CENTRAL TEXAS COLLEGE
BIOL 1409
BIOLOGY FOR NON-SCIENCE MAJORS II

Semester Hours Credit: 4

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I. INTRODUCTION

A. This course will provide a survey of biological principles with an emphasis on humans, including evolution, ecology, plant and animal diversity, and physiology.

B. This course may satisfy the Biology requirement in some curricula. Please check your degree pan to determine the status of this course in your program of study.

C. In support of the objectives of the Texas core curriculum, the course provides significant exercise of a student's critical thinking skills, communication skills, teamwork, and empirical and quantitative skills. These objectives form a foundation of intellectual and practical skills that are essential for all learning.

* Critical thinking skills include creative thinking, analysis, evaluation, and synthesis of information.
* Communication skills include effective development, interpretation, and expression of ideas through written, oral, and visual means.
* Teamwork includes the ability to consider different points of view and to work effectively with others to support a shared purpose or goal.
* Empirical and quantitative skills include the ability to manipulate and analyze numerical data or observable facts to reach informed conclusions.

D. Prerequisite: None. However, students are strongly encouraged to complete all developmental courses prior to any science course. Biol 1408 is not a pre-requisite to this course, but it would certainly be very helpful to students lacking background in basic biology and basic chemistry.

II. LEARNING OUTCOMES—From the Texas Academic Course Guide Manual (ACGM)

- Apply scientific reasoning to investigate questions and utilize scientific tools such as microscopes and laboratory equipment to collect and analyze data.
- Use critical thinking and scientific problem-solving to make informed decisions in the laboratory.
- Communicate effectively the results of scientific investigations.
- Define modern evolutionary synthesis, natural selection, population genetics, micro and macroevolution, and speciation.
- Describe phylogenetic relationships and classification schemes.
- Identify the major phyla of life with an emphasis on plants and animals, including the basis for classification, structural and physiological adaptations, evolutionary history, and ecological significance.
- Describe basic animal physiology and homeostasis as maintained by organ systems.
- Compare different sexual and asexual life cycles noting their adaptive advantages.
- Illustrate the relationship between major geologic change, extinctions, and evolutionary trends.

III. INSTRUCTIONAL MATERIALS

A. The instructional materials identified for this course are viewable through www.ctcd.edu/books

IV. COURSE REQUIREMENTS:

A. Reading:

Specific chapters from the textbook will be required reading. There will also be reading and preparation or homework assignments in the lab manual.

B. Completion of lab materials

This course includes a lecture and a lab component in a single course. You must complete the lab materials to be successful in the course

C. Attendance and participation in both lecture and lab:

Attendance is measured differently in on-line and in-face classes. However, your participation in the course material is essential to your success.

D. Integrity and scholarship:

All students are required to maintain the highest standards of scholastic honesty in the preparation of all coursework and examinations. Examples of scholastic dishonesty include plagiarism, collusion, and cheating, copying homework or lab work. This is not a comprehensive list. Students guilty of scholastic dishonesty will be administratively dropped from the course with a grade of "F" and subject to disciplinary action, which may include suspension or expulsion from the school.

E. Checking blackboard

It is the student's responsibility to check blackboard on a regular basis. It would be best to check every day, but you should check at minimum every other day.

F. Attendance Policy/Makeup Work:

1. **Attendance:** Regular attendance is necessary in order to maintain satisfactory grades in this class. Absences will not directly penalize your grade, but they can lead to lower exams grades or failing the course.
2. **Make-up work: No late work** will be accepted due to any circumstances not considered serious by the instructor. Documentation must be provided.
3. **Make-up exam policy: No make-up exams** are allowed due to any circumstances. A comprehensive final exam may replace one low, or missed, exam—either a lecture exam or a lab exam. Upon instructor discretion exams/tests and quizzes may be given with prior notice.

Course Content: College-level courses may include controversial, sensitive, and/or adult material. Students are expected to have the readiness for college-level rigor and content.

