

BIOL 1114 Introductory Biology - Summer 2016

Instructor: **Emily Thaden**
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Office: **By appointment**
 Office Hours: **By appointment**

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**.

TEXTS: Required:

Connect eBook for Hoefnagels, M., 2015. *Biology: Concepts and Investigations. 3rd edition*. McGraw-Hill: NY.
 See link "[Where do I get an ebook?](http://biol1114.okstate.edu)" on <http://biol1114.okstate.edu> for instructions
 French, D. 2015. *Investigating Biology: A Laboratory Resource Manual. 2015 edition* Fountainhead Press: Fort Worth.
 1 pkg. 5x8" index cards, one side lined
Journal of Introductory Biology Investigations (you will receive a free subscription to this).

Recommended:

Pechenik, J.A. 2016. *A Short Guide to Writing about Biology*. 9th Edition. Pearson Longman Publishers: 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 discussing term papers, poster sessions, letters of application, research proposals and offering suggestions to help improve many other forms of written or oral communications.

ATTENDANCE: You are expected to attend both lab and lecture. Arrive on time and stay for the entire period. **See the specific actions you must take for missing a lab or lecture exercise under Grading (below).**

In the event of **University cancellation** – check <http://biol1114.okstate.edu> for instructions regarding lab.

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: To see your exam and manuscript grades early use the [check your grades](http://biol1114.okstate.edu) link on <http://biol1114.okstate.edu>. Lab grades will be posted approximately one week after final reviews are returned to you. We use Desire2Learn (D2L) as an electronic gradebook. All grades will be entered and visible there. You have 7 days from the posting 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: 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 second week of class. If **you have health related issues that may interfere with participation in certain labs** (see materials list on Lab Resources and Institution Page on the course website) you must provide documentation to your TA from the Office of Student Disabilities Services **no later than 14 days prior to that week's Investigation** so we can properly prepare accommodations.

- 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 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 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, do not put your group number on the assignment, do not have the assignment in the requested format, or do not bring your clicker (with working batteries) to class. It is your responsibility to insure that these are done correctly.
- LAB¹:** This portion of the course is structured to offer you the most **authentic research experience** we could. You will work in teams as part of “scientific research institutions” under the guidance of lab mentors to answer questions you select. Each three-week long investigation is related to or inspired by research conducted by past or current OSU faculty or students when possible. You will design and conduct experiments, analyze and interpret results, and author reports (each week) in the form of manuscripts. You will submit your manuscripts to be reviewed by experts, who will provide feedback (and evaluation), and have the unique opportunity to have them published in the online *Journal of Introductory Biology Investigations*, which was created for OSU students. You can add your articles to portfolios of your work to demonstrate your skills. Your results will be made available to researchers and future students to help them in their research. **Additional details about lab are in the lab syllabus and *Investigating Biology: A Laboratory Resource Manual*.**
- GROUPS:** 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> including exams from past semesters, study guides, flow charts, outlines, note-taking aids, a knowledge checklist, tutorials and scenario software. **You will find the reading assignments for each scenario (lecture topics), and the computer-based planning forms here.** You will need your **O-Key Account Username** and Prism password. You will need to download web players for certain items to run. For help with the website email: zool-tech@okstate.edu or visit the technical support office located in 213 LSW.

¹ Development of these investigations is supported in part by a grant to Oklahoma State University from the Howard Hughes Medical Institute through its Science Education Program.

