

Instructor: Dr. Sara Fenske **Course:** Biology

Academic Year: 2008-2009

Course Philosophy: Biology is the study of life. It is the study of how organisms (such as ourselves) develop, function, and reproduce. As you will find, this is an incredibly complex and fascinating science. In this course you will learn the concepts and techniques of modern biology. Hopefully, through this course, you will come to appreciate, perhaps even love, this incredible science. The success of this course depends on your enthusiasm, hard work, and participation.

Course Requirements: 1) Essential Biology with Physiology
2nd edition by
Campbell, Reece, and Simon

- 2) Binder for Handouts and paper for notes
- 3) Pencil or Pen (blue or black)
- 4) All handouts
- 5) Access to the Internet

Grading Procedure: Grades are based on a combination of two Major Exams (at least 100 points each), Tests and Quizzes (at least 25 points each), and Writing Assignments (including lab reports) (25-100 points).

Grading Scale: As stated in the Student Handbook, letter grades are determined based on the following scale:

A- to A+: 90-100 D- to D+: 60-69
B- to B+: 80-89 F: 0-59
C- to C+: 70-79

Homework/ Classwork Policies:

1. Problem sets, research papers, and reading assignments must be completed by the assigned date. Any long-term projects should be worked on daily so that the task is completed on time and will earn the best grade.
2. Two major exams will be given in the first trimester and third trimester. Both exams are cumulative. Quizzes will be given every week to two weeks. At least one test will be given per trimester in addition to the major exam and quizzes. Pop quizzes may be given at any time.
3. All assignments should be turned in on the due date during the class period. The maximum score for any late assignments will decrease by 10% for every day late until the grade reaches a maximum score of 50%. Any work not turned in will receive a 0.
4. All work must be legibly written or typed, and grammatically correct.

5. Keep all handouts, homework, returned homework and exams in a binder.
6. Ask questions about any instructions that are not clear.

Classroom Policies:

1. Daily, *prepared* attendance is mandatory. The school's attendance policy will be strictly enforced.
2. You are solely responsible for any material covered or announcements made during your absence.
3. You are expected to treat everyone with respect at all times.
4. Cheating or plagiarism will result in a 0 grade for that assessment.
5. During all labs, safety comes first!
6. Finally, you are expected to ask questions about any material that is not clear. Do not worry about a question being too simple. If you don't understand, chances are others don't also (Yes, this is really true).

Tentative Schedule:

Week	Topics	Chapters
1	Overview of Biology & Biological Techniques Review: Water & Chemistry of Life	Ch. 1 & Ch. 2
2	Molecules of Cells: Carbohydrates, Lipids, Proteins, and Nucleic Acids	Ch. 3
3	Prokaryotic & Eukaryotic cells: Membranes & Subcellular organization	Ch. 4 & Ch. 5
4	Free energy changes, Coupled reactions & Enzymes	Ch. 5
5	Cellular Respiration and Fermentation	Ch. 6
6	Photosynthesis	Ch. 7
7	Cell Cycle, Meiosis & Gametogenesis	Ch. 8

8	Structure and Function of DNA, Replication of DNA	Ch. 10
9	Central Dogma: Transcription and Translation & Microbial Genetics	Ch. 10
10	Inheritance Patterns	Ch. 9
11	Inheritance Patterns	Ch. 9
12	Review / Exam Week	
13	Gene Regulation	Ch. 11
	Thanksgiving Break	
14	DNA Technology and Genomics	Ch. 12
15	DNA Technology and Genomics	Ch. 12
16	Population Evolution	Ch. 13
	Christmas Break	
17	Evolution of Biological Diversity	Ch. 14
18	Evolution of Microbial Life	Ch. 15
19	Evolution of Plants and Fungi	Ch. 16
20	Evolution of Animals	Ch. 17
21	Unifying Concepts of Animal Structure and Function	Ch. 21
22	Nutrition and Digestion	Ch. 22
23	Circulation and Respiration	Ch. 23
24	The Body's Defenses	Ch. 24

25	Hormones	Ch. 25
26	Reproduction and Development	Ch. 26
27	Nervous, Sensory, and Motor Systems	Ch. 27
	Spring Break	
28	Flowering Plants	Ch. 28
29	Plant Nutrition and Transport and Control Systems in Plants	Ch. 29
30	Population Ecology	Ch. 19
31	Communities and Ecosystems	Ch. 19
32	Human Impact on the Environment	Ch. 20
33	Review for Final	
34	Review for Final	
35	Final Exam Week	

Biology Outline:

- I. Overview of Biology
- II. The Chemistry of Life
 - i. Elements, Atoms, and Molecules
 - ii. Properties of Water
 - iii. Chemical Reactions
- III. Molecules of Cells
 - i. Introduction to Organic Compounds
 - ii. Carbohydrates
 - iii. Lipids
 - iv. Proteins
 - v. Nucleic Acids
- IV. Eukaryotic and Prokaryotic Cells
 - i. Introduction to the Cell
 - ii. Nucleus and Ribosomes
 - iii. Endomembrane System
 - iv. Chloroplasts and Mitochondria
 - v. Cytoskeleton
 - vi. Membrane Function
- V. Free Energy Changes, Coupled Reactions and Enzymes
 - i. Energy and the Cell
 - ii. Enzyme Function
- VI. Cellular Respiration and Fermentation
 - i. Introduction to Cellular Respiration
 - ii. Stages of Cellular Respiration and Fermentation
 1. Glycolysis
 2. Citric Acid Cycle
 3. Fermentation
- VII. Photosynthesis
 - i. The Light Reactions
 - ii. The Calvin Cycle
- VIII. Cell Cycle, Meiosis, and Gametogenesis
 - i. Cell Division
 - ii. Eukaryotic Cell Cycle and Mitosis
 - iii. Meiosis and Crossing Over

- iv. Alterations in Chromosome Number and Structure
- IX. Structure and Function of DNA
 - i. Structure of Genetic Material
 - 1. DNA
 - 2. RNA
 - ii. DNA Replication
 - iii. Central Dogma
 - 1. Transcription
 - 2. Translation
 - 3. Mutation
 - iv. Viral Genetics
- X. Patterns of Inheritance
 - i. Mendelian Genetics
 - ii. Variations on Mendel's Laws
 - iii. The Chromosomal Basis of Inheritance
 - iv. Sex Chromosomes and Sex-Linked Genes
- XI. Gene Regulation
 - i. Control of Gene Expression
 - 1. Effects of Gene Regulation
 - 2. Transcriptional Control
 - 3. RNA processing
 - 4. Translational Control
 - ii. Cloning of Plants and Animals
 - iii. Genetic Basis of Cancer
- XII. DNA Technology and Genomics
 - i. Recombinant DNA Technology
 - ii. DNA Fingerprinting and Forensic Science
 - iii. Genomics and Proteomics
 - iv. Gene Therapy
- XIII. Population Evolution
 - i. Darwin's Theory of Evolution
 - ii. Evidence of Evolution
 - iii. Natural Selection
 - iv. Darwinism and Genetics
 - v. Mechanisms of Microevolution

- XIV. Evolution of Biological Diversity
 - i. Origin of Species
 - ii. Biological Diversity
 - iii. Early Earth and Macroevolution
 - iv. Classifying Life
- XV. Evolution of Microbial Life
 - i. Origin of Life
 - ii. Prokaryotes
 - iii. Protists
- XVI. Evolution of Plants and Fungi
 - i. Plant Evolution and Diversity
 - ii. Fungi
- XVII. Evolution of Animals
 - i. Animal Evolution and Diversity
 - ii. Invertebrate Diversity
 - iii. Vertebrate Evolution and diversity
 - iv. Human Ancestry
- XVIII. Unifying Concepts of Animal Structure and Function
 - i. Structural Organization in Animals
 - 1. Structure and Function
 - 2. Types of Tissues
 - ii. Exchanges with the External Environment
 - iii. Regulating the Internal Environment
- XIX. Nutrition and Digestion
 - i. Animal Nutrition
 - ii. Human Digestive System
 - iii. Nutrition Requirements and Disorders
- XX. Circulation and Respiration
 - i. Animal Circulation
 - ii. Human Cardiovascular System
 - iii. Unifying Concepts of Animal Respiration
 - iv. Human Respiratory System
- XXI. Immune System
 - i. Nonspecific Defenses
 - ii. Specific Defenses

- iii. Disorders of the Immune System
- XXII. Hormones
 - i. Chemical Regulation
 - ii. Human Endocrine System
- XXIII. Reproduction and Embryonic Development
 - i. Unifying Concepts of Animal Reproduction
 - ii. Human Reproduction
 - iii. Reproductive Health
 - iv. Human Development
 - v. Reproductive Technologies
- XXIV. Nervous, Sensory, and Motor Systems
 - i. Overview of Animal Nervous Systems
 - ii. Human Nervous System
 - iii. The Senses
 - iv. Motor Systems
- XXV. The Flowering Plant
 - i. Plant Structure and Function
 - ii. Plant Growth
 - iii. Reproduction of Flowering Plants
- XXVI. Plant Nutrition and Transport
 - i. Structure and Function of a Flowering Plant
 - ii. Plant Growth
 - iii. Life Cycle of a Flowering Plant
- XXVII. Plant Nutrition and transport and Control Systems in Plants
 - i. Acquisition and Transport of Nutrients
 - ii. Plant Hormones
 - iii. Response to Stimuli
- XXVIII. Population Ecology
 - i. Overview of Ecology
 - ii. Evolutionary Adaptations of Organisms
 - iii. Population Ecology
- XXIX. Communities and Ecosystems
 - i. Properties of Communities
 - ii. Interspecific Interactions in Communities
 - iii. Disturbance of Communities

- iv. Energy Flow in Ecosystems
 - v. Chemical Cycling in Ecosystems
 - vi. Biomes
- XXX. Human Impact on Environment
- i. Human Impact on Biological Communities
 - ii. Human Impact on Ecosystems
 - iii. Biodiversity Crisis
 - iv. Conservation Biology