

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

SPRING SEMESTER 2014

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 102
Lab Hours: Tuesday 1:40 p.m. – 4:40 p.m. **Room:** Pierce 123

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. Students are strongly encouraged to utilize this book; it 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>January</u>			
W,	15	Science as a Way of Knowing	1
F	17	Major themes in Biology	1
M	20	Martin Luther King Day – no class	
W	22	Hierarchies: beginning with living chemistry and water	2,3
F	24	Building biological macromolecules: carbohydrates and lipids	4, 5
M	27	Proteins and nucleic acids	5
W	29	Structure and function revealed in cells	6
F	31	Cell biology - Problems/Case Study	
<u>February</u>			
M	3	Membrane structure and cellular transport	7
W	5	Transport problems	
Th	6	<i>Scientific Literature & Research (Library - Required) 8:00 – 8:45am and 9:00 – 9:45am</i>	
F	7	Fundamentals of energy transformations: enzymes, ATP and electron carriers	8
M	10	Cellular respiration I - Glycolysis	9
W	12	Cellular respiration II - Transition and the Krebs Cycle	9
Thu	13th	EXAM I 8:00 - 9:30 a.m. (through membrane transport)	
F	14	<i>Presentation of Scientific Data – bring your lab data and laptop to class</i>	
M	17	Cellular respiration III – Chemiosmosis and The Electron Transport System	9
W	19	Review and recapitulation: Accounting Day	
F	21	Homage to photosynthesis	10
M	24	Photosynthesis I: the light dependent reactions	10
W	26	Photosynthesis II: the light independent reactions and variations (C4 and CAM)	10
F	28	Cell reproduction: cell cycle, mitosis	12
<u>March</u>			
M	3	Sexual life cycles and meiosis	13
Thu	6th	EXAM II – 8:00 – 9:30 a.m. (through photosynthesis)	
W	5	Chromosomal mutations	15 pp. 297-300
F	7	Mendelian principles; genes and chromosomes	14, 15 pp. 286-288
	10 - 14	***SPRING BREAK**	
M	17	Patterns of inheritance	14 pp. 271-281
W	19	Chromosomal theory and linkage	15
F	21	Genetics problems and review	14, 15
M	24	DNA structure	16
W	26	DNA replication	16
Th	27	<i>Effective Presentations Workshop - Pierce 206 8:00 – 8:45, 9:00 – 9:45 a.m.</i>	
F	28	Gene to Protein I: transcription and the genetic code	17

M	31	Gene to Protein II: translation and genetic mutations	17
<u>April</u>			
W	2	Modeling Beyond Watson and Crick	
F	4	Molecular genetics workshop	
M	7	Charles Darwin and development of evolutionary concepts	22
Thu	10	EXAM III - 8:00 – 9:30 a.m. (through genetics)	
W	9	Evidence for evolution	22, 25 pp. 510-512; 519-530
F	11	Genetic Variation, Population Genetics and Hardy-Weinberg <i>Scientific Papers – “Ask THE EDITORS” 2:30-3:30 p.m.</i>	23
M	14	Microevolution: genetic drift, gene flow and mutation	23
W	16	Selection and Speciation <i>Research papers due in class</i>	23, 24 pp 487-501
F	18	Evolution of land plants	29
M	21	Sexual Encounters of the Floral Kind	38 pp. 801-807
W	23	Bryophytes and seedless vascular plants	29
F	25	Seed plants: gymnosperms and angiosperms	30
M	28	Evolutionary trends in land plants & Big Themes Revisited	

***** FINAL EXAMINATION – May 6th – 2-5PM**



DNA Polymerase



T-cell

BIOLOGY 141 TUESDAY LABORATORY SCHEDULE

SPRING 2014

DR. ELIZABETH GLEIM

<u>Date</u>	<u>Lab Topic (#)</u>	<u>Writing Assignment*</u>
<u>January:</u>		
21	Scientific Investigation	Materials and Methods; Title page

