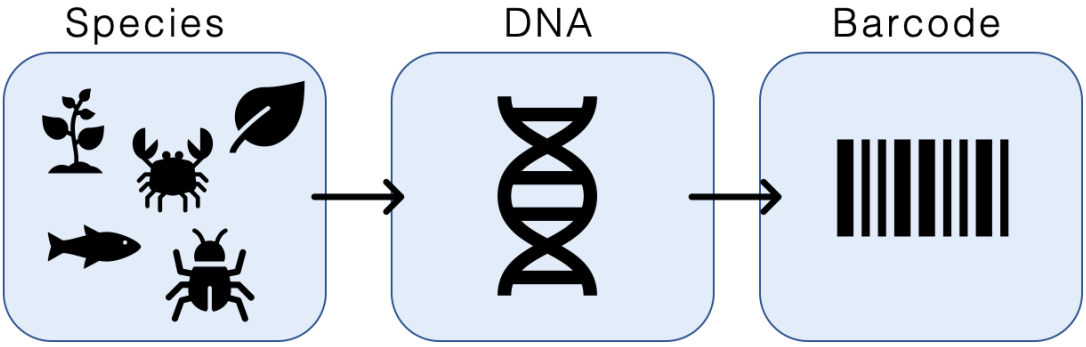

The University of Texas at El Paso

Barcoding

BIOL 1107 (CRN 16439)

Room: BIOL 111

Fall 2024
Tuesday and Thursday 1:30 - 2:50 pm

Teaching Assistant: Sara Gonzalez
sgonzalez28@miners.utep.edu
office hours T 11:00 -1:00 pm or by appointment, Biol 320

Required Materials

LAB COAT and GOOGLES

This laboratory requires a lab coat. You will not be able to participate in lab activities without proper attire and safety equipment. Failure to come prepared may result in a grade reduction and you will be asked to leave the lab for that day. You may find lab coats at the university bookstore or at any uniform supply store in El Paso or online.

COURSE DESCRIPTION

OVERVIEW AND LABORATORY OBJECTIVES

Students will work in groups of 3 – 4, to collect water samples from Ascarate Lake. Students will select a microinvertebrate as their taxa of interest. Groups will extract DNA, amplify it and sequence it in order to identify its species. Tuesdays will be reserved to introduce laboratory techniques, DNA extraction, amplification, purification, sequencing, and analysis through power points, scientific articles, and videos. On Thursday students will used put into practice the new skills gained. Which include proper laboratory etiquette, encourage the use of an aseptic technique, proper used of micro and serological pipettes, chemical dilutions, sorting macro-invertebrates, and help with DNA extractions.

In this laboratory we explore topics and activities such as

- Sample collection from aquatic habitats
- Determine water quality
- DNA extraction from invertebrates
- Gene amplification using Polymerase Chain Reaction (PCR)
- DNA barcoding and making a library of aquatic invertebrate barcodes from local wetlands
- Sequence analyses using computer software and pipelines
- Applications of DNA barcoding in monitoring biodiversity and other biological studies

GRADING GUIDELINES

QUIZZES Five quizzes will be administered to help reinforce concepts being develop throughout the lab. The quizzes will be given during the first 15 minutes of the lab if you are late and arrive after the quiz is over you will receive a zero. Weeks when no quizzes are schedule a group will be randomly selected to give a short "recap" on the important concepts, techniques or interesting facts cover in lab so far.

ALL LAB ASSIGNMENTS must be completed before leaving the lab. Details about assignments are explained in the lab handouts. Further explanation will be provided by your TA.

TWO EXAMS will be given throughout the semester.

GROUP PRESENTATION AND LAB REPORT will be based on sequence data analysis completed during the semester.

THERE WILL BE A COMPREHENSIVE FINAL EXAM on all material covered during the semester.

Grades

Description	Points	Description
EXAMS	200	100 points each
QUIZZES	70	10 points each
LAB ASSIGNMENTS & Modules	180	10 points each
LAB NOTEBOOK	50	3 check points
LAB REPORT	150	DNA Barcoding
PRESENTATION	100	DNA Barcoding
ATTENDANCE	100	
FINAL EXAM	150	Comprehensive
TOTAL	1000	

COURSE POLICIES

POLICY ON DROP DEADLINE : We will follow the College of Science and UTEP with respect to the drop date of **November 1st**. No requests for a withdrawal will be approved after this date.

POLICY ON CLASS PARTICIPATION : You are expected to come to class prepared to lead a discussion on the assigned topic. You should have a good understanding of the reading and have several questions ready to discuss.

LEARNING MODULES: This course is designed using a modular format—that is, each week is "packaged" as a single module so that all the materials, lecture notes, submission areas, discussion posts are in one area for a given week.

POLICY ON CAMPUS CARRY: Persons holding a Concealed Handgun License can lawfully carry their handgun into a UTEP classroom as long as the gun remains concealed. Open carry remains prohibited on campus. In other words, none of us should see (or be able to tell that there is) a gun at UTEP. Call the University Police at 747-5611 or dial 911 if you see any individual on campus with a handgun or other type of weapon. For more information on campus carry see [http://sa.utep.edu/campuscarry/]; for more information on overall campus safety see [http://admin.utep.edu/emergency].

