

# Tohono O'odham Community College



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## Syllabus: **BIO 154N: GLOBAL CHANGE BIOLOGY**

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### Course Information

Course Prefix/Number: Bio 154N  
Semester: Fall 2019  
Class Days/Times: MW 11:45 AM – 2 PM  
plus one Friday field trip and online work

Credit Hours: 4 (3 lecture & 3 lab periods, with some online assignments and field trip that shorten the in-class time.)  
Course Title: Global Change Biology  
Room: Gewkdag Son Ki Room 5

### Instructor Information:

Name: Melanie Lenart, Ph.D.  
Phone/Voice Mail: 520-383-0071  
Cell : 520-465-6877 (texts are fine)  
E-mail: mlenart@tocc.edu

Office location: Room 101 of the Ed Division Bldg, the Ha-Maşcamdam Ha-Ki:  
Office hours:

- 2 - 4:30 PM on Tuesdays and Thursdays.
- By appointment.

### Course Description:

Global change biology is a new field of biology which explores the consequences of global environmental change on humans and ecosystems. This course focuses on climate change as a key driver of environmental change. Climate change is addressed by exploring causes of past and current climate change while providing a strong contextual setting for Native American students based on their own culture and traditional ecological knowledge. Impacts of climate change on humans and ecosystems are covered from a holistic and interdisciplinary perspective with an emphasis on

# Tohono O'odham Community College

understanding the interconnectedness of biotic and physical systems. Students will learn about and compare traditional knowledge with western science understanding of climate processes and effects. This course will explore mitigation and adaptation strategies for climate change impacts and will include an opportunity for students to develop ideas on how Native American nations can respond to a future of changing climate.

## **Student Learning Outcomes (SLOs) :**

**After completion of the course students will be able to .....**

1. Apply basic concepts of meteorology, climatology and traditional ecological knowledge to describe and understand their local climate and environment.
2. Summarize how the Earth's climate system works, and understand the physical processes and dynamic interactions of the biosphere, atmosphere, oceans, ice and land surface.
3. Describe changes in climate through time and be able to distinguish between long term geologic-scale climate change and recent human-caused climate change.
4. Explain how future climate changes are projected, both globally and for their own region or tribal lands, and how scientists make predictions about future climate scenarios.
5. Discuss current impacts of climate change on humans and ecosystems as well as future projected impacts.
6. Describe various approaches to collecting and analyzing data, including field data collection, visual data analysis, and using data to understand trends or discover underlying issues.

# Tohono O'odham Community College

7. Apply scientific and traditional ecological knowledge toward positive solutions to the impacts of climate change while respecting tribal values and strengthening community ties.

## **Course Structure:**

This course contains the following: lectures, documentaries, in-class activities, in class and online discussions, laboratory exercises, field trip(s), reflective writing and homework assignments.

There are two final projects for this class:

- 1) an individual written project, and
- 2) a collaborative group project.

The individual final project for the course is a Climate Change Controversy Report in which students choose a current controversial topic related to climate change and explore each side of the issue. The objectives of this Controversy Report are:

- 1) to synthesize, apply, and add to course content by critically analyzing a current environmental issue related to climate change
- 2) to examine multiple perspectives and facets of a climate change issue by gathering information from a variety of sources, assessing the scientific credibility of the information, and determining the special interests (the players) involved, and
- 3) to arrive at a personal opinion based on a well-researched, well-thought-out rationale.

The group final project is the development of a Community-based Climate Change Adaptation Plan for our region. The Adaptation will integrate local traditional knowledge with scientific knowledge.

## **Course Assessment:**

Course assessment consists of quizzes, discussions, short written assignments, informal in-class assessments, an controversy report project on an issue which includes a paper and class presentation and a collaborative inquiry-based project. Study guides will be available to help you prepare for quizzes. In accordance with my teaching philosophy, in which I believe student learning occurs primarily through

# Tohono O'odham Community College

hands-on, real world application of course materials, quizzes comprise less than 50% of the final grade (although they are still an important aspect of course assessment and your grade).

In order to facilitate on-going faculty-student feedback and provide formative assessment, many class projects are divided into smaller intermediate steps such as topic choice, project proposals, and rough drafts. Student-to-student assessments are also included in this course through peer review of group participation and written assignments. I welcome student feedback about the course anytime. I will also provide students an opportunity to give me feedback on their course experience through an anonymous mid-course and final course evaluation.

