BIOL 1114 Introductory Biology - Summer 2009

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NATURE OF THE COURSE: This course introduces students to the integration between structure and function among all levels of biological organization. Students will learn to apply principles of evolution, genetics, physiology and ecology to understanding the integrated and interdependent nature of living systems through discussions that emphasize the process of science. Observation and investigation are emphasized in both lecture and lab.

OBJECTIVES: We want you to learn and be able to apply certain basic biological concepts and research skills. These are listed in a **knowledge checklist** that you can find on our website (see below). You can use this very detailed list as a **study guide** to help you keep track of what you need to know.

REQUIRED TEXTS:
Hoefnagels, M., 2009. ***Biology: Concepts and Investigations. 1st edition.*** McGraw-Hill: NY. (also as an e-book at http://store.vitalsource.com/show/9780072916904 see http://biol1114.okstate.edu/ebook.html for an explanation
French, D. 2008. ***Investigating Biology: A Laboratory Resource Manual***. ***2008 edition*** Fountainhead Press: Fort Worth.
1 pkg. **5x8"** index cards, one side lined
------- Note there is a fee for laboratory equipment/supplies charged to your bursar-----

RECOMMENDED:
Lawson, A. 1995. *Studying for Biology*. Benjamin/Cummings:NY
This book has particularly useful suggestions for test-taking and general studying suggestions. It explains how to "think like a scientist," a valuable, perhaps essential, skill in this course. It discusses scientific method, hypothesis formation and making predictions as you will need to do in lab and lecture. It outlines important points associated with some of the major theories in biology and provides tutorials for improving your critical thinking skills.
Pechenik, J.A. 2001. *A Short Guide to Writing about Biology*. 4th Edition. (or later) Longman:NY. This is an excellent companion to help you with writing lab reports. It explains in great detail what you should put where, how to describe your data, the format for your literature cited, suggestions for clearer writing, and many other important points. For those continuing on in science, this is a valuable reference book discussing term papers, poster sessions, letters of application, research proposals and gives suggestions that may help you improve all sorts of other written or oral communication.

ATTENDANCE: You are expected to attend both lab and lecture, arrive on time and stay for the entire period. **Missed labs or assignments CANNOT be made up, but additional points are available as explained under Grading (below).**

EXAMS:
Four exams are scheduled: Three (3) before the final exam and one (1) final. **Exams will be held every 2 weeks!!** We are very concerned about students who miss an exam. Please see our policy under Grading (below). All exams cover both theory and lab experiences and are cumulative; e.g., questions on exam 3 will test material covered before exam 1 and 2. Exam questions will typically require interpretation of data and application of concepts rather than rote memory. While emphasis will be placed on material specifically discussed in lecture, exams will also include questions covering other assigned materials and readings. Read all questions and answers *carefully* before choosing the single BEST response for each question. Feel free to ask the instructor present for clarification.
You must bring a **NCS Answer Sheet** (Available in the bookstore), and a **#2 lead pencil,** to each exam.

GRADEBOOK: We use Desire2Learn (D2L) as an electronic gradebook. All grades will be entered and visible there. Lab grades will be posted approximately one week after assignments are returned to you in lab. You have 5 days from the release of **any** grade to report a grade discrepancy to the appropriate instructor or it may not be changed.

DROP POLICY: See Catalog Registration & Records Section and dates on schedule.

ACADEMIC INTEGRITY: Make sure to read details on page 3 below**.**

SPECIAL NEEDS: If you have a documented disability and need special accommodations of any nature, I will work with you and the Office of Student Disability Services, 315 Student Union, to provide reasonable accommodations so that you have a fair opportunity to perform successfully in this class. Please let me know about any necessary accommodations by the end of the first week of class.

LECTURE: This portion of the course will combine mini-lectures, discussions, individual and group activities, multimedia presentations, and demonstrations to give you the opportunity to learn biological concepts in as active a manner as possible. Each segment of the course is structured around one or more scenarios - case studies or story lines that can be interpreted or solved by applying selected biological concepts. You will have the opportunity to accumulate up to 70 points toward your final semester grade from individual or group activities. **There are no "make ups" for specific assignments (see Grading below).** You may not earn credit for these if you are absent, do not turn in an assignment when it is collected, do not sign your own name on the assignment, if your group number is not on the assignment, or if the assignment is not in the requested format. It is your responsibility to insure that these are done correctly. You also may not earn credit for an assignment if the instructor determines you did not contribute toward the completion of the activity as a result of any number of inappropriate behaviors in class (i.e. sleeping, texting, reading the newspaper, irrelevant conversation). Lastly, not all lecture assignments will contribute toward your final grade.