POLICY ON CIVILTY: Please come to class on time. It is disturbing and distracting everybody if people come in late. Please do not hold private conversations during lectures but feel free to ask questions or start a discussion at any time. ***Cell phones MUST be turned off during class. DO NOT answer phones while in class.***

AMERICANS WITH DISABILITIES ACT (ADA) STATEMENT: If you have a disability and need classroom accommodations, please contact The Center for Accommodations and Support Services (CASS) at 747-5148 or by email to cass@utep.edu or visit their office located in UTEP Union East Room 106. For additional information please visit the CASS website at www.sa.utep.edu/cass. *CASS' Staff are the only individuals who can validate and if need be authorize accommodations for students with disabilities.*

MILITARY STATEMENT: If you are a military student with the potential of being called to military service and /or training during the course of the semester you are encouraged to contact one of the instructors no later than Feb 2nd.

POLICY ON HOMEWORK: All homework assignments are to be individual efforts unless specifically told otherwise. This policy will be strictly enforced.

POLICY ON MAKE-UP ASSIGNMENTS: NO make-up assignments will be given for reasons other than illness (doctor's note required) absence with the instructor's prior approval or when a student is on official University business (documentation required BEFORE the absence).

POLICY ON ACADEMIC HONESTY: Academic Dishonesty will not be tolerated. All university guidelines will be strictly followed. Please read these guidelines carefully. If you have any questions regarding the university policy please contact the Dean of Students.

PLAGIARISM DETECTING SOFTWARE: Some of your course work and assessments may submitted to SafeAssign, a plagiarism detecting software. SafeAssign is used review assignment submissions for originality and will help you learn how to properly attribute sources rather than paraphrase.

POLICY ON ELECTRONIC DEVISES: Use of **laptops** during class is not permitted except for class assigned presentations. The necessity of classroom interaction in this course negates the usefulness of laptops as a note-taking device. The use of your laptop during class can also prove distracting to your classmates so please refrain from using your laptop during class. Use of **cell phones or other wireless devices are not permitted.**

- Set your phone to mute or silent mode before coming to class.
- Do not answer incoming calls or make outgoing calls except in an emergency.
- Do not use text messaging or web browser features while in class.

If you choose not to comply with these policies, you will be asked to leave the classroom.

Course Resources: Where you can go for assistance

UTEP provides a variety of student services and support:

Technology Resources

- Help Desk: Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus.

Academic Resources

- UTEP Library: Access a wide range of resources including online full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.
- University Writing Center (UWC): Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.
- Math Tutoring Center (MaRCS): Ask a tutor for help and explore other available math resources.
- History Tutoring Center (HTC): Receive assistance with writing history papers, get help from a tutor and explore other history resources.
- RefWorks: A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide.

Individual Resources

- Military Student Success Center: Assists personnel in any branch of service to reach their educational goals.
- Center for Accommodations and Support Services: Assists students with ADA-related accommodations for coursework, housing, and internships.
- Counseling and Psychological Services: Provides a variety of counseling services including individual, couples, and group sessions as well as career and disability assessments.

Laboratory Schedule

Date	Lab#	Topic	Quiz	Skills	Due	Module
8-27	L1	Introduction to course: Intro aquatic invertebrates & notebooks		Table of contents		DNA structure & replication
8-29	L2	Practice pipetting, dilutions & handling invertebrates		Using a pipette, conversion & dilutions	L1A1	Why do zooplankton matter?
9 -03	L3	Introduction to barcoding & aquatic invertebrates	Q1	Creating a contig	L2A1	
9-05	L4	Practice DNA extraction from invertebrates		Extracting DNA from invertebrates	L3A1	DNA extraction
9-10	L5	Introduction to PCR, electrophoresis Reading #1			L4A1	
9-12	L6	Practice PCR		PCR reaction	L5A1	Gel electrophoresis
9-17	L7	Practice gel electrophoresis Reading #2	Q2		L6A1	Ascarate sampling video
9-19	L8	Introduction to contigs			L7A1	
9-24	L9	***FIELD TRIP 1: Ascarate Lake***		***Data from field trip, biodiversity***		
9-26	L10	Aquatic invertebrate washing & DNA Extraction	Q3	Background on taxa of interest	L9A1	2020 Water Chemistry video
10-01	L11	PCR reactions			L10A1	
10-03	**L12**	**Midterm 1**			**Notebooks due**	
10-08	L13	Electrophoresis & back up DNA extractions				
10-10	L14	PCR Reactions	Q4		L13A1	
10-15	L15	Gel electrophoresis: recap water chem			L14A1	
10-17	L16	Re-do DNA extractions	Q5	Ways to improve DNA extraction	L15A1	
10-22	L17	Re-do PCR		Way to prevent contamination	L16A1	Giving a scientific talk
10-24	L18	Gel electrophoresis & Introduction to DNA purification	Q6		L17A1	*Send eDNA to sequence*
10-29	L19	DNA purification		Gene cleaning	L18A1	
10-31	L20	Select paper to present & APA formats				
11-05	L21	Contig building	Q7			Gene Cleaning
11-07	L22	BLAST and MAFFT align sequences				
11-12	L23	Writing a lab report: Introduction & Discussion		BLAST	L22A1	
11-14	**L24**	**Midterm 2**		**L24M2**	**Notebooks due**	
11-19	L25	Writing a lab report: Methods & Results		IMRAD	L25A1	
11-21	L26	MSA & Phylogenetic Analysis	Q8	MSA	L26A1	IMRAD
11-26	L27	Turn in draft of lab report			L27A1	
11-28	**L28**	**Thanksgiving NO LAB**				
12-03	L29	Group presentations	Peer evaluations & Turn in Final lab report (L29R1)			
12-05	**L30**	**Final Exam (Comprehensive)**	**L30F1 (L1-29)**		**Notebooks due**	