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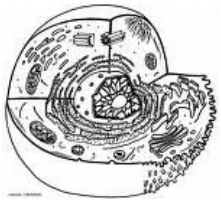
Biology 141(Q) Cell Biology and Genetics



Syllabus---Fall Semester 2012

Professor: Dr. Steve Baker
Office: Pierce Hall #117A

Lecture Hours: MWF 12A; 12:00-1:05, in Pierce 101
Lab Wednesday 2:30-5:30

Office Hours: My office hours will be 9-10 TTh, 9:30-10:30 MWF or by appointment; see me after class or email to set up. You are welcome to talk to me anytime if I am in the office or lab.

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

Optional Writing Book: A Student Handbook for Writing in Biology, Karen Knisely, 2005, 2nd edition, W.H. Freeman and Co. This is a great resource for writing, and is on reserve in the library.

Required Lab Text: SYMBIOSIS: *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 in the bookstore. ***Used lab manuals are not permitted***.

Web Site: www.masteringbio.com. Mastering Biology provides online study materials. Your text has instructions for accessing the site.

Course Objectives: This course is designed to serve as an introduction to the basic themes of biology and to begin your training as a scientist by introducing you to the basics of investigative science and science writing. The topics covered by the course will expose you to the basics of biology at the molecular, cellular, and organismal levels. Initially, you will learn about biological molecules and how they lead to cell structure and function. Secondly, we will learn about vital cell functions such as transport and the production of energy. A third objective will include the basics of molecular biology and inheritance, and how genetics is responsible for the evolution of populations. Your work in the lab will involve investigations addressing these topics, in order to broaden your understanding and to help you begin to learn how to "think and act like a scientist." These basic themes will prepare you well for more advanced study in biology.

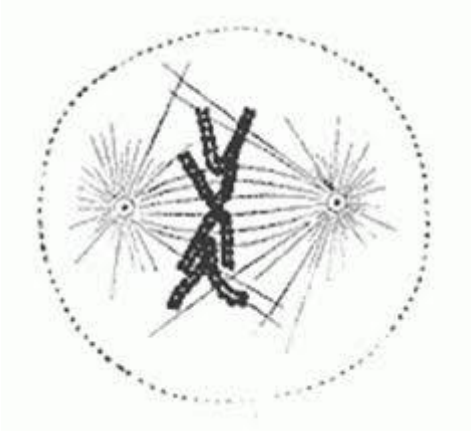
BIOLOGY 141 Fall 2012 LECTURE SCHEDULE

Date	Topic	Assigned Reading
W, Aug 29	Science as a Way of Knowing	1
F, Aug 31	Major themes in Biology	1
M, Sept 3	***Labor Day** no class or lab*	
W, Sep 5	Hierarchies: beginning with living chemistry and water	2,3
F, Sep 7	Building biological macromolecules: carbohydrates and lipids	4,5
M, Sep 10	Proteins and nucleic acids	5
Tu, Sep 11	***Scientific Literature and Research (Required) 8-8:45 AM or 9-9:45 AM– in the Library***	
W, Sep 12	Structure and function revealed in cells	6
F, Sep 14	Cellular Case Studies	
M, Sep 17	Membrane structure and cellular transport	7
W, Sep 19	Transport problems	
F, Sep 21	***Presentation of Scientific Data—bring your data and laptop to class***	
M, Sep 24	Fundamentals of energy transformations: enzymes, ATP and electron carriers	8
W, Sep 26	Cellular respiration I - Glycolysis	9
Thurs, Sep 27	**EXAM I 8:00 - 9:30 a.m. (through membrane transport)**	
F, Sep 28	Cellular respiration II - Transition and the Krebs Cycle	9
M, Oct 1	Cellular respiration III - Chemiosmosis and the Electron Transport System	9
W, Oct 3	Review and recapitulation: Accounting Day	
F, Oct 5	Homage to photosynthesis	
M, Oct 8	Photosynthesis I: the light dependent reactions	10
W, Oct 10	Photosynthesis II: the light independent reactions and variations (C4 and CAM)	10
F, Oct 12	Cell reproduction: cell cycle, mitosis	12
M, Oct 15	*** Fall Break***	
W, Oct 17	Sexual life cycles and meiosis	13
Thurs, Oct 18	**EXAM II – 8:00 – 9:30 a.m. (through photosynthesis)**	
F, Oct 19	Chromosomal mutations	15 pp. 297-300
M, Oct 22	Mendelian principles; genes and chromosomes	14, 15 pp. 286-289
W, Oct 24	Patterns of inheritance	14, pp. 271-281
F, Oct 26	Chromosomal theory and linkage	15
M, Oct 29	Genetics problems and review	14, 15
W, Oct 31	DNA structure	16
Th, Nov 1	***Effective Presentations Workshop - Pierce 206 8-8:45; 9:00-9:45 am (optional)***	
F, Nov 2	DNA replication	16
M, Nov 5	Gene to Protein I: transcription and the genetic code	17
W, Nov 7	Gene to Protein II: translation and genetic mutations	17
F, Nov 9	Molecular genetics workshop	

