

**Biology 1215**  
**Principles of Biology**  
**Tentative Syllabus-Fall 2006**

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**Office hours:** Everyday, one hour before lecture and lab

**Text:** *Biology: Concepts and Connection*, 5<sup>th</sup> edition, by Campbell, Mitchell and Reece. Addison Wesley Longman, Inc., San Francisco (2006).

**Supporting material:** Any multimedia material (e.g., slides) as well as course announcements and useful links will be posted on VISTA. Check often.

**Lecture schedule (likely to change):**

<b>Date</b>	<b>Topic</b>
Week I,II	<u>Introduction, Scientific method</u> -Chapter 1 Learning objectives: The student will gain an appreciation for the unity and diversity of life and how scientists organize living systems. In addition, the various approaches to the study of the biological world are introduced.
Week II	<u>Atoms and molecules</u> -Chapter 2 Learning objectives: Basic knowledge of the nature of matter and how the nature of matter influences living systems will be learned. The different electronic forces that bond atoms together and how that influences the properties of molecules will be learned. The student will become familiar with the differences between elements, atoms, compounds and molecules.
Week III	<u>Water and aqueous solutions</u> -Chapter 2 Learning objectives: The student will understand the nature of the water molecule and its vital role of in living systems. The role of cohesion, adhesion, and pH in making life possible will be discussed.
Week IV	<u>Macromolecules (carbohydrates, fats and lipids)</u> -Chapter 3 Learning objectives: The student will learn the nature and structure of the small molecules (monomer) that make up larger molecules. The structures of different types of carbohydrates and lipids and how the structure influences the functions will be learned. <u>Macromolecules (proteins, DNA and RNA)</u> -Chapter 3 Learning objectives: The structures of the monomers that comprise protein and nucleic acids will be understood. The influence of the structures of the monomers on the behavior and function of the molecules will be learned.
Week V	<u>Microscopes, cellular structures and functions</u> -Chapter 4 Learning objectives: The student will appreciate the basic concepts governing magnification and resolving power, and how those concepts make light and electron microscopes differ. The sizes of different types of cells will be learned, as well as the differences between prokaryotic and eukaryotic cells and plant and animal cells.
Week VI	<u>Cellular structures and functions</u> -Chapter 4 Learning objectives: The names and functions of the structures found in plant and animal cells will be gained. The student will be able to recognize and identify the structures on a diagram of the cell.

**Sept. 4****Exam 1**

Week VII

Energy utilization in living things, enzymes-Chapter 5

Learning objectives:

The student will learn about the different types of energy and the laws of thermodynamics that govern their interconversions. An appreciation of the molecules in living systems that contain energy and how the energy is released and used will be gained. The function of enzymes as macromolecules that utilize energy to rearrange other molecules will be understood.

Membrane structure and function-Chapter 5

Learning objectives:

The structure and function of the molecules that make up cellular membranes will be understood. An appreciation of the influence of the different molecules in the membrane on membrane function will be gained.

Week VIII

Cellular respiration -Chapter 6

Learning objectives:

The student will learn the definition of cellular respiration and the principles of redox reactions. Understanding of the mechanisms cells employ to utilize redox reactions to generate energy-rich molecules will be gained.

Glycolysis, Krebs cycle and fermentation-Chapter 6

Learning objectives:

Understanding the function of glycolysis in energy generation and precursor molecule formation will be acquired. The functions and benefits of the Krebs cycle in comparison to alcohol and lactic acid fermentation will be learned. The student will be able to label a diagram of a mitochondrion and identify the location of significant reactions.

Week IX

Photosynthesis (light reaction)-Chapter 7

Learning objectives:

The student will understand the structure of plant leaves and chloroplasts, and the impact the structures on photosynthesis. The function and reactions of photosynthesis and the role light and chlorophyll play in energy harvesting will be learned.

Photosynthesis (dark reaction)-Chapter 7

Learning objectives:

The functions of the dark reactions (Calvin cycle) will be emphasized. The student will be able to label a diagram of a chloroplast and identify locations of significant chemical reactions.

**Oct 2****Exam 2**

Week X

Chromosome structure, mitosis-Chapter 8

Learning objectives:

The structure of chromosomes and locations of genes will be learned. The cell cycle will be understood, including the events of interphase and mitosis. The student will be able to inspect and identify a cell diagram at any stage of the cell cycle.

Mitosis and meiosis-Chapter 8

Learning objectives:

The student will learn the function and stages of meiosis. The student will be able to compare and contrast the functions and stages of mitosis and meiosis. Causes of variation among individuals will be learned, including recombination and malfunctions during meiosis.

Week XI

Mendelian inheritance-Chapter 9

Learning objectives:

The student will gain an appreciation for the logic behind Mendel's experiments. The terminology invented by Mendel and the principles he discovered will be understood. Students will learn how to set up and interpret a Punnett square for a monohybrid cross.