LAB: This portion of the course offers the opportunity for students to explore and apply concepts to answer research questions. Success in the laboratory involves teamwork in designing and conducting experiments, performing pre-lab and lab activities and report writing. While you will be given the entire lab period to complete your experiments and lab reports, because each lab group's experiments will vary in duration, you are not required to remain in lab after you turn in your report. Additional details about lab are in the lab syllabus.

GROUPS: While taking exams is an individual activity, almost all other activities will involve your participation with other class members in a group. Permanent groups will be formed in the first week. Groups will produce weekly lab reports AND complete their lecture exercises collaboratively. **Peer evaluation** will affect your lab grade – See your lab manual for further information.

WEBSITE: A variety of materials are available on our website – **http://biol1114.okstate.edu.** These include exams from past semesters, study guides, flow charts, outlines, note-taking aids, a knowledge checklist, and tutorials. You will also find the reading assignments for each scenario (lecture topics), lab study guides and many of the computer-based pre-lab assignments here. You will need your Okey ID and Prism password to access the tutorials and pre-lab exercises.

LEARNING RESOURCES CENTER (LRC): Room 303 in LSW is staffed by the teaching assistants for the course and is open MW 10:15am-3:00pm. Various materials there will help you understand lecture and lab – including **all pre-lab materials**. The instructor on duty will be happy to help you prepare planning forms or study for the tests. Students who go there do better in this class!

ACADEMIC INTEGRITY: We follow the OSU policies on Academic Integrity (http://osu.okstate.edu/acadaffr/aa/academicintegrity.htm) and the Cheating & Plagiarism section (pp.G4 – G7) of your lab manual (French, D. 2008. *Investigating Biology: A Laboratory Resource Manual*). A "first" offense (in this course or any other course during your time at OSU) will result in either a Level 1 (a "0" for the assignment) or Level 2 (an "**F!**" for the course) sanction as described in the OSU Academic Integrity Policy. A second violation (in this course or any other course during your time at OSU) is an automatic Level 2 sanction. Any violations beyond a Level 2 sanction (**F!**) will result in an automatic suspension for no less than one year (fall/spring & summer semesters). **ALL** violations and sanctions become a part of you permanent academic record! **Be sure that you have read and understand this new policy as the penalties for violations of Academic Integrity are very serious.**

In addition to the policies described in the above sources, some examples of violations of Academic Integrity more specific to this course include, but are not limited to, the following:

- You may not use, as part of your groups' report, any part of a lab report not produced by your group in the current semester. This is considered **unauthorized collaboration and plagiarism**.

- While you may talk with your group members about planning form or pre-lab materials, your planning form and pre-lab answers should represent your personal work in the current semester. Copying answers, or allowing others to copy answers, from either present or past works or having someone fill in your forms for you, is considered **unauthorized collaboration and cheating**. This includes copying your own work from previous semesters (multiple submissions).

- Identically written (or highly similar) answers (e.g. identical hypotheses) are also considered **cheating**, although some similarity will be acceptable if it is clear to the Teaching Assistant that in all other ways the work is representative of each individual student.

- **To avoid** the violation of unauthorized collaboration with currently enrolled students on planning forms, you must write the name and section number of your collaborators on your planning form; excessively similar answers may result in reduced credit.

- Possessing lab materials (including lab manuals, lab reports, planning forms, pre-lab exercise answers) from prior semesters or from other students is considered **unauthorized collaboration.**

- Using information exclusively found in prior editions of the laboratory manual is unacceptable. If such materials appear in a lab report or planning form, it will be considered **unauthorized collaboration.**

- Submitting in-class exercises with the names of members not present in class is considered **cheating** by all group members whose names appear on the exercise. Each member of a group must write his/her own name on materials submitted by the group.

- Possessing a student response pad ("clicker") other than the one assigned to you is considered **unauthorized collaboration and cheating**.

- Misidentifying the exam version (star or no star) by indicating the incorrect version on the form or placing it in the alternate group for grading is considered **cheating**.

- Possessing a form of the exam during the examination period that is inconsistent with the assigned distribution of exams as indicated during the examination period is considered **unauthorized collaboration and cheating** by all affected individuals.

- Access to any electronic devices (for example cell phone, PDA, calculator, portable multimedia devises such as an ipod, electronic dictionaries) during an exam without explicit prior permission is considered **cheating.** All such devices must be turned off and out of sight or reach.

