

BIOLOGY 141 (INQ, WR) CELL BIOLOGY AND GENETICS SYLLABUS

FALL SEMESTER 2013

SECTION 9A

Professor: Dr. Elizabeth Gleim **Office:** Pierce Hall #113B **Phone:** (770) 784-4745
Lecture Hours: Monday, Wednesday, Friday; 9:30 a.m. – 10:35 a.m. **Room:** Pierce 101
Lab Hours: Wednesday 2:30 p.m. – 5:30 p.m. **Room:** Pierce 125

Office Hours: Tuesday 3:00-4:00 p.m., Friday 10:35-11:35 a.m. Students are encouraged to see Dr. Gleim during class to make appointments for other times.

Required Texts: *Campbell Biology*, Reece, J.B., Urry, L.A., Cain, M.L., Wasserman, S.A., Minorsky, P.V., and Jackson, R.B. 2011, 9th edition, Benjamin/Cummings Publishing; *Practicing Biology*, Heitz, Jean and C. Griffen. Benjamin/Cummings Publishing Co., Inc. 2011.

Required Lab Text: SYMBOSIS: *Investigating Biology*, 7th ed. Morgan, J. G. and M. E. B. Carter. Benjamin/Cummings Publishing Company, Inc. 2011. A customized edition published for BIO 141 is available ONLY in the bookstore. ***Used lab manuals are not permitted.***

Optional Writing Book: *A Student Handbook for Writing in Biology*, Karin Knisely, 2013, 4th edition, W.H. Freeman and Co. This is a great resource for writing, and is also on reserve in the library.

Web Site: *MasteringBiology* provides online study materials, practice exams, learning activities and strategies for success. Your text has instructions for accessing the site: www.masteringbio.com

Course Objectives: The purpose of this course is to give you, the student, a firm foundation in the underlying themes of biology. You will study living organisms, cell structure and function, genetics, and evolution. You will first develop an understanding of the chemical molecules that make up the structure of a cell and how these molecules govern cell function. Secondly, you will study the fundamentals of cell function, including transport across cell membranes and energy transformation in living cells. Thirdly, you will learn the basic mechanisms of cell reproduction, inheritance of biological traits, and processing of genetic information. You will also develop an understanding of gene transmission within populations and how genes are responsible for the evolution of populations. A fourth objective of this course is for you to use your knowledge of cellular mechanisms to understand the concepts of evolution and diversity in the biological world. Finally, a very important objective of this course is teaching you to “think and act like a scientist” through methods of scientific inquiry and the practice of deductive reasoning. Both lecture and laboratory are designed to accomplish these goals with the two components of the course integrated through study, laboratory exercises, group work, scientific writing, and individual disciplined study. Mastering these fundamental themes of biology will prepare you to further explore the more intricate and specialized areas of this field. *This course fulfills the Inquiry (INQ) and Continuing Writing Requirement (WR).*

Date	Topic	Assigned Reading
<u>AUGUST</u>		
W 28	Science as a Way of Knowing	1
F 30	Major themes in Biology	1
<u>SEPTEMBER</u>		
M 2	<i>**Labor Day** no class or lab</i>	
W 4	Hierarchies: beginning with living chemistry and water	2,3
F 6	Building biological macromolecules: carbohydrates and lipids	4, 5
M 9	Proteins and nucleic acids	5
Tu 10	<i>Scientific Literature & Research - Library - Required 8:00 – 8:45am and 9:00 – 9:45am</i>	
W 11	Structure and function revealed in cells	6
F 13	Cell biology - Problems/Case Study	
M 16	Membrane structure and cellular transport	7
W 18	Transport problems	
Th 19	<i>Effective Presentation of Scientific Data – P206 bring your data - 8:00 – 8:45am and 9:00 – 9:45am</i>	
F 20	Fundamentals of energy transformations: enzymes, ATP and electron carriers	8
M 23	Cellular respiration I – Glycolysis	9
W 25	Cellular respiration II - Transition and the Krebs cycle	
Th 26	EXAM I - 8:00 - 9:30 a.m. (through membrane transport)	
F 27	Cellular respiration III – Chemiosmosis and The Electron Transport System	9
M 30	Review and recapitulation: Accounting Day	
<u>OCTOBER</u>		
W 2	Homage to photosynthesis	
F 4	Photosynthesis I: the light dependent reactions	10
M 7	Photosynthesis II: the light independent reactions and variations (C4 and CAM)	
W 9	<i>Development of Team Research Proposal (bring your laptop to class)</i>	
F 11	Cell reproduction: cell cycle, mitosis	12
M 14	<i>**FALL BREAK** no class or lab</i>	
W 16	Sexual life cycles and meiosis	13
Th 17	EXAM II – 8:00 – 9:30 a.m. (through photosynthesis)	
F 18	Chromosomal mutations <i>Research proposals due to Blackboard by 9 a.m.</i>	15 pp. 297-300
M 21	Mendelian principles; genes and chromosomes	14, 15 pp. 286-289
W 23	Patterns of inheritance	14 pp. 271-281
F 25	Chromosomal theory and linkage	15 (remaining pp.)