Course Policies:

- Attendance is necessary at all class and lab meetings. If you can attend a different lab or lecture section, that attendance will count. This may or may not be possible depending on the number of students in the lab class.
- Class will begin promptly at the scheduled time. Quizzes may begin at the start time for class and may substitute for taking attendance. If you miss a quiz at the start of class, be sure to sign in so that you are not also counted absent.
- Class members are expected to remain in class until dismissed by the instructor. This was a problem last semester. If you need to leave the class, you must come to the front of class, sign out, give a reason and then sign back in when you return. If you fail to do this, you will be counted absent for the entire class. I do not expect any student should need to do this more than 3 times a semester.
- The instructor may confiscate any electronic devices that are mis-used during class or that cause disruption in the class. They will be returned at the end of the class or by the department chair, director of student life or the HS principal depending on the situation.
- No lab materials may leave the room.
- Keep your voice down and save discussion that is not related directly to the lab material for time between classes.
- Eating and drinking in the classroom is not permitted at any time. Within reason, you may step out of the lab room to eat, drink, use the restroom etc. If this policy is abused, it may be revised during the semester. No student should be out of the room for more than 5 minutes. Again, you must sign out and back in if you leave during class time. The only exception to this policy is a bottle of water that cannot spill.
- Children are not permitted in the lab at any time.
- Cameras may be used only in lab to take pictures of the lab materials for home study. No videos are permitted.
- All disputed issues will be resolved in accordance with established institutional (CTC) guidelines.

- All lab materials will be properly cleaned and returned to their appropriate places before students leave the lab.

Course Quizzes:

- Quizzes will be given on blackboard and will be password protected.
- You will be given a set amount of time to complete the quiz.
- Quizzes will be distributed after certain labs are completed.

The following are summarized from the student handbook. It is your responsibility as a CTC student to be familiar with this (long) document. Here is a link:
https://www.ctcd.edu/sites/ctcd/assets/File/Student%20Life/studenthandbook.pdf

Academic Honesty (see student handbook): Cheating in any form will not be tolerated. The CTC catalog states: "Students guilty of scholastic dishonesty will be administratively dropped from the course with a grade of "F" and subject to disciplinary action, which may include suspension and expulsion." A formal charge against the student may be made to the College Disciplinary Board. Cheating is defined as:

- Giving, receiving, and/or aiding in either the giving or receiving of any unauthorized information during testing.
- Communicating the contents, general or specific, of any test or quiz to include discussing contents of an exam with other currently enrolled students and the lending or borrowing of past tests or quizzes when the instructor has not specifically sanctioned this act.
- Using the testing area in any covert and unacceptable means of receiving or giving information.
- Collaborating on homework or projects when not specifically authorized by the instructor.

• **Plagiarism -** The taking of passages from the writing of others without giving proper credit to the sources.

• **Collusion -** Using another's work as one's own, or working together with another person in the preparation of work, unless such joint preparation is specifically approved in advance by the instructor.

• **Cheating -** Giving or receiving information on examinations.

• Use of generative artificial intelligence (AI) tools (including but not limited to ChatGPT, Dall-E, GitHub Copilot) in written assignments, discussion boards, or any other graded assignment completion in this course will be considered cheating and a violation of the Academic Integrity Policy (currently listed in the CTC Course Catalog and Student Handbook), unless otherwise permitted by the course instructor. Action will be taken following the process laid out in the policy in response to such violations, which can include a zero for the assignment, an F in the course, or potentially stricter penalties. Work submitted by the student should be work that was personally authored by that student only. Graded submissions for this course should not be created by someone or something else.

Dismissal Policy (see student handbook):

A high standard of conduct is expected of all students. It is assumed that obedience to the law, respect for property, integrity, and common sense will guide the actions of each member of the class. If in the opinion of the instructor the conduct of a student is unacceptable, the student will be asked to leave the class or lab, counted absent, and not be allowed to re-enter without written

permission from the Department Chair. In a case of severe misconduct, the instructor may request the dismissal of the student from class permanently.

Email: Students are required to email instructors using their CTC email ONLY.

VI. SEMESTER GRADE COMPUTATIONS

This is what you are graded on:

Grade Components		
Component	**Possible Points**	**Earned points**
Achieve**These points are transferred from Achieve into BB after every unit exam. Total points for Achieve is capped at 100	100	
Graded Lab, Quizzes, and Presentation. During lab there may be Assignments graded at any time. Quizzes may also be given out at any time as well. There will also be a term project presentation.	175	
Participation points. Before Unit exams, you will do a participation activity.	25	
Five Lecture Exams in class. Worth 100 points each. These will cover the textbook, lectures and lab materials. Lab materials covered on these will be specified on reviews or during the lectures. Extra credit may be earned for certain exam questions.	500	
Lab Midterm and Lab Final These exams will be given in lab and will include questions related to the lab materials including practical questions.	200	
Final Exam This is an opportunity to replace one of your lowest test scores. This final does not weigh anything against your grade. It is completely **optional.**	100 points	
Total	1000 points (+ any earned extra points)	

This is how your course grade will be determined. Rounding and final grades are strictly at the discretion of the instructor. You may get a grade higher than the calculated grade, but you will not get a grade lower than the calculated grade. It is possible for two students who have the exact same numeric grade to earn different letter grades based on the judgment of the instructor that one has displayed much more positive participation than the other.

