**BIOL 1114 Introductory Biology - Spring 2012**

**Sections -_____**

Instructor: _____ My Office:_____
Dept. Office: _____ Phone: _____
Office Hours: _____ 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.

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., 2012. ***Biology: Concepts and Investigations. 2nd edition.*** McGraw-Hill: NY. See http://biol1114.okstate.edu/ebook.html for an explanation about the versions of the book.
French, D. 2011. ***Investigating Biology: A Laboratory Resource Manual***. ***2011 edition*** Fountainhead Press: Fort Worth.
1 pkg. **5x8"** index cards, one side lined
eInstruction Student Response Pad (clicker) – (http://bioweb-cfs.cas.okstate.edu/info/clicker/Index.cfm)

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). In the event of University cancelation – check http://biol1114.okstate.edu for instructions regarding lab.**

EXAMS:
Four exams are scheduled: Three (3) before final exam week and one (1) during finals week. **The dates and locations 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 a policy to avoid creating a more stressful situation for students. **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 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 instructors present for clarification.

All exams are "in common," i.e., everyone taking this course this semester, regardless of instructor, takes the same exam at the same date and time as listed for each exam, but in a different room. Exams are usually NOT scheduled for the room where you attend lecture/theory. Be sure you know when and where to take your exams. Check your syllabus early, if you have a conflict with another common exam, let me know ASAP. Compensation time for taking the 3 exams at 5:30 occurs in the 3-hr lab period when no lab is scheduled (Week 1).

You must bring a **NCS Answer Sheet** (Available in the bookstore), a **#2 lead pencil,** and **your student ID** to each exam.

To get credit, you must fill out the information on your answer sheet correctly - Put your **O-Key Account**

**Username** in the boxes indicated **for LAST NAME** and darken the appropriate circles. **Write your Name (Last, First) in the space above the boxes** containing your O-Key Account Username. To indicate the form of the exam you are taking ("Star or Nostar" as marked on your test form), **write S or N in the last column of the name boxes and darken the appropriate circle**. Enter the number **121n** (where n = 1, 2, 3, or 4) and **darken the corresponding circles** in the **first 4 columns** of the **"Student ID."** Do NOT enter other information. Failure to perform this correctly will incur a **-10pt handling fee**.

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 7 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: 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.

LECTURE/THEORY: 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.

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.

COURSE 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.

WWW SITE: 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, tutorials and pre-lab exercises. **You will find the reading assignments for each scenario (lecture topics), lab study guides, and the computer-based pre-lab assignments here.** You will need your **O-Key Account Username** and Prism password. You will need to download webplayers for certain items to run. For help with the website email: zool-tech@okstate.edu or visit the technical support office located in the LRC.

LEARNING RESOURCES CENTER: Room 303 in LSW is staffed by the teaching assistants for the course and is open throughout the week (See the schedule on our website). 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. For help you can also email: biol1114@okstate.edu . 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 p.G4 – G7) of your lab manual (French, D. 2011. *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 your 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 or the use of photocopied planning forms 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 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 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.**

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

## Schedule

| Date | Week | Scenario (for readings see http://bioweb-cfs.cas.okstate.edu/info/requiredreadings) | Lab Topic |
|---|---|---|---|
| 9 Jan | 1 | 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? | LAB - Read pp.G1-G40 in the lab manual. **Complete & turn in Planning Form for Investigation 1 in the LRC (due 5pm day before lab in week 2 (week of 16 Jan).** |
| 16 Jan | **M** | **Martin Luther King Holiday: No Class** | |
| 17 Jan | T | Last day to add and last day to drop with no grade | |
| 17 Jan | 2 | 2. Surviving Fire and Ice: The scenario focuses on surviving in desert and tundra and adaptations for thermoregulation and water retention. | 1. Why are larger *Tetra Cryptoforma* eaten more frequently than smaller ones? |
| 23 Jan | 3 | 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. | 2. Why are animals shaped differently in cooler climates than in warmer ones? |
| 30 Jan | 4 | Out of the Rain Forest continued. | 3. Why do certain animals eat more at certain temperatures than others, or than they do at other temperatures? |
| **6 Feb** | **M** | **EXAM 1 at 5:30 pm in [ROOM]–Topics for exams will be those from Scenarios 1-3** | |
| 6 Feb | 5 | 4. 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. | 4. Why is diffusion through a membrane sometimes faster? |
| 13 Feb | 6 | 5. 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. | 5. Why do certain cells contain more of certain structures than do others? |
| 20 Feb | 7 | 6. 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. | 6. Why do certain finches survive and reproduce more than others under various conditions of food availability? |
| 27 Feb | 8 | Rainbow Connection - continued. | 7. Why do plants grow better under certain lighting conditions than others? |
| **5 Mar** | **M** | **Exam 2 at 5:30 pm. in [ROOM]- Topics for exams will be those from Scenarios 1-6** | |
| 5 Mar | 9 | 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. | 8. Why do plants transpire water faster under certain environmental conditions? |
| 12 Mar | 10 | Emerging Diseases continued | 9. Why do some populations of bacteria become resistant to antibiotics? |
| **19-23 Mar** | **11** | **Spring Break – No Classes** | **No Lab** |
| 26 Mar | 12 | 8. Family Reunion: A family reunion opens the door to talk about cancer, DNA, protein synthesis, genetically determined diseases and biotechnology. | 10. Why can some bacteria produce a color that others cannot? |
| 2 Apr | 13 | Family Reunion continued | 11. Why is a new population of people exhibiting disease symptoms? |
| 6 Apr | F | Last day to drop with automatic W | |
| **9 Apr** | **M** | **EXAM #3 at 5:30 pm in [ROOM]- Topics for exams will be those from Scenarios 1-8** | |
| 9 Apr | 14 | 9. Hogs & Chickens: Statistics about concentrated animal feeding operations raise questions about nutrients in biogeochemical cycles, the effects of livestock and people on aquatic systems. | 12. Why are invertebrate species disappearing from Clearwater Creek? |
| 16 Apr | 15 | 10. 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. | 13. Why is there less oxygen in some streams than in others? |
| 23 Apr | 16 | Why We Care about Fat continued. | 14. Why do some guppies attract more mates than others? |
| **3 May** | **R** | **FINAL EXAM at 12:00 – 1:50 pm in [ROOM]**<br>**Topics for exams will be those from All Scenarios** | **Note the Exam time!!!** |