28	Microscopes and Cells	Review table**
<u>February:</u>		
4	Diffusion and Osmosis	Introduction; References
11	Enzymes	Results; Table; Figure
14	<i>Respiration/Fermentation Proposal posted to Blackboard by 2:30 p.m.</i>	
18	Cellular Respiration and Fermentation	Title page; Figure; Discussion; References
20	(Thur.) LAB EXAM I (thru Enzymes)(Sign-up for exam times: 6:00 p.m. or 6:30 p.m.)	
25	Mitosis and Meiosis	Comparison Table**
<u>March:</u>		
4	Research Teams: Proposal Development <i>Team Research Proposal submitted to Blackboard on Friday March 7th, by 2:30 p.m.</i>	
10 - 14	*** SPRING BREAK ***	
18	Field Research: Ecology and Evolution on the Outcrops	
20	(Thur.) LAB EXAM II (Mitosis and Meiosis) (6:00 p.m. or 7:00 p.m.)	
25	Microbial Diversity (Bacteriology)	<i>Research papers due in class 4/16</i>
<u>April:</u>		
1	Research Symposium <i>Technology Rehearsal - Upload and check your presentation at 2:30!</i>	
8	Molecular Biology	Map**
15	Plant Diversity I & II	
22	Bioinformatics: Molecular Phylogeny of Plants	<i>Report completed in lab</i>
24	(Thurs.) LAB EXAM III (Bacteriology, 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)

January:

28 Materials & Methods; Title page due in lab

February:

6 *Scientific Literature Workshop, preliminary references due (required)*
11 Title page, Introduction; References due in lab
13 Exam I
14 *Effective Data Presentation Workshop – bring your data and laptops to class*
14 Respiration/Fermentation proposal due on Blackboard by 2:30 p.m.
18 Results; Table; Figure due in lab
20 Lab Exam I
25 Title page; Figure; Discussion; References due in lab

March:

6 **Exam II**
7 Laboratory research project proposals due on Blackboard by 2:30 p.m.
20 Lab Exam II
27 *Effective Presentations Workshop (2 group members must attend)*

April:

1 Research symposium (*Technology Rehearsal 2:30 p.m.*)
10 Exam III
11 *"Ask the Editors" session 2:30 p.m.*
16 Research paper due in class
22 Molecular phylogeny report completed in lab
24 Lab Exam III

May:







6 **Final Exam**


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 and skills 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. This will save a lot of time when it is time to study for exams. Also, writing questions during the initial reading 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 for many people can be more helpful than the text.
-  **Take good notes.** I cannot stress this enough! 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. I strongly recommend printing lectures out prior to lecture (in "handout" format) and taking notes so that they correlate to specific slides. This will help you significantly when studying and also prevents you from the temptation of simply writing down what is already given to you on the slide. Review your notes after every lecture and before the next class.
 - This probably goes without saying, but if I say "write this down" or "this is important"---write it down. Even if you think you'll remember that and don't need to write it down...write it down and put a star by it, that information may very well re-visit you 😊
-  **Connect the lecture notes to your readings.** For the test, you are responsible for information in the textbook as well as the power points and lecture notes. Make sure that you are able to grasp and connect major concepts thoroughly and in detail.
-  **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.
-  **Do the handouts and check your answers.** You will be given many ungraded handouts throughout the semester. These handouts are a way for you to practice applying your knowledge and critical thinking skills and it is almost guaranteed that you will see these types of questions on exams. *Be sure to check your answers to ensure that you are learning correctly.* This can be done a number of ways: 1) Attend SI sessions, handouts are almost always covered 2) Check answers and/or work on the handouts in a study group 3) Some handouts have answer keys which will be posted on Blackboard 4) If after attending SI and/or working with friends, you are still stuck on a question or 2 on a handout, come see me and we can go over it.
-  **Take advantage of your resources:** Attend SI on a regular basis. Take advantage of my office hours to get individual assistance, I am always happy to help.

 **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!

 **Lab is equally important!** Please read your lab manual BEFORE lab and pay attention to the details. During lab, take good notes and make detailed observations---drawings can often be helpful. Always ask yourself, have I taken thorough enough notes that if I revisit this in a few weeks, I will remember and understand why I did what I did? 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.

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 Elise Huyett.

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 or hoodies can be worn while taking an exam. All cell phones must be left on silent 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	