ACADEMIC INTEGRITY: Be sure that you have read and understand this policy, as the penalties for violations of Academic Integrity can be very serious. We follow the OSU policies on Academic Integrity (<http://academicintegrity.okstate.edu/>) and the **Cheating & Plagiarism section (pp.G6 – G10) of your lab manual** (French, D. 2015. *Investigating Biology: A Laboratory Resource Manual 2015 Edition*). 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) may be upgraded to the next sanction level. ALL violations and sanctions become a part of a permanent educational record! 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:



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:

- Using information from **ANY** source without properly **paraphrasing** (writing in your own words) **and citing**. Refer to **Cheating & Plagiarism (pp. G6 – G10)** in the lab manual for details, explanations, and advice on avoiding improper uses of others work.
- Using any part of an unpublished manuscript without properly paraphrasing and citing, the permission of the original authors, and the permission of your mentor. This is **unauthorized collaboration or plagiarism**.
- **Falsifying authorship**, i.e. including as an author a student who did not adequately contribute to the production of a manuscript submitted for credit OR failing to include an author who did is considered **fabricating Information** by all authors on a manuscript. All authors who miss a part of a lab must have their contributions explained truthfully on the authorship form.
- 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 must write his/her own name on materials his/her group submits.
- Possessing a student response pad (“clicker”) other than the one assigned to you is considered **unauthorized collaboration and cheating**.
- Possessing or sharing a password 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 devices 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 and 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**.

Cowboy Values:  **Honesty**  **Trust**  **Respect**  **Fairness**  **Responsibility**

<u>Schedule</u>			
Date	Week	Scenario	Lab Topic
June 6-7	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 – Assignment: Read Guide to Success section (ppG1-G48) in the lab manual.
June 8-9		Surviving Fire and Ice: The scenario focuses on surviving in desert and tundra and adaptations for thermoregulation and water retention.	Thu: Intro Lab – Have assignment completed prior to attending lab.
June 13-16	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: Investigation 1: Institute of Comparative Respiration Research. Focus on Thermoregulation, Body Shape Size & Shape using Clay Models. Thu: Investigation 1: Continue Research
June 20	3	Exam #1 – Covers Topics from Scenarios 1-3	
June 21-22		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: Investigation 1: Final Analysis & Submission
June 23		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: Investigation 1: Institute of Comparative Respiration Research. Focus on Respiration & Metabolism
June 27-28	4	Marooned in the Galapagos (continued)	Tu: Investigation 1: Continue Research
July 29-30		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.	Thu: Investigation 1: Final Analysis & Submission
July 4	5	University Holiday – No Classes	
July 5		Exam #2 – Covers Topics from Scenarios 1-6 -----	Tu: Investigation 2: Research in the Acme Brewing & Baking Company
July 6-7		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.	Thu: Investigation 2: Continue Research
July 11-14	6	Family Reunion: A family reunion opens the door to talk about cancer, DNA, protein synthesis, genetically determined diseases and biotechnology.	Tu: Investigation 2: Final Analysis & Submission
July 15		Last day to drop with “W”	Thu: Investigation 3: Biofuels Research & Aquatic Quality Collaborative. Focus on Water Quality research.
July 18	7	Exam #3 – Covers Topics from Scenarios 1-8	
July 19-21		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: Investigation 3: Continue Research Thu: Investigation 3: Final Analysis & Submission
July 25-26	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: Laboratory Final
July 27		Review	
July 28		Final Exam – Covers Topics from all Scenarios	Thu: No Lab

GRADING:

Component	Format	Available Points	Maximum Points allowed	Notes
Lecture Activities	1-5 pt. quizzes/ homework	About 80	70	Can earn only 70 pts in this category All exams are cumulative; Each tests over ALL material covered previously.
Exam 1	40 questions worth 2 points each	80	80	
Exam 2	40 questions worth 3 points each	120	120	
Exam 3	40 questions worth 3 points each	120	120	
Final Exam	50 questions worth 4 points each	200	200	
Lecture Subtotal:		About 600	590	
Planning form	Weekly write-up	<u>Required for entry into lab</u>	-	Must be turned in by 5:00 pm the day before lab. Must be turned in BEFORE you leave lab. 40 points serve as “disaster insurance”
Manuscripts	Weekly reports, final submission worth 100 points each	400	400	
Lab Final	Multiple choice, short answer, essay	50	50	
Lab Subtotal:		450	410	Can only earn 410 points in the lab portion
TOTAL:		Approximately 1,050	1,000	

*** Note: Lab grades are adjusted by peer evaluations; please see your lab manual and lab syllabus for details.**

What do you do if you miss an exam? If for ANY reason you miss any of the first three exams, and notify me within a week, the entire final exam will be used to determine a substitute grade for the missed exam. **If for ANY reason you (will) miss the final exam and notify me no later than 24 hours after the exam,** the grade of “I” 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 one of the 2 following semesters, i.e., in Fall 2016 or Spring 2017. If you miss the final exam and do not notify me, you will be assigned a “0” for the final exam grade. Exceptions for the final exam will require approval of the Dean of Arts & Sciences.

