



Syllabus:

BIO 181N: Unity of Life I—Life of the Cell

Course Information

Course Prefix/Number: **BIO 181N**
 Semester: **Fall 2019**
 Class Days/Times:
MW 9:15-11:15 plus online work

Credit Hours: **4.0**
 Course Title: ***Unity of Life I—Life of the Cell***
 Room: **Science Lab**

Instructor Information:

Name: Dr. Teresa Newberry

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 Office location: **Room 107**
Ha-Maşcamdam Ha-Ki:
 Office hours: **11:45-1 p.m. M-Th**

Course Description:

This is an introductory course for biology majors with an emphasis on the unifying molecular and cellular principles of all life on earth. It covers the principles of structure and function of living things at the molecular, cellular and organismic levels of organization including introduction to the scientific process, scientific measurements and laboratory techniques, chemistry of cells, organization of cells, metabolism, patterns of cell division, patterns of inheritance, nucleic acids, and biotechnology

Student Learning Outcomes

1. Explain the unity and interrelationships of life from both Western and O'odham perspective
2. Demonstrate proficiency in using the scientific method to design and conduct experiments.
3. Demonstrate proficiency in using tools for metric measurement, light microscopes, pH meters, and separation techniques such as chromatography and/or electrophoresis.
4. Explain chemical principles that govern normal cell function.

5. Describe the structure and function of cells and cellular components.
6. Describe energy production and utilization by cells.
7. Explain patterns of cell division at the molecular and cellular level.
8. Describe and apply patterns of inheritance
9. Explain the role of nucleic acids in cell function.
- 10.** Describe methods and applications of biotechnology

Course Structure:

The theme of this course is the Himdag value of kinship relationships (T-l:migi) which explains the unity of life on Earth. In this course students learn about the unity within the diversity of life and how cell biology and chemistry reflects the inter-relatedness or kinship (t-i:migi) of all organisms. Students will compare and contrast traditional technology with modern technology. The students will formulate a personal ethic regarding the use of plants, animals and humans in science teaching and research, incorporating perspectives from Western science and TOCC Himdag core values and indigenous research practices. The students will express these views through a formal reflection paper on the ethics of experimentation.

This course is an integrated lab/lecture course where the labs are integrated into the regular class periods. This course consists of three modules centered on the following themes:

PART I: INTRO & FOUNDATIONS OF LIFE

—introduction and cell structure & function

--Units 1-3

PART II: ENERGY OF LIFE

--how living organisms get energy

--Units 4-8

PART III: GENETICS & BIOTECHNOLOGY

--genetics and patterns of inheritance

--Units 9-13

Each module consists of multiple units and culminates in an exam. Each unit consists of PowerPoint lectures, assigned reading, films, online homework and practice quizzes using McGraw Hill connect, reflective writing, discussions, laboratory project, and quizzes.

This course also includes two papers. A biographical paper on an important woman or minority scientist and their contribution to the field of genetics, cellular or molecular biology and a paper exploring the ethics of experimentation from an indigenous lens.

Texts and Materials:

Required Texts: "Biology" P.H. Raven, and G.B. Johnson, Twelfth Edition

iPad ebook: "CK12 Honors Biology" (optional)

Connect Link: <https://connect.mheducation.com/class/t-newberry-fall-2019>

Course Assessment:

Course assessment consists of exams, quizzes, online homework and practice quizzes, online discussions, short written assignments, informal in-class assessments, laboratory reports, a biographical paper and reflection paper. Study guides will be available to help you prepare for exams. In accordance with my teaching philosophy in which I believe student learning occurs primarily through hands-on, real world application of course materials, exams usually comprise 50% or less of the final grade (although they are still an important aspect of course assessment and your grade. 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.

Evaluation 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:

Evaluation:	Points:	
Exams	300 (3 @ 100 pts)	
U & A Homework, Pre & Post-tests & Quizzes	215 pts	
Labs, Class Assignments & Videos	265 pts	
Reflections & Papers	220 pts	
TOTAL	1000	

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:

Course Policies:

- 1) Students are expected to attend each class., arriving on time, except in the case of an excused emergency.
- 2) Students are expected to contact instructor prior to absences, coming late to class or leaving early.
- 3) Unexcused late arrivals or early departures will count against attendance record.
- 4) Class participation and preparation are essential to student success. Students must read textual material, prepare for projects, complete required research as stated on the course schedule.
- 5) Students are expected to come to class prepared for class and having done any preliminary work required as per the course schedule.
- 6) Students are expected to stay in class and work diligently throughout the whole time. Sleeping, frequent/continued exiting from the class during the class period will constitute one (1) absence.
- 7) No cell phone use is allowed during class. Use of cell phones during class, unless permitted by instructor, is a violation of the T-So:son.

Classroom Behavior

- Visitors may be only allowed at class sessions or on field trips with instructor approval, visitor's safety and behavior are the responsibly of the student.
- Possession of drugs, alcohol or firearms on college property is illegal.
- Food and beverages are allowed in classrooms at discretion of the instructor.
- Cellphones should be turned off during class, unless the instructor is allowing students to use their tools (calculator, internet access).
- Students creating disturbances that interfere with the conduct of the class or the learning of others will be asked to leave.
- Student behavior is also detailed in student handbook under Student Code of Conduct Violations

Make-up & Late work 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! Laboratories cannot be made up except in the case of college closure. In class exams and quizzes can only be made up if the absence is an excused absence and they must be made up before the next class period. 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.

