



Syllabus: ANR 221N Soil Science

Course Information

Course Title: Soil Science

Course Prefix/Number: ANR 221N-1

Semester: Spring 2021

Class Days/Times: Tuesdays and Thursdays, 10:00 AM - 12:45 PM at <https://us06web.zoom.us/j/84352994454>

Credit Hours: 4 (includes lab)

Prerequisites: None

Delivery: Synchronous

Instructor Information

Name: Kimberly Danny, M.S.

Office Phone/Voice Mail: (520) 479-2300 Ext. 1518

E-mail: kdanny@tocc.edu

Office location: Ha-Maşcamdam Ha-Ki: (Faculty Building), Room 121, S-Cuk Du'ag Maşcamakuḍ (Main Campus), Sells, AZ

Office hours:

- In-person: Tuesdays & Thursdays 1:45-2:45 PM
- Zoom: <https://us06web.zoom.us/j/9262129224>
 - BIO 100N Study Session (Optional): Monday 4:45-5:30 PM
 - BIO 105N Study Session (Optional): Monday 5:30-6:15 PM
 - Open to all: Wednesdays 12-1:30 PM
- Or by appointment

Course Description

Fundamental principles of soil science, including the origin, nature, and classification of soils, emphasizing the chemical, physical, and biological properties in relation to growth and nutrition of plants. Useful for anyone interested in water resources, agriculture, ecology, engineering, environmental restoration, and any number of other environmental sciences. Lecture and lab are integrated in this course.

Student Learning Outcomes

After completion of the course students will be able to:

1. Identify the Five Key Functions of Soil in our ecosystem.
2. Describe how indigenous people, including Tohono O'odham, evaluate soils.
3. Describe the factors influencing the formation of soils.
4. Recognize the distribution and use of the 12 soil orders.

5. Relate the influence of the 7 soil physical properties to the functions of soils.
6. Apply soil-water functions to soil management.
7. Associate soil aeration and soil temperature with the soil environment.
8. Recognize the nature and properties of colloidal soil properties.
9. Determine the influence of soil reaction, pH, on soil management decisions.
10. Identify the properties of alkaline and salt affected soils of arid regions.
11. Recognize the importance of soil organisms and organic matter in soil ecology.
12. List the macro-nutrient and micro-nutrient elements of soils.
13. Recognize the goals of practical nutrient management.
14. Associate the significance of soil erosion with land degradation.
15. Recognize how soils can affect plant communities and plant growth.
16. Apply data found in the Soil Survey of the Tohono O'odham Nation to the practical use of soil science principles.

Course Structure

BIO 100N-1 will be delivered virtually via Zoom on the specified days and time. Learners are required to actively engage in the live Zoom sessions. I intend to include short breaks, interactive discussions, and more. Please note that your attendance in the synchronous sessions will be included into your final grade. Outside of the Zoom sessions, learners are expected to complete the activities listed below.

This course is divided into three modules, each with a broad focus. The modules are divided as follows: 1) Fundamentals of Soil, 2) physical, chemical & biological characteristics, and 3) soil management and issues. Each module also contains some combination of documentaries, in-class activities, online discussions, laboratory exercises, reflective writing, and an exam. In addition, learners will be asked complete to complete one individual research presentation this semester.

Course Learning Materials and Textbook Information

Canvas, <https://tocc.instructure.com/login/canvas>

I highly recommend bookmarking Canvas on your web browser and/or downloading the "Canvas Student" app and setting notifications to your preference. All assignments, quizzes, lab reports, and presentations should be submitted via Canvas. I will only accept assignments by email in unavoidable cases. Please note that assignments submitted via email are more likely to get lost or graded later than the rest of the class.

Textbook

You can either purchase the textbook from the TOCC Bookstore. The contact information can be found at their website, <https://tocc.edu/book-store/>. Or you can purchase or rent a print or electronic copies of the textbook from a seller of your choice.

Wiel, R.R. & Brady, N.C. (2017). *The Nature and Properties of Soils*. (15th edition). Pearson.

Other Materials

You will also need the following basic household items to complete the online activities: measuring tape or meter/yard stick, gloves, trowel or shovel, water bottle and a phone/camera for taking photos.

Course Outline and Important Dates

Course Outline

- | | |
|---------------------------------------|--------------------------------------------------|
| I. Scientific method | VIII. Soil aeration & temperature |
| a. Western approach | IX. Soil colloids |
| b. Tohono O'odham approach | X. Soil reactions & pH |
| II. Soil formation | XI. Saline & sodic soils |
| III. Soil classification | XII. Soil organisms |
| a. Western classification | XIII. Soil organic matter & carbon cycle |
| b. Indigenous classifications | XIV. Nutrients & nutrient management |
| IV. Soil properties | XV. Soil conservation |
| V. Soil geography (mapping & surveys) | XVI. Soil & influence on local plant communities |
| VI. Soil water | |
| VII. Hydrologic cycle | |

Important Dates

The TOCC 2021-2022 Academic Calendar can be viewed at the following webpage: https://tocc.edu/wp-content/uploads/2021/10/2021-2022-Academic-Calendar-10.29.2021_MSC.pdf.

Evaluations and Grading & Assignments

Your grade will be determined by the following:

GRADE	PERCENTAGE (%)
A	90-100
B	80-89.9
C	70-79.9
D	60-69.9
F	0-59.9

Evaluation	# of Tasks	Pts per Task	Total Points	% of Grade
Participation, Attendance	15	5	75	8%
Quizzes, Reading Assignments (2 lowest scores dropped)	14	10	120	12%
Online Discussion Boards, Reflective writing, (2 lowest scores dropped)	14	10	120	28%
Lab Activities/Reports (Lowest score dropped)	12	25	275	19%
Exams	4	75	225	23%
Research Presentation	1	150	150	16%
Total			965	100%

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.