M	28	Genetics problems and review	
W	30	DNA structure	16
Th	31	8:00 – 8:45, 9:00 – 9:45 a.m. - <i>Effective Presentations Workshop</i> - Pierce 206 (optional, HOWEVER, 2 members from each group MUST attend)	

NOVEMBER

F	1	DNA replication	16
M	4	Gene to Protein I: transcription and the genetic code	17
W	6	Gene to Protein II: translation and genetic mutations	
F	8	Molecular genetics workshop	
M	11	Charles Darwin and development of evolutionary concepts	22
W	13	Evidence for evolution	22, 25 pp. 510-512; 519-530
Th	14	EXAM III - 8:00 – 9:30 a.m. (through genetics)	
F	15	Population Genetics and Hardy Weinberg <i>Scientific Papers – “Ask THE EDITORS” 2:30-3:30 PM P101</i>	23
M	18	Microevolution: genetic drift, gene flow and mutation	23
W	20	Genetic variation and selection	23
F	22	Speciation	24, pp. 488-501 <i>Research papers due in class</i>
M	26	Evolution of land plants	29
W	27	**THANKSGIVING BREAK BEGINS**	

DECEMBER

M	2	Sexual Encounters of the Floral Kind	38 pp. 801-807
W	4	Bryophytes and seedless vascular plants	29
F	6	Seed plants: gymnosperms and angiosperms	30
M	9	Evolutionary trends in land plants & Big Themes Revisited	

***** FINAL EXAMINATION - December 17th - Tuesday 9 a.m.-12 p.m.*****



DNA Polymerase



T-cell

BIOLOGY 141 WEDNESDAY LABORATORY SCHEDULE

FALL 2013

DR. ELIZABETH GLEIM

<u>Date</u>	<u>Lab Topic (#)</u>	<u>Writing Assignment*</u>
Sept. 4	Scientific Investigation	<i>Title page; Introduction; References (due 18th in lab)</i>
11	Microscopes and Cells	Review table ⁺
18	Diffusion and Osmosis	<i>Results; Table; Figure</i>
25	Enzymes	<i>Materials and Methods</i>
Oct. 2	Cellular Respiration and Fermentation	<i>Title page; Figure; Discussion; References</i>
3	(Thur.) LAB EXAM I (thru Enzymes) (Sign up for exams at 6:00 p.m. or 6:30 p.m.)	
9	Mitosis and Meiosis	Comparison Table ⁺ <i>Research papers due in class 11/22</i>
<i>Research Proposals submitted to Blackboard ON FRIDAY, Oct. 11th by 9 a.m.</i>		
16	**No Lab this week due to FALL BREAK**	
<i>Research Proposals submitted to Blackboard ON FRIDAY, Oct. 18th by 9 a.m.</i>		
23	Field Research: Ecology and Evolution on the Outcrops	
24 th	(Thur.) LAB EXAM II (Mitosis & Meiosis) (6:00 p.m. or 6:30 p.m.)	
30	Microbial Diversity (Bacteriology)	
Nov. 6	Research Symposium <i>(Technology Rehearsal – 2:30 Pierce 101)</i>	
13	Molecular Biology	Map ⁺
20	Plant Diversity I & II	Comparison Tables ⁺
27	**No Lab this week due to THANKSGIVING BREAK **	
Dec. 4	Bioinformatics: Molecular Phylogeny of Plants	<i>Report completed in lab</i>
5 th (Thurs.)	LAB EXAM (Molecular Biology and Plant Diversity I & II) (6:00 p.m. or 6:30 p.m.)	