M, Nov 12	Charles Darwin and development of evolutionary concepts	22
W, Nov 14	Evidence for evolution	22,25
Thurs, Nov 15	**EXAM III - 8:00 – 9:30 a.m. (through genetics)**	
F , Nov 16	Population Genetics and Hardy Weinberg	23
	Scientific Papers – "Ask the Editors"- 2-3 p.m. Pierce 101	
M, Nov 19	Microevolution: genetic drift, gene flow and Mutation	23
	Research papers due in class	
W, Nov 21	*** THANKSGIVING BREAK******	
M, Nov 26	Genetic variation and selection	23
W, Nov 28	Speciation	24, pp. 487-501
F, Nov 30	Evolution of land plants	29
M, Dec 3	Sexual encounters of the floral kind	
W, Dec 5	Bryophytes and seedless vascular plants	29
F, Dec 7	Seed plants: gymnosperms and angiosperms	30
M, Dec 10	The Big Themes Revisited	

****** FINAL EXAMINATION ----Tuesday, December 18, 9 AM*****

The instructor reserves the right to adjust dates and topics on lecture and lab syllabi if he determines it is necessary.



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BIOLOGY 141 Wednesday LABORATORY SCHEDULE
Fall 2012 Dr. Steve Baker

Lab: 2:30-5:30 PM, Wednesday Lab meets in Pierce 125

Date		Lab Topic (#)	Writing Assignment*
Sept.	5	Scientific Investigation	*Title page; Introduction; References* (due 19th in lab)
	12	Microscopes and Cells	Review table+
	19	Diffusion and Osmosis	*Results; Table; Figure*
	26	Enzymes	*Materials and Methods*
Oct.	3	Cellular Respiration and Fermentation	*Title page; Figure; Discussion; References*
	4th	***(Thur.) LAB EXAM I (thru Enzymes) (Sign up for exams at 6:00 p.m. or 6:30 p.m.)***	
	10	Mitosis; Research Proposal Development	Comparison Table+
	15	**FALL BREAK**	
		Research Proposals submitted to Learnlink ON FRIDAY, Oct. 19th by 9 am	
	24	Field Research: Ecology and Evolution on the Outcrops	
	25th	***(Thur.) LAB EXAM II (Respiration, Mitosis, and outcrops) (6:00 p.m. or 6:30 p.m.)***	
	31	Microbial Diversity (Bacteriology)	*Research papers due in class 11/19*
Nov.	7	Research Symposium *(Technology Rehearsal – 8 a.m. – Pierce 101; one team member must be there)*	
	14	Molecular Biology	Map+
	21	**THANKSGIVING BREAK**	
	28	Plant Diversity I & II	Comparison Tables+
Dec.	5	Bioinformatics: Molecular Phylogeny of Plants	*Report completed in lab*
	6th	***(Thurs.) LAB EXAM (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)

September:

- ***11*** ***Literature workshop, preliminary references due (required)***
- **19 Title page, Introduction; References due in lab**
- ***21*** ***Effective data presentation workshop – bring your data and laptops to class***
- **26 Results; Table; Figure due in lab**
- **27 Exam I**

October:

- **3 Materials & Methods due in lab**
- **4 Lab Exam I**
- **10 Title page; Figure; Discussion; References due in lab**
- **18 Exam II**
- **19 Laboratory research project proposals due on Learnlink by 9 am**
- **25 Lab Exam II**

November:

- **1** ***Effective presentations workshop (optional, 1 group member must attend)***
- **7 Research symposium (*Technology Rehearsal 8 am*)**
- **15 Exam III**
- ***16*** ***"Ask the Experts" session***
- **19 Research paper due in class**

December:

- **5 Molecular phylogeny report completed in lab**
- **6 Lab Exam III**
- **18 Final Exam, 9am - 12pm**

STUDENT'S GUIDE TO BIOLOGY 141

Welcome to Biology 141! The information in this handout and accompanying materials should be read and followed by all students in Introductory Biology. If you do not understand everything in this handout, you should ask for clarification.