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. 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. Grades can be monitored via Canvas.

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 withdrawal and a "W" or "Y" will be recorded. 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 (approved by Faculty Senate April 2014).

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. There must be an 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.

Instructor Withdrawals

Students who have missed four consecutive classes (or the equivalent) not submitted any assignments nor taken any quizzes by the 45th day census report, due on **10/3/2019** are assumed NOT to be participating in the class and may be withdrawn at the faculty member's discretion.

Student Withdrawals

Students may withdraw from class at any time during the first 2/3 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.

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

Reasonable Disability Accommodations (Americans with Disabilities Act):

TOCC seeks to provide reasonable accommodations for all qualified individuals with disabilities. The College will comply with all applicable federal, state and local laws, regulations, and guidelines with respect to providing reasonable accommodations as required to provide an equal educational opportunity. It is the student's responsibility to make known to the instructor his or her specific needs in order to determine reasonable accommodations. We will work together in order to develop an Accommodation Plan specifically designed to meet the individual student's requirements.

Title IX

Tohono O'odham Community College faculty and all staff are dedicated to creating a safe and supportive campus. Title IX and our school policy prohibit discrimination on the basis of sex- this includes sexual misconduct; harassment, stalking, domestic and dating violence and sexual assault.

Sexual discrimination and sexual violence can undermine students' academic success and quality of life on campus and beyond. We encourage students who have experienced 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

Course Outline:

(see course schedule below for dates):

- I. Introduction to the Unity of Life
 - a. Characterization of Life—O’odham and Western perspectives
 - b. Unity and Diversity of Life—O’odham and Western perspectives
 - c. Interrelationships in Life—O’odham and Western perspectives
- II. Introduction to the Scientific Process
 - a. Steps of the scientific process
 - b. Analyzing data
 - c. Ethics of experimentation
- III. Scientific Measurements and Laboratory Techniques
 - a. Light microscopy
 - b. Metric measurements
 - c. pH meter
 - d. Spectrophotometer and/or electrophoresis
 - e. Laboratory safety skills
- IV. Chemistry of Cells
 - a. Significance of water to life
 - b. Structures of functions of biological molecules
- V. Organization of Cells
 - a. Prokaryotic cells
 - b. Eukaryotic cells
 - c. Membrane dynamics
- VI. Metabolism
 - a. Energy harvesting pathways
 - b. Photosynthesis
- VII. Patterns of Cell Division
 - a. Mitosis
 - b. Meiosis
- VIII. Patterns of Inheritance
 - a. Chromosomal genetics
 - b. Human genetics
- IX. Nucleic Acids
 - a. Deoxyribonucleic Acid (DNA) structure and replication
 - b. Transcription and translation
 - c. Gene expression
- X. Biotechnology
 - a. DNA manipulation
 - b. Applications of DNA technology**

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.

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 LECTURE SCHEDULE FALL 2019
 SEE CANVAS FOR DETAILED SCHEDULE OF ALL DUE DATES
 NEWBERRY

Dates	Unit #	Unit Name	Reading Assignments	Assignment Due Dates
		PART I: INTRO & FOUNDATIONS OF LIFE		
8/19-8/26	1	Introduction to the Unity of Life	"Native Science" by Greg Cajete: Forward, Intro & Body Sense ; "Spirit & Reason": Traditional Technology by Vine de Loria	CANVAS Intro: 8/21 Email to Prof: 8/21 Reading & Discussion on Traditional Technology: 8/28
8/28-9/11	2	The Chemical Building Blocks of Life	Chapter 3	Connect Biol Prep: 8/28 Reflection on O'odham vs. Western Science Definition of Life: 9/4 Dialectic Journal: 9/11
9/16-9/30	3	The Cell—The Smallest Unit of Life	Chapters 4 & 5	Exam I: Units 1-3
*****FALL BREAK*****				

		PART II: ENERGY OF LIFE		
10/7-10/9	4	Energy & Metabolism	Chapter 6	
10/14-10/16	5	How Cells Harvest Energy	Chapter 7	
10/21-10/23	6	Photosynthesis	Chapter 8	
10/28 & 10/30	7	How Cells Divide	Chapter 10	Biographical Research Paper due: 11/4
11/4-11/6	8	Sexual Reproduction & Meiosis	Chapter 11	Exam II: Units 4-8
		PART III: GENETICS & BIOTECHNOLOGY		
11/13-11/18	9	Genetics	Chapters 12 & 13.1 & 13.2	
11/20-12/2	10	Genes and How They Work	Chapter 14.1, 14.2 & 15	
12/3-12/9	13	Biotechnology & Ethics of Experimentation	Chapter 17	Reflection: Ethics of Experimentation: 12/3
12/11				Exam III: Units 9-13

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 TENTATIVE LAB SCHEDULE FALL 2019
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Lab #	Laboratories & Class Activities
1	Functional Groups & Chemical Models
2	Cell Size
3	Microscope Lab & Cell Types
4	Diffusion Lab
5	Experimental Design
6	Presentation of Data
7	Numerical Analysis
8	Diffusion Lab Report
9	pH & Buffers
10	Investigating Photosynthesis & Cell Respiration
11	pH & Buffers
12	DNA Structure & Protein Synthesis
13	Probability & Mendelian Genetics
14	Sameness and Variety
15	Genetics Practice Problems