- Students who take a conflict exam may not possess a list of their answers, have copies of their exams, or communicate any information about the exam to other students, until after the normally scheduled exam is completed. To do so is considered **unauthorized collaboration and cheating.**

Schedule

Date	Week	Scenario	Lab Topic
June 8-11	1	**Psychics and Scientists**: A series of short scenarios will center on distinguishing science from non-science, a faculty research question, analysis of class score data, and what is a theory?	Tu: no lab
June 10-11		**Surviving Fire and Ice**: The scenario focuses on surviving in desert and tundra and adaptations for thermoregulation and water retention.	Thu: Why are larger *Quattro variegatus* eaten more frequently than smaller ones?
June 15-18	2	**Out of the Rain Forest**: An aboriginal fishing expedition in the rain forest is explored in terms of the action of a toxin produced by plants. Pesticides, coevolution, and cell respiration will be discussed.	Tu: Why are animals shaped differently in cooler climates than in warmer ones?
			Thu: Why do certain animals eat more at certain temperatures than others, or than they do at other temperatures?
June 22	**3**	**Exam #1 – Covers Topics from Scenarios 1-3**	
June 23-24		**Chemical Defenses**: A Nigerian child eats a poisonous bean, which requires extraordinary treatment by the local physician, framing investigation of cell membrane structure, secretion, intercellular communication, and neurons.	Tu: Why is diffusion through a membrane sometimes faster?
June 25, 29		**Marooned in the Galapagos**: This trip raises questions about what makes a species or organism successful. Attention to the physical character of these desert islands and animals living there highlights natural selection in action.	Thu: Why do certain cells contain more of certain structures than do others?
June 30 – July 2	4	**Rainbow Connection**: A scuba diving botanist is sent by the Smithsonian to collect algae. Blood is spilled and the biological uses of colored light, including photosynthesis, are explored.	Tu: Why do certain finches survive and reproduce more than others under various conditions of food availability?
			Thu: Why do plants grow better under certain lighting conditions than others?
July 6	**5**	**Exam #2 – Covers Topics from Scenarios 1-6**	
July 7-9		**Emerging Diseases**: On the Amazon we meet the Yanomami amidst a breaking TB epidemic, raising the roles of symbiosis, population dynamics and evolution in development of epidemics.	Tu: Why do plants transpire water faster under certain environmental conditions?
			Thu: Why do some populations of bacteria become resistant to antibiotics?
July 13-16	6	**Family Reunion**: A family reunion opens the door to talk about cancer, DNA, protein synthesis, genetically determined diseases and biotechnology. **17 July – Last day to drop with "W"**	Tu: Why can some bacteria produce a color that others cannot?
			Thu: Why is a new population of people exhibiting disease symptoms?
July 20	**7**	**Exam #3 – Covers Topics from Scenarios 1-8**	
July 21-23		**Hogs & Chickens**: Statistics about concentrated animal feeding operations raise questions about nutrients in biogeochemical cycles, the effects of livestock and people on aquatic systems.	Tu: Why are invertebrate species disappearing from Clearwater Creek?
			Thu: Why is there less oxygen in some streams than others?
July 27-29	8	**Why We Care about Fat**: our contemporary preoccupation with fat sets the scene for a discussion of fat metabolism, its genetic, nervous and hormonal control, and behavioral implications.	Tu: Why do some guppies attract more mates than others?
			Thu: no lab
July 30	**8**	**Final Exam – Covers Topics from all Scenarios**	

GRADING:

Component	Format	Available Points	Maximum Points allowed	Notes
Lecture Activities	1-5 pt. quizzes/ homework	About 75-80	70	Can earn only 70 pts in this category
Exam 1	40 2-pt. questions	80	80	All exams are cumulative; Each tests over ALL material covered previously.
Exam 2	40 3-pt. questions	120	120	
Exam 3	40 3-pt. questions	120	120	
Final Exam	50 4-pt. questions	200	200	
Lecture	**Subtotal:**	About 600	590	Can only earn 590 points in the lecture portion
Planning form	10-pt write-up	130	130	Must be turned in by 3:00 pm the day before lab.
Lab Reports	20-pt report	280	280	Must be turned in BEFORE you leave lab and CANNOT BE MADE UP.
Extra Credit opportunities in lab	Pre-labs, Optional experiment components	More than 100		These serve as "disaster insurance" against absences and undesirable performances.
Lab	**Subtotal:**	More than 510	410	Can only earn 410 points in the lab portion.
	TOTAL:	Approximately 1,110	**1,000**	

What do you do if you miss an exam?