Mendelian inheritance-Chapter 9

<p>Week XII</p> <p><b>Oct 23</b></p> <p>Week XIII</p>	<p>Learning objectives: The student will learn to interpret the more complex situation of a dihybrid cross by extending the use of the Punnett square. <u>Non-mendelian inheritance</u>-Chapter 9</p> <p>Learning objectives: The student will learn to contrast mono and dihybrid crosses with complete dominance is observed to situations with incomplete dominance, co- dominance, pleiotropy, polygenic inheritance and sex-linked traits. <u>Gene expression (DNA)</u>-Chapter 11</p> <p>Learning objectives: The structure of DNA and how it forms genes will be learned. The nature of the double helix and the implications for the function of DNA will be understood. How information is coded into the sequence of DNA and how the information is transferred to the next generations will be understood. <u>Gene expression (transcription)</u>-Chapter 11</p> <p>Learning objectives: The role of RNA polymerase in transcription and the structure of RNA in contrast to DNA will be learned. <u>Gene expression (translation)</u>-Chapter 11</p> <p>Learning objectives: The functions of different types of RNA and ribosomes in translation will be understood. The student will understand how a mutation in the DNA can change the function of a protein.</p> <p><b>Exam 3</b></p> <p><u>Evolution and natural selection</u>-Chapter 13</p> <p>Learning objectives:</p>
	<p>The student will be familiar with the evidence that supports the theory of evolution, including the fossil record, biogeography, comparative anatomy and embryology, and molecular biology.</p>
<p>Week XIV</p> <p>Week XV</p> <p>Week XVI</p> <p>Week XVII</p>	<p><u>Population genetics, agents of evolution</u>-Chapter 13</p> <p>Learning objectives: The student will learn that natural selection acts to remove unfavored variants from populations and that the consequent shift in gene frequencies can be described by the Hardy-Weinberg equation.</p> <p><u>Species/speciation</u>-Chapter 14</p> <p>Learning objectives: The student will learn different definitions of species, with emphasis on the biological concept of species. The barriers established that create species will be learned. <u>Species/speciation Part 2</u> Chapter 14</p> <p>Learning objectives: How different reproductive barriers emerge as populations diverge will be understood.</p> <p><u>Environmental factors that influence biology</u>-Chapter 34</p> <p>The student will appreciate the non-biological influences that impact living organisms and influence evolution.</p> <p><u>Humans as ecosystem elements</u></p> <p>Students will learn how they are embedded within the ecosystem and how they affect it.</p>
<p><b>The final exam</b> (comprehensive) is scheduled for Fri, December 15 at 10:30 a.m. - 12:30 p.m. I will not allow a final to be made up unless you have a hospital record.</p>	

**Lab Schedule:** The lab schedule and requirements will be discussed during the first lab session. The exact nature of the lab assignments will be announced in lab at least 1 week prior to the due date, and may consist of short quizzes or handouts to be filled in by the student.

**Attendance:** Not required for lecture but is required for lab. Two labs missed and 30 points will be removed from your lab grade. Three labs missed and 60 points will be removed. If four labs are missed no points will be given for lab.

**Grading policy.** I will base your grade on your performance in the classroom and nothing else. Lecture exams may consist of any combination of multiple choice, short answer, fill in the blank, matching, identification of figures or essay questions. The final exam will be comprehensive but with an emphasis on new material. The distribution of points will be as follows, with the lab grade counting for 20% of the final grade:

Exam 1: 100 points  
Exam 2: 100 points  
Exam 3: 100 points  
Final exam: 200 points  
Lab grade 120 points

The grading scale will be:

90-100%	A	
80-90%		B
70-80%		C
60-70%		D
Below 60%	F	

#### ADA COMPLIANCE STATEMENT Columbus State University

*If you have a documented disability as described by the **Rehabilitation Act of 1973 (P.L. 933-112 Section 504)** and **Americans with Disabilities Act (ADA)** and would like to request academic and/or physical accommodations please contact Joy Norman at the **Office of Disability Services** in the Center for Academic Support and Student Retention, Tucker Hall (706) 568-2330, as soon as possible. Course requirements will not be waived but reasonable accommodations may be provided as appropriate.*

#### Course Do's and Don'ts

Do	Consequence
Come to class	You'll learn more*
Ask questions	You'll learn more
Study frequently	You'll learn more
Come to office hours	You'll learn more
Rewrite notes with the aid of the text	You'll learn more
Respect me and classmates	You'll make me happy**
Check VISTA	You'll learn more
Don't	Consequence
Use your cell phone	You'll be removed from class for the day
Cheat	You'll fail the exam and possibly more***
Disrespect myself or others	You'll be removed from class for the day
Expect to do well without working	You won't
Stay silent if you have a question	That will be the question on the exam

\* and probably get a better grade

\*\* and you'll get to stay in class

\*\*\* I'll bring your case to the Dean of Academic Affairs