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 about 80 points offered, although only 70 points 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 you will have 70 points by the end of the semester.

What do you do if you miss a lab? Since your work is a team effort, if you are absent from any part of a lab period for ANY reason, your co-authors (team members + mentor) will determine the **extra contribution you must make to compensate for each absence**. If you do not accomplish what is specified, you will lose 1/3 of the manuscript score for each absence. We are not judging the legitimacy or nature of the excuse for being absent, just whether you have contributed appropriately to the final products. The minimum recommended alternative contribution to a manuscript for each absence of any kind (which is what is expected if no alternative is specified) are 10 pages of literature review (see lab manual for format) to be included in the introduction or discussion when the manuscript is submitted to JIBI. The review should be based on a minimum of 5 reference sources from peer-reviewed science journals, not including JIBI or found in the lab manual or on the BIOL 1114 website. Your team must explicitly **describe your extra contribution as part of the authorship form** you must submit with each final manuscript. In addition, you will have the opportunity to earn up to **40 extra points on the lab final**, which can be applied to absences.

In the event of University cancellation – check <http://biol1114.okstate.edu> for instructions regarding lab.

Grading Scale

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

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 or energy 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 to each other.
- 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 be able to explain how this process leads to any adaptation, to explain its action and result in every scenario, and how 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** - Living systems must maintain a constant internal environment between limits or to return things to normal following disturbance. 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 identify or predict the starting ingredients, 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, or to provide constructive feedback on the course.

-The BIOL 1114 Faculty

You are required to sign and return this sheet to me, acknowledging that you have been provided 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) _____ **Please check EACH box below:**

- I will come to lab prepared to work with my group
- I will participate with my group and allow other members to participate
- I will evaluate my group members fairly and accept their evaluations of me.
I will properly **paraphrase** (write in my own words) **and cite** all information that I use from **ANY** source in my groups' manuscript. Failure to do this is **plagiarism**
- I will properly paraphrase and cite, obtain the permission of the original authors, and obtain the permission of my mentor when I use any part of an unpublished manuscript. Failure to do so is **unauthorized collaboration or plagiarism**.
- I will include as authors all and only students who contribute adequately to the production of a manuscript submitted for credit. Failure to do so would be **falsifying authorship** and would be considered fabricating information by all authors on a manuscript. All authors who miss a part of a lab must have their contributions explained truthfully on the authorship form.
- I will only include on in-class exercises the names of those members of my group who participated in completing the exercise. Including the names of others 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.
- I will possess only a student response pad ("clicker") that is registered to me. To possess a clicker belonging to another student is considered **unauthorized collaboration and cheating**.
- I will not possess a password other than the one assigned to me or share mine with another student. To do so is **considered unauthorized collaboration and cheating**.
- I will not misidentify the exam version (star or no star) by indicating the incorrect version on the form or placing it in the alternate group for grading. To do so is considered **cheating**.
- I will not possess a form of the exam during the examination period that is inconsistent with the assigned distribution of exams as indicated during the examination period. This is considered **unauthorized collaboration and cheating** by all affected individuals.
- I will not access any electronic devices (for example smartphone, cell phone, PDA, calculator, portable multimedia devices such as an iPod, electronic dictionaries) during an exam without explicit prior permission. This is considered **cheating**. All such devices must be turned off and out of sight or reach.
- If I take a conflict exam, I will not possess a list of answers, have copies of 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**.