FENG CHIA UNIVERSITY

Introductory Biology (With Lab)

EES105, Summer 2019 (July 1 - August 2)

Lecturer: TBA

E-mail: TBA

Time: Monday through Friday (2 hours each day)

Contact hours: 60 (50 minutes each)

Credits: 4

Office hours: 2 hours (according to the teaching schedule)

Course Description

Biological Science is all around us, and affects every aspect of our lives and every facet of life on Planet Earth. The goal of this course is to furnish students with the basic foundation, information, and analytical tools necessary to grasp the fundamental concepts central to the study of biology.

This is a vast and highly diverse subject, and thus will require an overview approach in a short course such as this one. We will cover the most important areas in some detail, both in the classroom and in the laboratory, while striving to achieve a balanced view of the big picture ideas.

Required Text

Biology Today and Tomorrow, With Physiology, 3rd Edition or 4th, by Starr, Evers, and Starr (published in 2010 by Cengage).

ISBN-10: 0495561576

ISBN-13: 9780495561576

Course Hours

The course has 20 lecture sessions and 5 lab sessions in total. Each session is 120 minutes in length. Lecture session meets from Monday to Thursday. Lab session meets on each Friday.

Assessment

Your final grade is based on the following components:

Quizzes/Homework	20%
Practical Exercises	25%
Midterm Exam	25%
Final Exam	30%
Total	100%

Grading System of FCU:

Letter Grade	Score
A	80-100
B	70-79
C	60-69
D	50-59
E	Below 50

Quizzes/Homework

Multiple self-assessment quizzes and homework assignments will be offered for students to practice their concept understanding and to prepare for the lectures. These quizzes and homework assignments will be POSTED ON BLACKBOARD on a weekly basis. Many of these assignments will be discussed during class and/or recitation. Late homework will NOT be accepted, except in

the case of a documented medical reason (documentation is required).

Attendance Policy

Attendance at lectures, recitations, and labs is expected. Continued absences will detract from your final grade. If you have missed/will be missing a class or recitation session for an acceptable reason, such as illness or religious observance, please let me know in person with a written document. Ideally, you should let me know of your absence prior to missing the class. In addition, missing a class for an acceptable reason **will not excuse you from completing the class exercises and the out-of class assignments** so, if you miss a class, it is your responsibility to obtain notes from a classmate and contact the instructor in order to complete all the assignments by their original or extended deadlines.

WEEK ONE:

1. Invitation to Biology.
2. Molecules of Life.
3. Cell Structure.
4. Energy and Metabolism.
5. Capturing and Releasing Energy.

LAB TOPIC: Examination and comparison of cellular structure and function, including microscopic analysis of organelles. Comparison of cell structure in various Prokaryotes and Eukaryotes.

WEEK TWO:

6. DNA Structure and Function.
7. Gene Expression and Control.
8. How Cells Reproduce.
9. Patterns of Inheritance.

10. Biotechnology.

LAB TOPIC: Genetics experiment using computer simulations to study, analyze, and make verifiable predictions involving patterns of inheritance, dominance, co-dominance, and related aspects of genetics. Use of manipulable models to study how the structure and function of DNA molecules produces these inheritance patterns. Microscopic study of cells at various stages of mitosis and meiosis.

WEEK THREE:

11. Evidence of Evolution.
12. Processes of Evolution.
13. Early Life Forms and the Viruses.
14. Plants and Fungi.
15. Animal Evolution.

LAB TOPIC: Exercises in developing and analyzing phylogenetic relationships. Use of taxonomic methods to compare various alternative means of categorizing various life forms. Study of evidence from succession in multiple communities as a window into adaptive radiation and evolution.

WEEK FOUR:

16. Population Ecology.
17. Communities and Ecosystems.
18. The Biosphere and Human Effects.
19. Animal Tissues and Organs.
20. How Animals Move.
21. Circulation and Respiration.
22. Immunity.

LAB TOPIC: Field trip to local areas of environmental concern as well as facilities involved in

water treatment and reduction of air pollution. Comparison of environmental quality challenges, methods, and areas of emphasis in industrial, residential, and rural regions.

WEEK FIVE:

23. Digestion and Excretion.
24. Neural Control and the Senses.
26. Reproduction and Development.
27. Plant Form and Function.
28. Plant Reproduction and Development.

List of Laboratory Experiments

Week 1: Application of the Scientific Method

-Observe

-Develop hypotheses

-Identify variables and controls

-Collect and analyze data

-Draw conclusions

-Calculate measurements relative to percent error, significance, etc. towards scientific reasoning.

-Explore the process for organizing, formatting and preparing a lab report.

Week 2: Cell Structure and Function

-The application of cell theory

-The structure and function of eukaryotic and prokaryotic cells will be contrasted and compared

-Students will identify eukaryotes and prokaryotes based on cellular structure

Week 3 A. Mitosis and Meiosis

-Identification of chromosomal structures while exploring the stages of the cell cycle (chromatin, sister chromatids, homologous chromosomes and centromeres.

- Animal and plant mitosis (compare and contrast)

-Compare and contrast Mitosis and meiosis

- Exploration of Parent and daughter cell division

Week 4. Mendelian Genetics

A.Review the work of Mendel in terms of the formation of modern genetics (law of segregation and the law of independent assortment)

-Explore homozygous, heterozygous, dominant and recessive alleles and genotype and phenotype.

-Use of crosses (monohybrid and dihybrid) to analyze inheritance patterns (dominance, incomplete dominance and co-dominance).

B. Ecology

-Explore ecology and natural selection

-Review selective pressures and the impact on population

-Identify climate patterns, & plant and animal species in different terrestrial biomes

Week 5.

Animal and Plant Diversity

-Explore plant groups and distinguishing characteristics (Bryophytes, Pterophytes,Gynomsperms and Angiosperms)

-Compare and contrast monocots and dicots

- Identify Reproductive structures of plant groups

-Drawing and labeling shoot systems of a vascular plant and the parts of a flower

-Review Structure and leaf arrangement exploration of various plants

Academic Honesty

Feng Chia University defines academic misconduct as any act by a student that misrepresents the students' own academic work or that compromises the academic work of another scholastic misconduct includes (but is not limited to) cheating on assignments or examinations; plagiarizing, i.e. misrepresenting as one's own work any work done by another; submitting the same paper, or substantially similar papers, to meet the requirements of more than one course without the approval and consent of the instructors concerned; sabotaging another's work within these general definitions, however, Instructors determine what constitutes academic misconduct in the courses they teach. Students found guilty of academic misconduct in any portion of the academic work face penalties ranging from lowering of their course grade to awarding a grade of E for the entire course.