Biology 121: General Biology I Fall 2010
Three Rivers Community College, Norwich, CT
Instructor: Sarah B. Selke, Ph.D.
Office Hours (C214): Monday 2:30-4pm, Wednesday 11:30 am – 1pm
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Required Text:
Biology, **8th edition**, Campbell, Reece, Urry, Cain, Wasserman, Minorsky & Jackson. Published by Pearson.
You may buy either the paperback custom edition that is available only at the TRCC bookstore, or the hardback full text version. If you plan to take Bio 122, it is recommended that you buy the full-text version.

It is **strongly recommended** that you purchase access to the textbook website (http://www.masteringbio.com/): A password will be included if you purchase a new textbook. If you buy a used book with an expired password, you can purchase a password separately at the Mastering Biology website.

Course Prerequisites:
Current enrollent, or passing grade ("C" or better) in English 101 or an equivalent course. Chemistry 111 or high school chemistry.

Course Description:
This course stresses the unifying themes in biology including the life processes common to all organism and their strategies for survival. Topics include scientific method, evolution, chemical basis for life, cell components and processes, cell cycles, molecular genetics and patterns of inheritance. A complete listing of concepts covered is attached. This course is four credits.

This course is a web-enhanced course, which means that some required activities such as weekly quizzes are conducted online. The online portion of the course can be accessed through **http://my.commnet.edu/.** Once you are logged into myCommNet, click the Blackboard Vista icon in the upper right hand corner of the screen.

Course Objectives:
Upon completion of this course, the student will be able to recognize terminology, specific biological facts, and utilize general principles associated with the structural and functional organization of living things. The student will also obtain a more fully developed series of computer-based skills. This course also stresses critical thinking skills which are designed to allow the student to develop more meaningful learning beyond rote memorization; extend beyond lower levels of learning (knowledge and comprehension) to higher levels of learning (application, analysis, synthesis and evaluation); apply concepts and principles to real world experience and situations; and enhance problem solving skills.

Attendance Policy:
Attendance at all class sessions is required. If a class is missed due to circumstances beyond your control, please be sure to notify your instructor and make the necessary arrangements **with a classmate** for obtaining the notes. **You will be responsible** for the material**.**

Electronic devices (cell phones, pagers etc.) will be put in "Silent Mode" or turned off while class is in session.

Grading Overview:
Your grade is based on a 1000-point scale.
    Reading quizzes and homeworks = 225 points
    Tests & final = 375 points
    Labs = 400 points

No individual extra assignments will be given.

Grading for reading quizzes and homeworks
Reading quizzes and homeworks are worth a total of 225 points.

There will be four homeworks, worth a varying number of points, for a total of 105 points. Some assignments will require accessing the course website on Blackboard Vista.

There will be a reading quiz associated with each chapter in the textbook. Reading quizzes are conducted online through the course website on Blackboard Vista. Each reading quiz must be taken **before** coming to class. Each of the 17 reading quizzes will be worth 8 points. The lowest two quizzes will be dropped for a total of 120.

4 homeworks = 105 points
15 reading quizzes x 8 points each = 120 points
Total = 225 points

Grading for Tests & Final (375 points)
There are three tests worth 75 points each. Each test will consist of multiple choice and/or true & false questions.

The final is worth 150 points. It will consist of multiple choice and/or true & false questions. **The final exam is cumulative.**

Each exam and the final will be taken individually, at which point the exams will be collected. Then, there will be a 20-minute period where you will join two other students and retake the exam as a group. This exam will be handed in as well. Your individual exam will be graded, as will the group exam. **If the group scores higher than the highest score for any one person within the group, the differential (up to 10 points) will be added to each group member's individual exam score.**

For example, if the group score is 95, and the individual members' scores are 60, 70, and 90, the group earns a 5-point bonus. I will add the bonus to each individual member's grade, so the final grades would be 65, 75 and 95. If the group scores lower than the highest individual score, no points will be subtracted from the individual members' scores.

A #2 pencil is required for each exam. This item will not be supplied; you must bring it to each exam date.

The final exam must be taken to pass this course.

3 units tests x 75 points each = 225 points
1 final @ 150 points = 150 points
Total = 375 points

Grading for Lab (400 points)
There are eleven graded lab activities. Your lab assignment is due at the beginning of the following lab period. Each is worth 40 points. The lowest lab grade will be dropped. Late labs will be penalized 5 points if turned in the following day and 10 points thereafter. **No late labs will be accepted once the corrected labs are returned.**

10 labs x 40 points each = 400 points

How to calculate your grade:
To determine your grade, I suggest creating 2 columns of scores. The first is the total number of points for each assignment; the second is the points you earned on that assignment. To determine your grade, add up each column and divide **your score** total by the **high score** total.

