BIO K121: General Biology I, Spring 2016
Three Rivers Community College, Norwich, CT
Instructor: Sarah B. Selke, Ph.D.
Office Hours (C214): Mondays 1:15 – 2:45pm, Tuesdays 2:30 – 4pm
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Required Text:
Biology How Life Works, 1st edition, Morris et al, 2013, Volume I
Textbook and access code to LaunchPad, the textbook website, are required.

Course Prerequisites:
CHE K111 or CHE K121, either course with a "C" grade or better; ENG K101 placement or ENG K100 passed with a "C" grade or better; or permission of the Department Chair.
If a student has not met the above chemistry prerequisite, the student may take BIO K121 by concurrently taking CHE K111 or CHE K121.

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

This course is a web-enhanced course, which means that some required activities are conducted online in our Blackboard Learn course shell and on the textbook website.

- The Blackboard portion of the course can be accessed through **http://my.commnet.edu/.** There are two course shells associated with this class, one for lab and one for lecture. **All online course information is in the lecture shell.**
- LaunchPad is the name of the textbook website. The website can be accessed at http://www.macmillanhighered.com/launchpad/morris1e/3052789

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, contact a classmate to obtain the notes. You will be responsible for reviewing the material on your own. I will meet with you to answer any questions that you have once you have obtained the class notes and studied the material on your own.
Due to scheduling issues, it is unlikely that a missed lab can be made up.
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 (online) = 120 points
In-class quiz, tests & final = 430 points
Labs = 450 points

No individual extra assignments will be given.

- **Grading for pre-class quizzes (120 points)**

  There is a pre-class quiz associated with each chapter in the textbook and with two labs. Lecture quizzes are conducted online through LaunchPad, the textbook website. Lab quizzes are conducted online through Blackboard. Each quiz must be taken **before** coming to class or lab. **Pre-class quizzes are open-book and time-unlimited.** Each of the quizzes is worth 8 points, and there are approximately 18 quizzes over the course of the semester. The highest 15 quizzes will be counted for a total of 120 points.

  15 pre-class quizzes x 8 points each = 120 points

- **Grading for Tests, In-class Quizzes & Final (430 points)**
  There are three tests each worth 80 points. Each test may consist of multiple-choice questions, fill-in-the-blank, matching and/or short answer.

  There are two quizzes each worth 40 points. Each test may consist of multiple-choice questions, fill-in-the-blank, matching and/or short answer.

  The final is worth 150 points. It may consist of multiple-choice questions, fill-in-the-blank, matching and/or short answer. **The final exam is cumulative.** The final exam is scheduled for Tuesday, May 17th during your normal lab time.

  A #2 pencil is required for each exam. This item will not be supplied in class.

  The final exam must be taken to pass this course.

  3 chapter tests = 240 points (80 points each)
  2 quizzes = 40 points (20 points each)
  1 final @ 150 points = 150 points
  Total = 430 points

- **Grading for Lab (450 points)**
  There are eleven graded lab activities. Your lab assignment is due at the beginning of the following lab period. Each lab is worth 45 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. You are allowed one late lab with no penalty (your "oops" lab). **No late labs will be accepted once the corrected labs are returned.**

  10 labs x 45 points each = 450 points

- ***Learning Curve Activities (45 points)***
  Learning Curve activities for each chapter have been assigned on LaunchPad. Each activity is worth 5 points. ***Your total points for these activities, up to 45 points, may be substituted for one lab.***

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

A partial example:

Points assignment is worth	Points I earned
8 (a quiz)	8
45 (a lab)	37
90 (a test)	80
Total = 143	Total = 115

103/143 = 0.80 = 80% = B-

Make-ups:
Make-up quizzes & exams will be granted on an individual basis only following a conference with the instructor. **All make-ups must be completed within a week of the original exam date.** Please be aware that the format of any makeup 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 quiz or test taken by the rest of 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. There will be no make-up for the Lab Practical.**

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 **May 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 a counselor in the Student Services Development Center (A-wing, first floor).

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.