## **Texts and Materials:**

“Red Alert! Saving the Planet with Indigenous Knowledge” Daniel R. Wildcat

“Dire Predictions” by M.E. Mann & L.R. Kump

Readings from “Life in the Hothouse: How a Living Planet Survives Climate Change” by Melanie Lenart

*Optional: iPad: Earth the Operators Manual plus climate change apps*

## **Policies and expectations-**

**Course Policies Requirements:** (1) Attend class regularly; (2) Complete in-class and out-of-class assignments and submit to the instructor; (3) Attend all field trips or ; (4) Take all exams (5) Complete all class projects & presentations.

**Attendance:** You are expected to arrive to class on time and actively participate each class period. Quizzes and exams are given out at the beginning of class time. Field trips and class activities begin at the start of class and may be missed if you do not arrive to class on time. Because exams, labwork and/or other assignments potentially occur every class period, points potentially will be lost each class period missed. If you miss all or a portion of a class, then you are solely responsible for obtaining missed class material from fellow students. Complete attendance is mandatory during student project presentations; otherwise presentation points will be forfeited. Four consecutive, unexcused absences

# Tohono O'odham Community College

may result in withdrawal. You may request to be excused from class for religious observances and practices, for illness, for travel or for personal or family emergency. If you will be absent or have been absent, please notify the instructor as soon as possible.

**Make-up policy:** Missed exams due to an excused absence can be made up within two days of the exam date. Late assignments that can be made up will be accepted but will be penalized 25%. Laboratories cannot be made up. At the instructor's discretion, extra credit opportunities and optional activities may be provided.

**Academic Integrity:** Violations of scholastic ethics are considered serious offenses by Tohono O'odham Community College, the Student Services Department, and by your instructor. Students may consult the TOCC Student Handbook sections on student code of conduct, on scholastic ethics and on the grade appeal procedure. Copies are available at Tohono O'odham Community College.

All work done for this class must be your own. While you may discuss assignments with other class members, the final written project must clearly be your own. You may use work from books and other materials if it is properly cited. Copying from a book without proper reference or from a person under any circumstances will result in an "F" for the assignment, and at the instructor's discretion, possibly an "F" for the course.

## **ADA Compliance:**

Tohono O'odham Community College strives to comply with the provisions of the Americans with Disabilities Act and Section 504 of the Rehabilitation Act. If you have a learning problem, physical disability, or medical illness that requires you to have any special arrangements, please inform your instructor at the beginning of the semester so your academic performance will not suffer because of the disability or handicap.

## **Classroom Behavior:**

- Because of insurance limitations, non-registered visitors are not allowed at class sessions or on field trips.
- Possession of drugs, alcohol or firearms on college property is illegal.
- Food and beverages are allowed in classrooms.
- Pets, telephones, pagers and other electronic devices that distract students are not allowed in classrooms.
- Students creating disturbances that interfere with the conduct of the class or the learning of others will be asked to leave.

# Tohono O'odham Community College

## **Course Feedback:**

All assignments, written papers and quizzes will be graded and returned to the students as quickly as possible. E-mail and phone messages will be returned within two days. A student or the instructor may request a student conference at any time during the semester. Students are encouraged to monitor their progress and current grade by logging into Canvas and checking the gradebook.

## **Instructor Withdrawals:**

Students who have missed four consecutive classes, not submitted any assignments nor taken any quizzes by the 45th day census report, due on 10/5/2018 are assumed NOT to be participating in the class and will be withdrawn. Students may withdraw from class at any time during the first two-thirds of the semester without instructor permission and without incurring any grade penalty. Please be sure to withdraw yourself by 11/4/2019 if you do not expect to complete the class, otherwise you may receive an "F" grade.

## **Incomplete (I) grade:**

"I" grades are not awarded automatically. The student must request an "I" from the instructor who will judge the student's ability to complete the course on his or her own. Generally, the student must have completed over 80% of the course requirements with at least a "C" grade. An "I" requires a written contract between the student and the instructor listing work to be completed as well as how and when the work will be done. If the work is not completed within the contract period, the "I" grade automatically reverts to an "F." "I" grades will not be re-evaluated during the final two weeks of the semester when class activities are normally at their most intense.

## **Special Withdrawal (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.

**Final Grades:** Students will receive a grade transcript from the college mailed to the address given with registration materials at the end of the semester when all grades have been recorded.

## **SPECIAL NOTE TO STUDENT:**

For privacy and security reasons, instructors are advised **NOT** to give grades over the telephone. Grades will be emailed with written permission from the student.

# Tohono O’odham Community College

Your instructor will make every attempt to follow the above procedures and schedules, but they may be changed in the event of extenuating circumstances.