Course Grade Calculation					
Grade	**A**	**B**	**C**	**D**	**F**
Percent	90-100%	80-89%	70-79%	60-69%	0-59%
Points	900-1000	800-899	700-799	600-699	0-599

Monitor your progress
You can check your grades throughout the course by selecting the **Tools > My Grades** link in the BB menu. Interim lab grades and Interim Achieve grades will be added to the gradebook periodically. You can always check your grades in these aspects of the course by looking at either the Achieve gradebook or by looking at the Lab grade book in BB.

VII. NOTES AND ADDITIONAL INSTRUCTIONS FROM THE INSTRUCTOR

A. **Course Withdrawal (see student handbook):**

B. **Administrative Withdrawal (see student handbook):**

C. **Incomplete Grade (see student handbook):**

E. **Americans With Disabilities Act (ADA) (see student handbook:**

http://www.ctcd.edu/disability-support

F. **Instructor Discretion:** The instructor reserves the right of final decision in course requirements and alterations of grading scale.

G. **Civility:** Individuals are expected to be cognizant of what a Constructive educational experience is and respectful of those participating in a learning environment. Failure to do so can result a disciplinary action up to and including expulsion.

Civil behavior includes, but is not limited to, refraining from use of cell phones or electronic devices in an inappropriate manner, positive and friendly interaction with other students and instructor during class; refraining from use of inappropriate language, or hostile behavior. **Decisions regarding civility are the instructor's prerogative.**

VIII. COURSE OUTLINE

A. The process of science (Relates to ACGM objectives A, B and C)

1. Learning Outcomes:

Upon successful completion of this section, the student will:

a. Discuss how the scientific method is used to test hypotheses.
b. Evaluate the factors that influence the strength of scientific studies and whether the results of the study are applicable to a particular population.
c. Evaluate the evidence in media reports of scientific studies.
d. Explain how the scientific method applies to clinical trials designed to investigate important issues in human health.

B. Natural Selection and adaptation (Relates to ACGM objective D)

1. Learning Outcomes

a. Discuss the prevalence of Staph bacteria both in cases of infection and in cases where no infection is occurring.
b. Explain how bacteria resist the effects of antibiotics.
c. Explain how populations evolve, and the role of evolution in antibiotic resistance.
d. Discuss the observations Charles Darwin made about nature that helped shape his thinking about evolution.
e. Describe the research done by other scientists which shaped Darwin's thoughts on evolution.

C. Non-adaptive evolution and speciation (Relates to ACGM objective D)

1. <u>Learning Outcomes:</u>

a. Define the term gene pool and explain how it relates to populations and species rather than to individuals.
b. What evolutionary mechanisms influence the gene pool and how may each mechanism alter it.
c. Explain the difference between an evolving gene pool and a nonevolving gene pool over the course of generations.

d. Discuss the most common mechanisms by which new species arise and how we can differentiate between related species.

D. Evidence for evolution (Relates to ACGM objective D)

1. <u>Learning Outcomes</u>:

Upon successful completion of this chapter, the student will:

a. Explain how the fossil record reveals information about evolutionary change.

b. Explain what is meant by the term transitional fossil, and the role transitional fossils play in our understanding of the fossil record.

c. Discuss how modern anatomical features and DNA reveal information about evolution.

E. History of life on Earth (Relates to ACGM objective D and E)

1. <u>Learning Outcomes</u>:

Upon successful completion of this chapter, the student will:

a. Explain major evidence that reveals the history of life on Earth. Discuss some key things we know about this history.

b. Discuss the evidence which helps explain the modern distribution of species on Earth.

c. Discuss the modern classification system for major groups of organisms and the basis on which they are classified.

F. Prokaryotic diversity (Relates to ACGM objectives F and G)

1. <u>Learning Outcomes</u>:

Upon successful completion of this chapter, the student will:

a. Identify the domains of life that include prokaryotic organisms.

b. Compare and contrast the major features of bacteria and archaea

c. Describe the challenges faced by organisms living around deep ocean vents and explain how they are able to survive these challenges.