A partial example:

High score	My score
8	8
40	35
75	70
Total = 123	Total = 113

113/123 = 0.92 = 92% = A-

Make-ups:
Make-up exams will be granted on an individual basis only following a conference with the instructor. **All make-up tests must be completed within a week of the original exam date.** Please be aware that the format of any makeup exam is at the discretion of the instructor. The format could be the same, oral, essay or other, depending on the circumstances. It will not be the same exam taken by the rest of the students in the class.
Due to scheduling issues, it is unlikely that a missed lab can be made up. **No credit will be given for a lab write-up if you did not participate in the lab.**

Final Grade:

93.5-100.0 = A	77.5-79.4 = C+
89.5-93.4 = A-	73.5-77.4 = C
87.5-89.4 = B+	69.5-73.4 = C-
83.5-87.4 = B	63.5-69.4 = D+
79.5-83.4 = B-	59.5-63.4 = D
	00.0-59.4 = F

College Withdrawal Policy:
The last day to withdraw is **December 9th**. Students who do not withdraw but stop attending class **will receive** a grade of "F" for the final grade.   **Verbal withdrawals cannot be accepted**.

Accommodations for Disabilities:

If you need assistance or modification of class procedure owing to any type of disability, please let me know so that arrangements for accommodation can be made. In order to receive accommodations, you must register with Chris Scarborough, learning specialist at 860-823-2985 or a counselor in the Student Services Development Center.

Academic Misconduct:

Academic dishonesty and plagiarism will not be tolerated. Plagiarism, cheating, or any form of academic dishonesty is **prohibited**. Plagiarism includes any instance of copying words or ideas from another person (ie. another student, author of a book, internet resource etc.) without properly acknowledging the source. Students guilty of academic dishonesty directly or indirectly will receive a **zero** for an exercise or exam and may receive an **F** for the course in addition to other possible disciplinary sanctions that maybe imposed through the regular institutional procedures.

BIO 121 Fall 2010 Class Schedule*/Selke

Date	Topic	Campbell Chapter	Exams	Lab (Tuesday)
M 8/30	Introduction	1		White Powders
W 9/1	Chemistry	2		
M 9/6	No Class			Atoms & Molecules
W 9/8	Water & Carbon	3 & 4		
M 9/13	Large Biological Molecules I	5		Enzymes
W 9/15	Large Biological Molecules II	5		
M 9/20	Catch up/Review/Cells	6		Microscopes & Cells
W 9/22			**Exam I Chapters 1-5**	
M 9/27	Cells I	6		Diffusion/osmosis I
W 9/29	Cells II	6		
M 10/4	Membrane structure & function I	7		Diffusion/osmosis II
W 10/6	Membrane structure & function II	7		
M 10/11	Metabolism	8		Tissues
W 10/13	Cellular Respiration I	9		
M 10/18	Cellular Respiration II	9		Cell respiration
W 10/20	Photosynthesis I	10		
M 10/25			**Exam II Chapters 6-9**	Photosynthesis
W 10/27	Photosynthesis II	10		
M 11/1	Cell communication, Cell cycle	11, 12		Mitosis
W 11/3	Mitosis	12		
M 11/8	Meiosis I	13		Meiosis
W 11/10	Meiosis II	13		
M 11/15	Mendelian Genetics I	14		Genetics I
W	Mendelian Genetics II	14		

11/17				
M 11/22	Chromosomal Inheritance I	15		Genetics II Gel electrophoresis lecture
W 11/24	No Class			
M 11/29	Chromosomal Inheritance II	15		DNA
W 12/1			**Exam III Chapters 10-15**	
M 12/6	DNA Structure & Function I	16		DNA Structure & Function II (Chpt 16)
W 12/8	DNA $\rightarrow$ protein II	17		DNA $\rightarrow$ protein I (Chpt 17)
M 12/13	Biotechnology	17		Final Exam Review
W 12/15	Final Exam (cumulative)		**Final Exam (cumulative)**	

* Tentative schedule. Any announcements made in class supercede this schedule.

Course Objectives:

1.   Distinguish between living organisms and non-living things by describing the features and characteristics of life.

2.   Using the procedure and terminology, describe the scientific method through examples.

3.   Identify the principal elements that make up the body, give their chemical symbols and summarize the main functions of each.

4.   Demonstrate knowledge of the atomic structure and its relationship to the interaction of atoms to form molecules.

5.   Demonstrate knowledge of ionic, covalent and hydrogen bonds and give examples of each. Compare them in terms of the mechanisms by which they are formed and their relative bond strengths.

6.   Define pH in terms of hydrogen ion concentration and be able to identify any given pH as acid, base, or neutral and discuss their properties. Describe how pH changes are minimized by buffers.

7.   Describe the types and functions of organic and inorganic compounds found in the body.

8.   Demonstrate knowledge of the cell organelles and their functions.

9.   Demonstrate knowledge of the various mechanisms of active and passive transport relative to the plasma membrane.

10. Discuss the effect of the first and second laws of thermodynamics and relate how they affect organisms and the ecosphere.

11. Explain the composition, classification, and function of enzymes. Explain and describe factors influencing an enzyme's regulation.

12. Define and explain anabolic and catabolic mechanisms. Explain how anabolic and catabolic reactions are essential to a cell.