Blackboard Learn & your TRCC email address:
Your Blackboard Learn courses are automatically connected to your college-provided email account. For more information about this email account, visit the college home page and click the "New student email" button. This email account is the only official electronic means that the college will communicate course and non-emergency information to you. Make sure that you check it weekly at a minimum. Another option is to set up to forward your email from the college address to your preferred address. **Important class information is frequently communicated through the Blackboard Learn email function.**

myCommNet Alert:
myCommNet Alert is a system that sends text messages and emails to anyone signed up in the event of a campus emergency. Additionally, TRCC sends messages when the college is delayed or closed due to weather. All students are encouraged to sign up for myCommNet Alert. A tutorial is available on the Educational Technology and Distance Learning Students page of the web site.
http://www.trcc.commnet.edu/div_it/educationaltechnology/Tutorials/myCommNetAlert/MIR3.html

Digication:
As a student you will maintain an online learning portfolio using a college-designed template in Digication. Through this electronic tool you will have the opportunity to monitor your own growth in college-wide learning. It may even help you determine a major that is best suited to you. You will be able to keep and maintain your learning portfolio after graduation. A Three Rivers General Education Assessment Team will select and review random works to improve the college experience for all. If your work is selected and reviewed for assessment purposes, it will remain anonymous and private. Digication provides a "place" where you will connect your learning from the classroom, college, and life in general. Sometimes when you review all of the work you have done and think about it, you end up learning something different and perhaps unexpected. Please review your course outlines to determine what assignments to upload into the TRCC Digication template and please post your own choices, as well. Have fun in learning!

Policies described in this syllabus may change. Any policy change will be described in writing and distributed in class and electronically. Policy changes are not applied retroactively.

BIO 121 Spring 2016 Class Schedule*/Selke

Day #	Date	Topic	Textbook Chapter	Exams	Lab (Tuesday)
1	M 1/25	Introduction	1.1 – 1.4		Nanobacteria – Case Study
2	W 1/27	Chemistry & Water	2.1 – 2.3		
3	M 2/1	Carbon & Organic Molecules	2.4 – 2.5		Atoms and Molecules
4	W 2/3	DNA & Transcription	3		
5	M 2/8	Transcription con't Proteins & Translation	4		**Quiz – Chemistry** Transcription & Translation Lab
6	W 2/10	Proteins & Translation	4		
	M 2/15	**No class**, President's Day			Enzymes
7	W 2/17	Cell Membranes, O & D	5.1 – 5.2		
8	M 2/22			**Test 1 Lectures 1 - 6**	Osmosis/Diffusion I
9	W 2/24	Cell Compartments	5.3 – 5.5		
10	M 2/29	Energy, Enzymes	6		Osmosis/Diffusion II Lecture (catch-up)
11	W 3/2	Cellular Respiration I	7		
12	M 3/7	Cellular Respiration II	7		Photosynthesis & Cell Respiration
13	W 3/9	Photosynthesis I	8		
14	M 3/14	Photosynthesis II	8		Microscopes I (Cells)
15	W 3/16	**Quiz** – Cell Respiration Photosynthesis III	8		
Spring Break 3/19-3/27					
16	M 3/28	Cell Communication	9		Microscopes II (Tissues)
17	W 3/30			**Test 2 Lectures 7 - 15**	
18	M 4/4	Cell Form & Function	10		Mitosis & Meiosis I
19	W 4/6	Cell Division I	11		
20	M 4/11	Cell Division II	11		Mitosis & Meiosis II Prep for Lab Practical
21	W 4/13	DNA Replication	12		

22	M 4/18	DNA Manipulation	12		**Lab Practical** Prep for Gel Electrophoresis
23	W 4/20	Genomes	13		
24	M 4/25	Mutation & DNA Repair	14		Gel Electrophoresis lab Lecture (catch-up)
25	W 4/27	Genetic Variation	15		
26	M 5/2			**Test 3 Lectures 16 - 24**	Genetic Variation lecture Genetics I
27	W 5/4	Mendelian Inheritance	16		
28	M 5/9	Mendelian Inheritance	16		Genetics II, Lecture
29	W 5/11	Non-Mendelian Inheritance	17		
30	M 5/16	Genes & Environment	18		
	T 5/17	Final Exam (cumulative)		**Final Exam (cumulative)**	**Final Exam (cumulative)**

*** Changes to this schedule will be announced in class.**

There are eleven graded lab activities. Some of these activities take two lab periods to complete.

1. Nanobacteria (Scientific Method)
2. Atoms & Molecules
3. Transcription & Translation
4. Enzymes
5. Diffusion & Osmosis (two week lab)
6. Photosynthesis & Cellular Respiration
7. Microscopes (two week lab, Cells & Tissues)
8. Mitosis & Meiosis (two week lab)
9. Lab Practical
10. Gel electrophoresis
11. Genetics

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

*** NOTE: Class lectures will present this information in a different order.**

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