***Writing assignments are due one week later at the beginning of the lab period unless otherwise noted.**

***These assignments are not turned in for a grade.**

IMPORTANT DATES FOR BIOLOGY 141 (INCLUDES LAB AND OUT OF CLASS SESSIONS)

September:

- 10 *Scientific Literature workshop (required) in Library*
- 18 Title page, Introduction; References due in lab
- 19 *Effective data presentation workshop – bring your data P206*
- 25 Results; Table; Figure due in lab
- 26 **Exam I**

October:

- 2 Materials & Methods due in lab
- 3 **Lab Exam I**
- 9 Title page; Figure; Discussion; References due in lab
- 9 In-Class Research Development Proposal – identify your team and bring your laptop to class
- 11 Laboratory research project proposals due on Blackboard by 9 am
- 17 **Exam II**
- 24 **Lab Exam II**
- 31 *Effective presentations workshop (2 group members must attend)*

November:

- 6 Research symposium (*Technology Rehearsal at 2:30*)
- 14 **Exam III**
- 15 *“Ask the Experts” session*
- 22 **Research paper due in class**

December:

- 2 Molecular phylogeny report completed in lab
- 5 **Lab Exam III**
- 17 **Final Exam, 9 a.m. – 12 p.m.**








Expectations, Evaluation and Tips for Success in Biology 141

Welcome to Biology 141! Please read carefully and follow the information in this handout and any accompanying materials. You are responsible for understanding all of the information presented here, so please ask questions if needed. Please pay attention to any changes to the syllabus as some information may be subject to change during the semester.

Introductory Biology (141) is designed for students who **plan to major in biology or neuroscience and behavioral biology**, attend **professional school in a health related field**, or **have a strong background in biology** and have chosen biology to fulfill their distribution requirements. This may be one of the more difficult courses you will take, as you will be expected to go beyond simple memorization of biological concepts and mechanisms, but have a strong enough grasp and understanding of these concepts and mechanisms to apply and think critically about them---in short, you will begin the process of learning how to think like a scientist. The material you learn in this course and the shift in thinking about science critically will serve as a foundation for the rest of your course work in biology and beyond; because of this, it is critical that you succeed in this course. Many of you in the future will be applying for summer jobs and internships and

further down the line taking examinations to enter graduate or professional schools and/or applying for jobs in science and the knowledge you gain here will be required for your success.

Tips for Success: Biology 141 is an intensive course and requires time. To perform well in this course, you must develop a proper plan for managing your time and your work, beginning from the first day of class. The following are some good study habits that will help you succeed in BIO 141:

-  **Keep up with assigned readings.** The readings listed for each lecture in the syllabus must be done BEFORE the lecture.
 - **How to Read Effectively:** Studies have repeatedly shown that simply reading and highlighting text do not result in you understanding and retaining that information. A more effective method would be reading a paragraph or 2 and then taking a moment to write down a summary (either in the margin or in a notebook) of what you just read. Writing questions during this time indicating concepts or mechanisms you don't understand and asking these in class or out of class are welcomed. Finally, look at the figures! They aren't just there to take up space and relieve you of reading less text 😊
-  **Take good notes.** In lecture, I will explain the most significant concepts from your readings and present images and examples that may not be in your textbook. You are responsible for all of this information. Detailed and well-organized notes are critical for studying and learning in this course. Ask questions in class to help you connect the concepts. Review your notes after every lecture and before the next class.
-  **Connect the lecture notes to your readings.** For the test, you are responsible for information in the textbook as well as the lecture notes. Make sure that you are able to grasp the major concepts thoroughly and in detail. Use the summary and review sections of your textbook as well as images and diagrams from your text and masteringbiology.com. In addition, connect the concepts learned in lecture to the lab exercises.
-  **Review material on a regular basis.** Study the diagrams in your text and lecture handouts. Practice writing out pathways and linking the concepts. Use the blank figures handed out in class for your study.
-  **Attend your SI sessions** on a regular basis. Take advantage of my office hours to get individual assistance.
-  **Keep two things in mind.** One - learn terminology and most importantly, understand the relevance of that terminology to biological function. Second – this course is designed to make you think and not just to have you memorize facts. Memorizing facts is important to establish a basis for your knowledge but it is not sufficient. You must be able to use your knowledge to think logically and analytically and this takes practice just like memorizing concepts does! Take advantage of SI sessions, in-class exercises and handouts, and questions at the end of chapters and on www.masteringbiology.com to practice applying your knowledge and thinking critically. Many of the test questions will revolve around this latter skill.
-  **Utilize proper study skills.** Develop study guides (perhaps make your reading notes this!); comparison charts, concept maps, and flash cards (make sure you know them backwards and forwards). Use the

MasteringBiology (www.masteringbiology.com) web resources provided with your textbook. Complete assignments in *Practicing Biology*. Don't be lulled into thinking familiarity is the same as having mastered a concept or system.