**GRADING:**

| Component | Format | Available Points | Maximum Points allowed | Notes |
|---|---|---|---|---|
| Lecture Activities | 1-5 pt. quizzes/ homework | About 65-70 | 60 | Can earn only 60 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 | 70 3-pt. questions | 210 | 210 | |
| **Lecture** | **Subtotal:** | About 600 | 590 | Can only earn 590 points in the lecture portion |
| Planning form | Weekly 10-pt write-up | 130 | 130 | Must be turned in by 5:00 pm the day before lab. |
| Lab Reports | Weekly 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** | |

*** 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 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 summer or fall 2012. 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, 65-70 points offered, although only 60 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 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! **In the event of University cancelation – check http://biol1114.okstate.edu for instructions regarding lab.**

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

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

**PARTICIPANT INFORMATION**
**OKLAHOMA STATE UNIVERSITY**

**Title:** Bridging the 21st Century: Transforming Life Science Instruction through Collaborative, Interdisciplinary Research

**Investigators:** Drs. Donald P. French (Department of Zoology), John I. Gelder (Department of Chemistry), Jason Belden (Department of Zoology), Julie Thomas, Julie Angle, and Toni Ivey (School of Teaching and Curriculum Leadership)

**Purpose:** The purpose of the research study is to identify students' concepts of physical and chemical processes underlying biological processes and the curricular needs, alignment, and overlap between biology and chemistry courses. These data will serve to develop a model for the optimal, integrated, course format and for continued research on barriers that impede transformation to interdisciplinary thinking and teaching of biology and chemistry.

**What to Expect:** No special action is required on your part. The investigators or one of the research assistants will be observing the class or videorecordings of the class to identify the concepts being taught and students understanding of the concepts based on discussions or answers to questions or assignments. No data linking you to specific actions or statements will be maintained (you will remain anonymous). The investigators or assistants will also examine written materials (assignments or assessments) for statements that would help identify how students understand concepts. Your identity will not be linked to any data extracted from written materials. You may be invited to elaborate on your comments, which may take 5 minutes of your time. Your identity will not be linked to any data extracted from such interviews.

**Risks:**"There are no risks associated with this project which are expected to be greater than those ordinarily encountered in daily life as a student. Your participation or refusal to participate will not negatively affect your grade.

**Benefits:**"You may gain an appreciation and understanding of how research is conducted."

**Your Rights:**Your participation in this research is voluntary. There is no penalty for refusal to participate, and you are free to withdraw your consent and participation in this project at any time, without penalty.

**Confidentiality:**All information about you will be kept confidential and will not be released. Research records will be stored securely and only researchers and individuals responsible for research oversight will have access to the records. You will not be identified individually.

**Contacts:**You may contact any of the researchers at the following addresses and phone numbers, should you desire to discuss your participation in the study and/or request information about the results of the study: Donald P. French, Ph.D., 501 Life Sciences West, Dept. of Zoology Oklahoma State University, Stillwater, OK 74078, 405-744-9690. If you have questions about your rights as a research volunteer, you may contact Dr. Shelia Kennison, IRB Chair, 219 Cordell North, Stillwater, OK 74078, 405-744-3377 or irb@okstate.edu

# BIOL 1114 Student Information Sheet Spring 2012

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) _____