13. Explain how chemical energy (ATP) is released by respiratory processes (anaerobic and aerobic).

14. Explain the process of photosynthesis.

15. Demonstrate knowledge and comprehension of mitosis and meiosis.

16. Explain the role of genes in inheritance and how they are passed from one generation to the next.

17. Demonstrate knowledge of the Mendelian Laws of Genetics and solve genetic problems involving monohybrid and dihybrid crosses.

18. Demonstrate knowledge of the various forms of gene interaction.

19. Discuss some common forms of human genetic disease.

Topic Outline

I. Life and science
  a. Life
  b. Characteristics of life
  c. The scientific method
  d. Development of the scientific attitude
  e. Biology today
  f. Biology as a science

II. Chemistry
  a. Matter and elements
  b. How elements differ
  c. Structure of matter
  d. Election arrangement
  e. Electron arrangement vs. Reactivity
  f. Chemical bonding
      1. Ionic bonding
      2. Covalent bonding
          a) polar
          b) non-polar
      3. Hydrogen bonding
      4. VanderWaals Forces
  g. Inorganic compounds
      1. Acids
      2. Bases
      3. Salts
      4. Water
  h. Organic compounds
      1. Carbohydrates
      2. Lipids
      3. Proteins
      4. Nucleic acids

III. Cells
  a. The cell theory
  b. The cell and its parts (structure and function)
      1. Membrane
      2. Endoplasmic reticulum
      3. Ribosomes
      4. Golgi complex
      5. Mitochondria
      6. Vacuoles
      7. Plastids
      8. Centrioles
      9. Cilia and flagella
      10. Nucleus
  c. Prokaryotic and eukaryotic cells
  d. Compare and contrast between plant an animal cells;

IV. The cell membrane/wall
 a. The cell membrane/wall structure and function
 b. The transport of materials across the membrane
  1. Passive transport
   a) osmosis
   b) diffusion
   c) dialysis
  2. Active transport
  3. Endocytosis
   a) pinocytosis
   b) phagocytosis
  4. Exocytosis
  5. Filtration
V. Energy transformations
 a. Chemical directions
  1. The first law of thermodynamics
  2. The second law of thermodynamics
  3. Entropy and enthalpy
 b. Cells energy
  1. ATP
 c. Metabolism
  1. Anabolic reactions
  2. Catabolic reactions
 d. Enzymes
  1. Characteristics
  2. Chemical and physical properties
  3. Classification
  4. Action
  5. Inhibition
 e. Cellular respiration
  1. Glycolysis (aerobic and aerobic respiration)
  2. Transfer reaction
  3. Kreb's cycle (citric acid cycle)
  4. Electron transport chain and chemiosmosis
  5. Fermentation
 f. Photosynthesis
  1. Requirements
  2. Light reaction (photophosphorylation)
  3. Dark reaction (carbon fixation)
VI. The cell cycle
 a. Control of cycle
  1. Cancer
 b. Interphase
  1. (GI) Gap I phase
  2. (S) Synthesis phase
  3. (GII) GapII phase
 c. Mitosis
  1. Prophase
  2. Metaphase

3. Anaphase
4. Telophase
  d. Meiosis
      1.   Gametogenesis
          a)   spermatogenesis
          b)   oogenesis

VII.   Genetics
    a. Genes
        1. Composition
        2. Function
    b.   Chromosomes
        1. Structure
        2. Role
        3. Number
    c.   Mendelian inheritance
        1. Dominance
        2. Independent assortment
        3. Segregation
    d.   Monohybrid and dihybrid crosses
        1.   Homozygous organism
        2.   Heterozygous organism
        3.   Genotype
        4.   Phenotype
        5.   Alleles
        6.   Dominance
        7.   Recessive
    e.   Laws of Probability
        1.   The sum law
        2.   The product law
        3.   Application
    f.   Gene interaction
        1.   Incomplete dominance
        2.   Epistasis
        3.   Codominance
    g.   Quantitative genetics
        1.   Polygenic inheritance
        2.   Multiple alleles
        3.   Pleiotropy
    h.   Sex-linked traits
        1.   The sex determining chromosome
        2.   X-linked (and influenced) genes
          a)   color blindness
          b)   hemophilia

        3.   Y-linked genes

VIII. Human genetics

    a.   Chromosomal abnormalities
        1.   Irregular numbers (aneuploid)
        2.   Monosomic cells
        3.   Trisomic cells
    b.   Genes and disease
        1.   Sickle cell
        2.   Cystic fibrosis
        3.   Neurofibromatosis
        4.   Huntington disease
        5.   Tay-Sachs disease
        6.   PKU
        7.   Trisomy 21 (Down's syndrome)
        8.   Turners syndrome
        9.   Kleinfelters syndrome
        10. Super male
        11. Meta female
    c.   Chromosomal aberrations
        1. Mutation
        2. Deficiency
        3. Duplication
        4. Inversion
        5. Translocation

IX.   DNA and the genetic code

    a. Protein synthesis
        1.   DNA
        2.   Transcription
        3.   Translation

X.   Gene regulation (operon theory)

    a. Operator region
    b. Promoter region
    c. Regulator gene
    d. Structural gene