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.

Policies and Expectations

Attendance Policy (Virtual via Zoom)

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.

COVID-19 Incomplete Policy (I)

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).
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 a change in jobs, 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), Virtual via Zoom

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 4, 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-thirds (2/3) of the semester without instructor permission and without incurring any grade penalty. Please be sure to withdraw yourself by **March 30, 2022**, if you do not expect to complete the class, otherwise you may receive an "F" grade. 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.

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, or the original work of your group. While you may discuss assignments with other class members, the final written project must clearly be original. 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. If you are uncertain about proper citations, ask your instructor or the librarian.

Course Feedback

All assignments will be graded and returned to the students promptly, typically within a week after the assignment is closed for handing in. Email 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. Quarterly grade reports will be provided to each student, either in person, by email or via the electronic system of Canvas.

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 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) 479-2300 Extension 1210. 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.

Instructor Policies and Expectations

Course Policies

- Class participation and preparation are essential to student success. Students must read textual material, prepare for projects, and complete required research as stated on the course schedule.
- No work is accepted after the last day of classes unless specified.
- Unacceptable student behavior is also detailed in the TOCC Student Handbook under Student Code of Conduct Violations.

Netiquette

(Adapted from Association of College & University Educators participation norms). ANR 221 includes discussion boards and other opportunities to provide feedback to fellow participants. Maintaining appropriate etiquette for online forms of communication—or netiquette—is crucial to ensuring that these discussion forums offer a rich learning experience for all participants. Learners are asked to kindly follow six norms for proper netiquette:

1. **Actively participate.** A greater number of voices enriches the course. Engaged learners can further their understanding of biology concepts through discussions and group activities.
2. **Read and respond to the discussion threads.** Learning is enhanced by engaging in meaningful discussions. A discussion does not take place by solely reading and responding to the initial prompts, but rather by reading other classmates' posts and providing feedback, offering encouragement, and sharing relevant resources.
3. **Embrace the diversity among learners.** Learners benefit from the exchange of diverse perspectives and experiences. Everyone is expected to be respectful of these differences.
4. **Be timely.** Discussions are most beneficial when people respond to one another in a timely manner. Please do your best to stay on track to maximize learning.
5. **Be specific.** Please provide specific evidence from instructional materials or your own classroom experiences when posting to the discussion forums. Citing evidence whenever possible allows you to effectively support your ideas.
6. **Use an appropriate tone and language.** Without nonverbal cues, humor and sarcasm can be mistaken as cold or insulting. Please be aware of your use of tone and language before submitting discussion posts.

Late Work

- **If you are experiencing hardships, please contact me as soon as possible so we can attempt to work something out.**
- Late work is accepted until a certain date. Each assignment will have a hard deadline, after which no submissions will be allowed.
- Extra credit opportunities and optional activities are provided at the instructor's discretion.
- A missed exam or presentation with no communication prior, during, or after the due date, the assignment will be marked zero.

Course Schedule

Key: W_D_: Week _ Discussion or
Reflection
W_PQ_: Week _ Practice Quiz
W_Q = Week _ Quiz

W_LAB_ = Week _ Lab Activity
RP = Research Presentation
S = Sunday
M = Monday

T = Tuesday
W = Wednesday
R = Thursday
F = Friday

Week	Dates	Important dates	Topic	Assignments
0	1/17-1/24	T 1/18: 1 st Day of class	Getting Started	W0Q
Part 1: Fundamentals of Soil				
1	1/17-1/24	F 1/21: Course Registration Deadline	Intro, soil functions, scientific method	W1PQ; W1D; W1LAB
2	1/24-1/31	M 1/31: Full Refund for Dropped Course(s) Deadline	Soil formation	W2PQ; W2LAB
3	1/31-2/7		Soil classification	W3PQ; W3D; W3LAB
4	2/7-2/14	F 2/11: Week 4 Progress Report	Soil classification	W4PQ; W4LAB; Exam 1
Part 2: Physical, Chemical and Biological Characteristics of Soil				
5	2/14-2/21	M 2/21: President's Day – College Closed	Physical Properties of Soil	W5PQ; W5D; W5LAB;
6	2/21-2/28		Physical Properties of soil	W6PQ; W6LAB;
7	2/28-3/7	F 3/4: 45 th -day Census	Soil Water, the hydrologic cycle	W7PQ; W7D; W7LAB; RP1 Topic
3/7-3/11: Spring Break				
8	3/14-3/21	M 3/14: Graduation Application Due F 3/18: Week 8 Progress Report	Soil aeration and temperature	W8PQ; W8LAB
9	3/21-3/28	M 3/21: Summer/Fall Registration Opens	The colloidal fraction	W9PQ; W9D; W9LAB
10	3/28-4/4	W 3/30: Student Withdrawal Deadline	Soil acidity; alkalinity; salinity, sodicity	W10PQ; W10LAB
11	4/4-4/11		Organisms and ecology of soil, Soil organic matter	W11PQ; W11D; W11LAB; Exam 2
Part 3: Soil Management				
12	4/11-4/18	F 4/15: Week 12 Progress Report	Macro- and micro-nutrients	W12PQ; W12LAB
13	4/18-4/25		Practical nutrient management	W13PQ; W13D; W13LAB
14	4/25-5/2		Soil erosion, pollution, soil health	W14PQ; W14D; RP1; Exam 3
15	5/2-5/6	F 5/6: Last Day of Instruction	Prospects of soil in the Anthropocene	Final Exam Final Presentation
-	5/13	Course Grades Due		

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.