarded automatically. The student must request an "I" from the instructor who can choose to award an Incomplete only if all three of the following conditions are met:

1. The student must be in compliance with the attendance policy.
2. The student must have unavoidable circumstance that would prohibit the student from completing the course.
3. The student must have completed over 75% of the course requirements with at least a "C" grade.

Incompletes are not a substitute for incomplete work due to frequent absences or poor academic performance. Incomplete grades that are not made up by the end of the ninth week of the following semester will be automatically changed to an F if the agreed upon work, as stipulated on the written form signed by the instructor and the student when the I grade is awarded, is not completed.

COVID-19 Related Incomplete Policy

A student may be considered for an incomplete (I) if:

1. The student completed 50% of the course. (Note: Students who have emergencies before 50% of the course is complete should withdraw "W" from the course)



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2. While completing the course the student was in "good standing" (i.e. had a grade of "C" or better and had good attendance).
3. The reason for not completing course was COVID related (ex. student contracted COVID, student had to care for someone with COVID or had to take on major care taking roles, had change in job, etc.)

For the incomplete, the Instructor must develop a plan with student and obtain permission from the student to grant an Incomplete. The student has until the end of **FALL 2022** to complete the course. Failure to complete the required plan will result in the incomplete (I) being replaced by a grade of F.

45th-Day Instructor Withdrawal Policy "FW" (Re: face-to-face, synchronous-virtual, or Flex courses)

Students who have missed four (4) consecutive classes, has not submitted any assignments, nor taken any quizzes by the 45th - day census report, due on **March 4th, 2022** are assumed NOT to be participating in the class and may be withdrawn at the faculty member's discretion. After the 45th - day census, if a student needs to stop attending a course, they must withdraw from the course (see Student Withdrawal Policy).

Student Withdrawal Policy "W"

Students may withdraw from class at any time during the first two-third of the semester without instructor permission and without incurring any grade penalty. Please be sure to withdraw yourself by **March 30th, 2022** if you do not expect to complete the class, otherwise you may receive an "F" letter grade for the course. For more information on the student withdraw process email admissions@tocc.edu.

Special Withdrawals (Y) Grade

The "Y" grade is an administrative withdrawal given at the instructor's option when no other grade is deemed appropriate. Your instructor must file a form stating the specific rationale for awarding this grade. "Y" grades are discouraged since they often affect students negatively. Your instructor will not award a "Y" grade without a strong reason.

Equal Access Statement/Disability Accommodations

Tohono O'odham Community College seeks to provide reasonable accommodations for qualified individuals with disabilities. The College will comply with all applicable regulations, and guidelines with respect to providing reasonable accommodations as required to ensure an equal educational opportunity. This process includes self-identifying as a student with a disability, providing supporting documentation of their



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disability, and being approved for services through the Disability Resources Office (DRO). It is the student's responsibility to make known to their instructor(s) the student's specific needs within the context of each class in order to receive appropriate accommodations. We will work together in order to develop an accommodation plan specifically designed to meet the individual student's requirements.

For more information or to request academic accommodations, please contact: Anthony Osborn, TOCC Disabilities Resource Coordinator, aosborn@tocc.edu, or 520-383-0033 for additional information and assistance.

Title IX

Tohono O'odham Community College encourages each student to have the knowledge and skills to be an active bystander who intervenes when anyone is observed or being harassed or endangered by sexual violence. Sexual discrimination and sexual violence can undermine students' academic success and quality of life on campus and beyond. We encourage students who have experienced or witnessed any form of sexual misconduct to talk about their experience and seek the support they need.

Confidential support and academic advocacy can be found with: Student Services Title IX Coordinator/Counselor, Alberta Espinoza, M.Ed. located in I-We:mta Ki: Room 18. Phone 520-383-0033 email: aespinoza@tocc.edu

Conduct: Bias, Bullying, Discrimination and Harassment

Tohono O'odham Community College faculty and staff are dedicated to creating a safe and supportive campus environment as a core value. Harassment based on age, class, color, culture, disability and ability, ethnicity, gender, gender identity and expression, immigration status, marital status, political ideology, race, religion/spirituality, sex, sexual orientation, and tribal sovereign status will not be tolerated.

Classroom Behavior & Netiquette

- Student behavior is also detailed in student handbook under Student Code of Conduct Violations
- Netiquette is a set of rules for behaving properly online. Something about cyberspace makes it easy for people to forget that they are interacting with other real people. The following bullet points cover some basics to communicating online:



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- Be sensitive to the fact that there will be cultural and linguistic backgrounds, as well as different political and religious beliefs, plus just differences in general.
- Open discussion is an important part of learning and critical thinking especially in a course like this which where we examine complex environmental issues.
- Use good taste when composing your responses in Discussion Forums. Swearing and profanity will not be tolerated and your message will be removed immediately if it contains either of these.
- Also, please consider that slang can be misunderstood or misinterpreted.
- Don't use all capital letters when composing your responses as this is considered "shouting" on the Internet and is regarded as impolite or aggressive. It can also be stressful on the eye when trying to read your message.
- Be respectful of others' views and opinions.
- Avoid "flaming" (publicly attacking or insulting) them as this can cause hurt feelings and decrease the chances of getting all different types of points of view.
- Use good grammar and spelling. Avoid using text messaging shortcuts.

DISCLAIMER

This syllabus is designed to evolve and change throughout the semester based on class progress and interests. You will be notified of any changes as they occur.