Lab is equally important! The laboratory component of this course is intensive and requires time as well. Please read your lab manual BEFORE lab and pay attention to the details. Take good notes and make detailed observations. Answer all questions in the lab manual either during lab or immediately following lab. Review the objectives and prepare a study guide for the lab materials and activities on a weekly basis. Learn to manage your time well and prepare in advance for the lab writing assignments. Pay attention to information about lab exams. Make use of open lab time.

Supplemental Instruction. SI is provided for all students in BIO 141. I will explain this important program that provides assistance for all students who wish to improve their performance in biology. The BIO 141 SI leader is *Anna Mowell* this semester.

Ways of Inquiry (INQ). Biology 141 is designated as a “Ways of Inquiry” or INQ course. In INQ courses, students “understand and question the way knowledge is sought by actively learning and practicing the discipline’s approaches to inquiry” (INQ Vision Statement). In Biology 141, you will have many opportunities to engage in biological inquiry by asking questions, designing experiments, reading and writing critically, and working independently to seek knowledge.

Absences. Your attendance in this class is crucial to your success in this course. Not only will you receive information in class that is not necessarily available in your text or even in the power points, but this is a highly participatory course in which we often have discussions and have individual as well as group in-class exercises. Please see the absence policy that is handed out separately from this syllabus.

Cell Phones: The use of cell phones (texting, ringing, etc.) is strictly prohibited in the classroom and the laboratory. Please turn off your phone before you come to class (or just don't bring it!) and leave your phone at the front during exams. If you feel that you have a legitimate need to use your phone or leave the ringer on, please speak to me *before* class. ***Photography with camera phones is also prohibited in lab and lecture.***

Personal Computer. If you would like to take notes on your personal laptop in class you must seek special permission from the instructor. Use of laptops to surf the web, login to Facebook, Skype or other networking/chat during class is completely unacceptable and may result in you losing your privilege to use a laptop if you did have prior permission.

Honor Code. All examinations and all work for credit in this course come under the regulations of the Honor Code. Your signature on your work attests to your upholding the Honor Code. Please read the information on **plagiarism** on the Library web page and always ask if you have any questions about assignments. Note that writing assignments will be submitted to **SafeAssign on Blackboard**.


Office Hours. I would like to encourage you to meet with me in person about any concerns or questions that may arise during the semester. I want you to succeed in this course and am here to help in whatever capacity that I can. I have scheduled specific office hours but if these times are not suitable for you, please do not hesitate to make an appointment with me for a different time.


Blackboard Site: Blackboard will have announcements, handouts, information about Practicing Biology questions, and more! Your SI and TA will email you from Blackboard. You will upload all writing assignments on Blackboard. The syllabus and other assignments for lecture and lab will be posted on Blackboard.

Additional Sessions. We have two required additional instruction sessions in this course for library and information technology. These sessions are held outside of class time and are critical for your laboratory assignments.

Exam Protocols. Any item/s you bring to class with you the day of an exam must be left at the front of the room. This includes but is not limited to backpacks, folders, notecards, coats, and cell phones (which must be turned off). Do not come to any exam with notecards in your pockets or on your person. No hats can be worn while taking an exam. All cell phones must be left either in your bag in the front of the room or on the instructor's bench. Do not write notes, study material, abbreviations, or material that can be construed to be these on your body. Check for such notations and remove before the exam time. These are considered to be a breach of the Honor Code.

Evaluation Criteria:

 *Examinations* - There will be three lecture exams, each worth 100 points, including multiple choice, short answer and short essay questions. Exams will cover all material in lecture in addition to assigned textbook readings and other supplemental materials. Use the knowledge you gain in lab to help with understanding the lecture material. The final examination, worth 175 points, is comprehensive. Three laboratory exams, each worth 50 points, will be given in this course. Each lab exam will cover the material from the lab exercises. The lab exams will include a practical and a written portion.

 *Scientific Writing and Laboratory Project* - You will write individual sections of a scientific paper for specific laboratory exercises. The lab also involves a group independent investigation as a research project. For this laboratory, you will prepare a group symposium presentation and write an individual complete scientific paper. Specific instructions will be provided in lab. This course meets the Continuing Writing Requirement (WR).

Evaluation Points: Students are evaluated on their performance in the classroom and the laboratory. The following is the distribution of points:

300 points	3 lecture exams	Final grade determination:	
135 points	3 laboratory exams	90 – 100%	A
175 points	final examination	80 – 89%	B
35 points	scientific writing	70 – 79%	C
75 points	lab project	60 – 69%	D
720 points	total	<60	F
		Plus and minus grades are given	