We are very concerned about students who miss an exam. Students who miss an exam are typically under stress (e.g., personal or family tragedy, unavoidable personal obligation); therefore we developed the following policy to avoid creating a more stressful situation for students. **If you miss any of the first three exams** and notify me within 2 days, I will use the final exam to determine a substitute grade for the missed exam. **If you miss the final exam** and notify me within 24 hours, the grade of "I" (Incomplete) will be assigned, if you are passing the course at that point. You may remove the "I" by taking the final exam for BIOL 1114 in the following semesters, i.e., in fall of 2009 or spring of 2010. If you miss an exam and do not notify me, you will be assigned "0" for the exam grade.

What do you do if you miss an in-class exercise or homework assignment?

Specific exercises or assignments cannot be made up or submitted late. However, there will be, 75-80 points offered, although only 70 pts will be used in calculating your grade. This way you can accumulate points even if you have to miss one of these for ANY reason. Use every opportunity early and throughout the semester to complete these activities to be sure that you will have 70 pts. by the end of the semester.

What do you do if you miss a lab?

We created **Disaster Insurance** for just such circumstances. Like other insurance, it is there to reduce your stress during adversity. Disaster insurance is made up of the extra-credit opportunities, such as weekly pre-lab activities and optional items that you can include in your lab reports. You use these extra credit opportunities to bank points to be used against foreseen or unforeseen absences during the semester. If you complete these throughout the semester, you will have earned the points you might need if disaster strikes and you are forced to miss a lab or if you have not earned as many points on a lab report as you wanted. Remember - you CANNOT attend other lab sections – the ONLY way to earn points for labs you miss for ANY reason is by using your laboratory disaster insurance!

No last-minute offers of extra-credit are made in this course. Pay your premiums - use the extra-credit opportunities early in the semester!

Grading Scale

A	90 to 100%	900 to 1000 pts
B	80 to 89.9%	800 to 899
C	70 to 79.9%	700 to 799
D	60 to 69.9%	600 to 699
F	< 60%	0 to 599

Common Themes

The emphasis in this course is on your seeing biological principles in a context so that you can learn to apply the concepts in a novel situation. There are several common themes, threads or principles that we feel are important enough to repeat in various contexts. These include:

I. **"Scientific Method"** or your ability to state a hypothesis, design an experiment and interpret data.

II. **Surface-to-Volume ratio**. This ratio is fine tuned by natural or artificial selection so that an optimum ratio is achieved that maximizes or minimizes (as needed) the rate at which some material is gained or lost.

III. **Gradients** - Living things create or respond to these differences in concentration or amount of a substance over some area. You need to know how gradients are created in certain instances and/or what occurs when the gradient is present or absent.

IV. **Laws of Thermodynamics**. You need to know the rules that apply to energy and its transfer. You need to know what phenomena these laws help explain and how they help shape our understanding of how chemical reactions can be related.

V. **Protein structure and function and their use in membranes**. You need to know what effect changing a protein's shape has on the protein and what controls change. You need to know what functions proteins serve when they are positioned in membranes and how these functions are achieved.

VI. **Natural Selection.** You need to understand how this process leads to all of the adaptations we talk about. You need to understand its action and result in every scenario. You need to know fitness is involved. You need to understand and identify trade-offs in the costs and benefits that exist in every adaptation, structure or function.

VII. **Homeostasis** - The tendency to maintain a constant internal environment between limits or to return things to normal dictates what living systems do. You need to recognize where that happens in our investigations.

VIII. **Metabolism** - Chemical and energy transformations appear in several scenarios and are an essential characteristic of all living things. You need to know where and when this is applied and discussed. You need to understand the metabolic processes we discuss.

IX. **Inputs and Outputs**. This is not a principle, but it is a recurring theme in our discussions. You need to know what is the result or product of some certain processes or reactions. You need to know what are the starting ingredients or conditions or reactants when a process or reaction occurs. We frequently will ask you to explain or list these.

X. **Interfering with the System**. This too is a recurring theme in our discussions - what would happen if some system or process were broken or blocked? What would not happen?

This list may or may not help you in studying; we think it should and hope it does. It is not meant to be all inclusive or tremendously detailed. There may be themes you will see that we have not listed. You should however recognize the items discussed and understand how they provide answers to the types of questions we ask.

We hope you will enjoy working through the different scenarios and that you will learn from doing so. We wish you the best of luck in this course. Don't hesitate to call on any of us for help.

–The BIOL 1114 Faculty

BIOL 1114 Student Information Sheet Summer 2008

You are required to sign and return this sheet to me, acknowledging that you have received the syllabus.

NAME (PRINT)_____ Lecture Section _____

I acknowledge that I have received and am responsible for the material in the class syllabus and that I will abide by the class policies, including those in the BIOL 1114 specific Academic Integrity Policy Statement.

NAME (SIGNATURE) _____