

Dr _____
 Dept. Office: _____ (My mailbox is there.)
 OFFICE HOURS: _____

My Office: _____
 Phone: _____
 Email: _____

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.

REQUIRED TEXTS: Lewis, R., et al. 2003. *Life. 5th edition*. WCB/McGraw-Hill: NY.
 French, D. 2004. *Investigating Biology: A Laboratory Resource Manual. 7th edition*
 Fountainhead Press: Fort Worth.
 1 pkg. 5x8" index cards, one side lined
 ----- Note there is a \$12 fee for laboratory equipment/supplies -----

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. For those continuing on in science, this book provides a summary of many areas of biology as well as providing suggestions and tutorials for improving your critical thinking skills.

Pechenik, J.A. 2001. *A Short Guide to Writing about Biology*. 4th Edition.
 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.

Latourelle, S.. 2004. *Student Study Guide to Accompany Life 5th ed*
 By R. Lewis. WCB/McGraw-Hill: NY. This is a very basic and general study guide offering practice problems correlated with the material in the text.

ATTENDANCE: You are expected to attend both lab and lecture. Do arrive on time and stay for the entire period.
A missed lab CANNOT be made up except by using your "disaster insurance" – see below.

EXAMS: Four exams are scheduled: 3 throughout the course before final exam week and 1 during finals week. The dates are noted on the attached schedule. We are very concerned about students who due to circumstances 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 one of the first three exams, the final exam will be used to determine a substitute grade for the missed exam. If you miss taking the final exam and you let me know that you have missed it, the grade of "I" will be assigned if you are passing the course at that point. You may then remove the "I" by taking the final exam for BIOL 1114 in one of the 2 following semesters, i.e., in spring or summer of 2005. If you miss the final exam and do not notify me, you will be assigned an "F" for the final exam grade.

All exams cover both theory and lab experiences and are cumulative; questions on exam 3 may deal, e.g., with material covered before exam 1 or 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.

All exams are "in common," i.e., everyone taking this course this semester, regardless of instructor, takes the same exam at the same time. Those dates and times (5:30 pm) are listed for each exam. (If you have a conflict with another common exam, let me know ASAP.)

Compensation time for taking these 3 exams at 5:30 occurs in the 3-hr lab period when no lab is scheduled.

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You must bring a **NCS Answer Sheet** (Available in the bookstore), a **#2 lead pencil**, and **your student ID** to each exam. The exams are usually NOT scheduled for the room where you attend lecture/theory. Be sure you know where to take your exams. Check your syllabus early.

DROP POLICY: See Catalog Section 5.4 and dates on schedule.

ACADEMIC DISHONESTY: You should have read and now understand the O.S.U. policies on academic dishonesty. The penalty for ANY act of dishonesty in this class, including cheating and plagiarism, is a grade of ZERO on the assignment and academic discipline as warranted in accord with university guidelines. Do not even think of cheating.

SPECIAL NEEDS: If you have a disability and need special accommodations of any nature, I will work with you and the Office of Disabled Student 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 your disability and the accommodations you desire by the end of the second week of class.

LECTURE/THEORY: This portion of the course will combine mini-lectures, discussions, group activities, multimedia presentations, and other demonstrations and activities to give students an 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 vignettes that can be interpreted or solved by applying selected biological concepts. You will have the opportunity to accumulate up to 60 points toward your final semester grade from unannounced group activities (no makeups). It is your responsibility to insure that your name is on each in-class assignment when you are present.

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.

COURSE GROUPS: While taking exams is an individual activity, almost all other activities will involve your participation with two other class members in a group. Groups will form in the first week's lab. Groups will produce their weekly lab reports AND complete their lecture exercises collaboratively.

COMPUTER-MEDIATED COMMUNICATION: A class listserv:

BIOL1114-_____@listserv.okstate.edu (common e-mail address) will be used to supplement the traditional oral and written means of communicating. You are responsible for getting the information made available in this fashion. By sending to, replying to, or receiving e-mail from the listserv, you will be able to communicate to the entire class at once. You are also strongly encouraged to interact with the instructor and your classmates through this channel. Remember, however, that all messages posted to the listserv are sent to everyone. Be sure to send messages with any type of personal message directly to me at the e-mail address on this syllabus. Do not reply to a message from the listserv with any personal items.

WWW SITE: A variety of materials are available through the electronic Learning Resources Center. These include sample test questions, study guides, flow charts, outlines, tutorials and pre-lab exercises. It can be found at http://zoology.okstate.edu/zoo_lrc/biol1114. There are also additional ways to communicate with faculty and graduate students. **You will find the study guides and reading assignments for each scenario (lecture topics) and many of the computer-based pre-lab assignments here.**

LEARNING RESOURCES CENTER: Room 303 in LSW is staffed by the teaching assistants for the course and is open for extended periods throughout the week (See the schedule you will receive in lab). Various materials there will help you understand lecture and lab. Computers with tutorials for the course and sample test questions are available. There is also plenty of room for you to study with friends. The instructor on duty will be happy to help you understand any course-related material. Students who go there do better in this class!