G. Eukaryotic diversity (Relates to ACGM objectives F, G and H)

1. <u>Learning Outcomes</u>:

Upon successful completion of this chapter, the student will:

a. Name the major groups of Eukaryotic organisms and the factors that influence their diversity.

b. Discuss the features which distinguish plants from animals and fungi, and the major factors influencing plant diversity.

c. Discuss the features which distinguish animals from plants and fungi, and the major factors influencing animal diversity

d. Discuss the features which distinguish fungi from plants and animals, and the major factors influencing fungal diversity.

e. Explain what makes the group called Protists different from the other Eukaryotic kingdoms of organisms. What are the major factors influencing protist diversity?
f. Identify members of the major subdivisions of each of these groups.

H. Human Evolution (Relates to ACGM objectives F, G, H)

1. Learning Outcomes:

Upon successful completion of this chapter, the student will:

a. Discuss the genetics of human skin color and explain why there is so much variability found among different human populations.
b. What is the evidence for the location of the earliest evolution of humans and where are they thought to have evolved?
c. Explain how the fossil record has shaped our understanding of human evolutionary history.
d. Identify skin structures, tissue layers and functions.

I. Overview of physiology (Relates to ACGM objectives A, F and I)

1. Learning Outcomes:

Upon successful completion of this chapter, the student will:

a. Describe the basic organization of an animal body from the cellular to organismal level.
b. Explain the homeostatic regulation of body temperature in humans.
c. Discuss how homeostatic feedback loops regulate physiological systems.
d. Describe the major organs and body system functions in humans.
e. Compare thermoregulation in various types of animals.

J. Digestive system (Relates to ACGM objectives A, F and I)

1. Learning Outcomes:

Upon successful completion of this chapter, the student will:

a. Describe the anatomy of the human digestive system from the point at which food enters, to the points at which feces exit. Include a discussion of the accessory organs of digestion.
b. Discuss the importance of enzymes and mechanical processes in the breakdown of food as it moves through the digestive system.
c. Compare digestive systems of various animals.

K. Cardiovascular system (Relates to ACGM objectives A, F and I)

1. Learning Outcomes:

Upon successful completion of this chapter, the student will:

a. List the components of the cardiovascular system and explain how, and in what pathway, blood is moved through this system.
b. Compare the structure of the atria and ventricles of the heart with the structure of the major types of blood vessels. Include a discussion of the location and function of valves, both in the heart and in the blood vessels.
c. Describe the major risk factors for developing cardiovascular disease and the process by which it develops.
d. Compare the cardiovascular systems of various animals.

L. Respiratory system (Relates to ACGM objectives A, F and I)

1. Learning Outcomes:

Upon successful completion of this chapter, the student will:

a. List the major structures of the respiratory system in the order that air passes through them. Explain the mechanisms of pressure change in the respiratory system and how these changes are used to drive air movement.
b. The respiratory and cardiovascular systems cooperate to deliver oxygen to body tissues and remove carbon dioxide from body tissues. Discuss this cooperative process.
c. Explain how oxygen-carrying capacity and breathing rate are related. Describe the factors that affect oxygen carrying capacity and breathing rate.
d. Explain how scientific knowledge of the respiratory system is used to develop training regimens for elite athletes.
e. Compare the respiratory systems of various animals.

M. Central Nervous System (Relates to ACGM objectives A, F and I)

1. Learning Outcomes:

Upon successful completion of this chapter, the student will:

a. Describe the organization of the central and peripheral nervous system.
b. Discuss the structure of a neuron and explain how neurons transmit signals both from one end of a neuron to the other end, and from one neuron to another.
c. Explain how drug addiction and behavioral addiction are related to the physiology of the nervous system.
d. Compare nervous systems of various animals.

R. Reproductive system (Relates to ACGM objectives A, F and I)

1. Learning Outcomes:

Upon successful completion of this chapter, the student will:

a. Identify the major organs of the male and female reproductive systems and describe their functions.
b. Explain how various hormones are involved in the human reproductive system.

c. Describe several types of assisted reproduction and discuss the pros and cons of various methods.
d. Compare reproductive systems of various animals.

S Immune System (Relates to ACGM objectives A, F and I)

1. <u>Learning Outcomes</u>:

Upon successful completion of this chapter, the student will:

a. Compare and contrast virus structure with bacterial structure and explain how viruses cause disease.
b. List the major components of innate immunity and explain how each reduces the likelihood that an individual exposed to a virus or bacteria will become infected.
c. The Influenza virus has caused a number of pandemics and will likely cause pandemics in the future. Explain why this virus is particularly likely to cause world-wide outbreaks.