Students submitting assignments through the mail or by email are advised to make copies for their own protection.

If you move during the semester, please file a change of address form with the Student Services Office, and inform your instructor.

GOOD LUCK!

## Course Outline (Subject to Change):

**Table 1.** Below is an outline of class activities. The dates are tentative and subject to change—especially for the activities in the last month.

Dates	Week	Monday activities	Wednesday activities	Assignments	Due dates
Aug. 19-22	1	Intro	Re-introduction	Reading from Red Alert with essay	
Aug. 26-29	2	CC as relocation <b>FIRE:</b> Earth’s Energy Balance and the Sun	<b>AIR:</b> Atmospheric changes & greenhouse gases /Heat radiation and IR thermometers.	Vocabulary for Wed. <i>Elder interview, due Sept. 11</i>	Essay on Red Alert reading due Aug. 16 Vocab oral report Aug. 28
Sept. 2-4	3	<b>Labor Day: No class</b>	<b>WATER:</b> Precipitation, ocean changes, ice cover past, present, future <i>What can we do to support water?</i>	Reading on Gaia theory	

# Tohono O'odham Community College

Sept. 9-12	4	<b>EARTH:</b> Changes in vegetation over time. Plants and the four elements / Molecules and photosynthesis.*	<b>Gaia theory &amp; Mother Earth /</b> Vegetation changes in Deep Time <i>What can we do to support plants?</i>		Elder interview Due Sept. 11
Sept. 16-19	5	<b>QUIZ 1</b>  <b>Select topic areas for Issues paper/CCAP</b>	Dr. Selso Villegas (To be Invited) / TON Climate Change Adaptation Plan <i>What can we do to support water?</i>		QUIZ 1 Sept. 16 50 Points
Sept. 23-26	6	Dr. Paul Robertson (To be Invited) TOCC Climate Change Adapt. Plan. >	Himdag Committee? (To be invited) For second half, Camillus, < Clifford		Essay on Red Alert reading
		<b>Fall break: No class</b> Do backgd research on your issue (general/not specific to TOCC)	<b>Fall break: No class</b> Do backgd research on your issue (general/not specific to TOCC)		
Oct. 7-10	7	Collecting data: Western social science v. physical sciences. Observations, Native science	Collecting data: The Hockey Stick Keeling Curve O'odham sticks		Issues paper due Wednesday, Oct. 9
Oct. 14-17	8	Climate models	Climate change scenarios <i>What can we do about energy use?</i>		
Oct. 21-23	9	Review of data and models	<b>QUIZ 2</b>		Essay on Red Alert reading
Oct. 28-31	10	Biodiversity / Josh Hoskinson <i>What can we do to support animals?</i>	Climate change impacts, global		



# Tohono O’odham Community College

Nov. 4-7	11	Climate change impacts, regional (Southwest)	The problem with downscaling Extremes v. averages		
Nov. 11-14	12	<b>Veteran’s Day: No class</b>	<i>Today’s class optional for those attending field trip</i>		<b>Field trip to NAU for Climate 2020 Depart 7:30 AM 11-15 /Return ~4 PM 1-16</b>
Nov. 18-21	13	<i>What can we do to change energy use? (Fire)</i>	<i>What can we do to support air quality relating to energy use? (Air)</i>		Issues Topic applied to Climate Change adaptation plan due Nov. 20
Nov. 25-28	14	<i>What can we do to support water, including rivers? (Water)</i>	<i>What can we do to support plants and soil? (Earth)</i>		<b>Thanksgiving weekend</b>
Dec. 2-5	15	<i>What can we do to support people? (People or Food)</i>	Finalizing input to CCAP		
Dec. 9-12	16	<b>Final’s week Presentations on plan internally, planning for public presentation</b>	<b>Final’s week Presentations on plan to TOCC community (invited)</b>		Final version of Climate Change Adaptation Plan prepared & presented

## **FIELD TRIP or Equivalent Activities (200 POINTS)**

**100 points per day** for field trip to Northern Arizona University’s *Climate 2020: Seven Generations*. Funding support sought from NAU and TOCC Land Grant Office for Sustainability. Two-day trip to Flagstaff, departing 7:30 AM on Friday, Nov. 15, and returning around 4 PM on Saturday, Nov. 16.

Can substitute research paper along with one other field trip—preferably Kitt Peak trip with Josh Hoskinson’s class. If paper will replace two days of field trip, it will be an extensive research paper or compilation of topics for Climate Change Adaptation Plan.

# Tohono O'odham Community College