Date	Week	Schedule Scenario	Lab Topic
23 Aug	1	Psychics and Scientists: A series of short scenarios will center on measurement of psychic phenomena, a faculty research question, a breath holding experiment, analysis of class score data, and what is a theory?	Larger <i>Quattro variegatus</i> are eaten more often because they are easier to see.
30 Aug	2	Surviving Fire and Ice: The scenario focuses on surviving in desert and tundra and adaptations for thermoregulation and water retention.	Body shapes influence the rate of heat gain or loss in a predictable way.
30 Aug		Last day to drop with no grade	
6 Sep	M	Labor Day: No Class	
6 Sep	3	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, cell membrane function and cell respiration will be discussed.	How is metabolic rate influenced by ambient temperature?
13 Sep	4	Out of the Rain Forest continued.	How do various factors influence the passage of materials through a membrane?
20 Sep	M	EXAM 1 at 5:30 pm in a room TBA	
20 Sep	5	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.	How can cell structure be used to identify cell type, function, or location?
27 Sep	6	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.	How does seed/nut diversity and abundance influence survival of birds with different beak types?
4 Oct	7	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.	How does the color of light influence plant growth?
11 Oct	8	Rainbow Connection continued	What factor(s) result in the greatest water loss from soil with plant cover?
18 Oct	M	Exam 2 at 5:30 pm. in a room TBA	
18 Oct	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.	Does drug type or UV radiation influence evolution of antibiotic resistance?
25-26 Oct		Fall Break! No class	
25 Oct	10	Emerging Diseases continued Family Reunion: A family reunion opens the door to talk about cancer, DNA, protein synthesis, genetically determined diseases and biotechnology.	No lab
1 Nov	11	Family Reunion continued	How can the genetic composition of bacteria be altered in the laboratory?
8 Nov	12	Family Reunion continued	How can genetic material be identified in the laboratory?

12 Nov	F	Last day to drop with automatic W	
15 Nov	13	Family Reunion continued Hogs & Chickens: Statistics about concentrated animal feeding operations raise questions about nutrients in biogeochemical cycles, the effects of livestock and people on aquatic systems and the history of sewage.	Does sewage affect benthic and algal species diversity in streams?
22 Nov	M	EXAM #3 at 5:30 pm in a room TBA	
22 Nov	14	Hogs & Chickens continued.	No lab
25-26 Nov	Th-Fri	Thanksgiving Break: No Classes	
29 Nov	15	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.	What leads to anoxia in polluted streams?
6 Dec	16	Why We Care about Fat continued.	On what basis do male or female guppies select mates?
14 Dec	T	FINAL EXAM at 4-5:50 pm in a room TBA	

GRADING: Component	Format	Available Points	Maximum Points allowed	Notes
Lecture Activities	1-2 pt. quizzes/ homework	About 65-70	60	Can earn only 60 pts in this category All exams are cumulative; Each covers ALL material studied, previously.
Exam 1	40 2-pt. questions	80	80	
Exam 2	40 3-pt. questions	120	120	
Exam 3	40 3-pt. questions	120	120	
Final Exam	70 3-pt. questions	210	210	
Lecture Subtotal:		About 600	590	
Planning form	Weekly 10-pt write-up	130	130	Can only earn 590 points in the lecture portion Must be turned in by 5:00 pm day before lab. Must be turned in BEFORE you leave lab and CANNOT BE MADE UP. These serve as "disaster insurance" against absences and undesirable performances.
Lab Reports	Weekly 20-pt report	280	280	
Extra Credit opportunities in lab	Pre-labs, Optional experiment components	More than 100		
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 in-class exercise or homework assignment?

In the lecture portion of the course, 65-70 points for in-class activities will be offered, although only 60 pts will be used in calculating your grade. We use this as a way for students to accumulate points even if they have to miss a class for ANY reason. Use every opportunity early and throughout the semester to complete these activities to be sure that you will have 60 pts. by the end of the semester.

What do you do if you miss a lab?

We created **Disaster Insurance** for just such circumstances. It allows students to miss a lab without worrying about it. 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 or 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 have appeared 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

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

NAME(PRINT) _____ Lecture Section _____

Phone Number _____ (optional: in rare cases I have found it important to contact a student.)

I acknowledge that I have received and am responsible for the material in the class syllabus.

NAME (SIGNATURE) _____