Biology 141 is designed for students who **plan to major in biology or NBB**, 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, demanding that you not only learn and apply complex information, but that you also organize this information within the major concepts of biology. This information will be essential to your success in other biology courses, where your competence in basic biology will be assumed. In addition many of you will be taking examinations to enter graduate or professional schools, and the knowledge you gain here will be required later.

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.

"Life in Balance" Theme: Many of your Oxford courses will participate in this year's sustainability theme by including topics and examples that are relevant to the thoughtful use of our environment. You will see this theme reflected in our work in Biology 141 this semester!

Tips for Studying: Biology 141 is an intensive course and requires time. You must be able to carefully manage your time and your work! If you are an average reader, you should spend about 8 hours a week outside class working in BIO 141. To perform well in this course, you must be diligent about the following:

- *Keep up with assigned readings*. The readings listed for each lecture in the syllabus must be done BEFORE the lecture. The best overall study **approach is to read assignments over quickly at first for an overview. Then read more carefully, jotting down questions or areas of confusion for later checking and review.** It's a good idea to review the text again as you study with your notes.

- *Take good notes*. In lecture, I will explain the most significant concepts from your readings. At times, I will present examples or images that may not be given in your textbook. You are responsible for all of this information. It is essential that your notes be complete and well organized. Begin learning your notes immediately; don't wait until a few days before the test!

- *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.

- *Study the diagrams in your text and lecture handouts*. Practice writing out pathways and link the concepts. It is helpful to **prepare your own tables and diagrams** as a study aid and review for much of the material in BIO 141.

- *Learn and think.* While studying, keep two things in mind: One is to **learn terminology** and most importantly, understand the relevance of that terminology to biological function. Second – it is crucial to remember that this course is designed to make you **think** and not just to have you memorize facts. Many of the test questions will revolve around applying your knowledge. Therefore you should be confident of what you know and what it means.

- **Be an active learner.** Develop study guides, comparison charts, and concept maps. Use the MasteringBiology (www.masteringbiology.com) web resources provided with your textbook. Complete assignments in *Practicing Biology*. Attend Supplemental Instruction and organize your own active study group. Don't be lulled into thinking familiarity is the same as knowledge. The latter takes time and an organized plan of study.

- **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 during the lab and take time to make detailed observations. Answer questions in the lab manual either during lab or immediately following lab. Pay attention to information about lab exams. Make use of open lab time. Learn to manage your time well and prepare in advance for the lab writing assignments.

Supplemental Instruction (SI) is provided for all students in Biology 141. I will explain this important program that provides assistance for students who wish to improve their performance in biology**.**

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 exams 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.

Absences: The policy on absences is provided in a separate handout. Unexcused absences in lecture, lab, examinations or a failure to follow the procedures outlined in that handout will result in a reduction in your grade. Any questions about absences should be asked immediately. It is your responsibility to be aware of the policy.

Cell Phones: The use of cell phones is strictly prohibited in the classroom and the laboratory. Please turn off your phone before you come to class and leave your phone at the front during exams. **Photography with camera phones is also prohibited.**

Personal Computer: If you would like to take notes on your personal laptop/tablet in class you must seek special permission from the instructor. Use of laptops for surfing the web, working on assignments, Facebook, Skype or other networking/chat during class is **completely unacceptable.**

Honor Code: Regulations of the Honor Code apply to all work for credit in this course, including lecture and lab examinations. Handouts will be submitted through Blackboard Safe Assign to assist in evaluation of their originality. Please pledge all of your work with your signature to indicate that you have followed the rules of the Honor Code.

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 have scheduled specific office hours but if these times are not suitable for you, please do not hesitate to make an appointment with me by emailing me through Learnlink or sbaker@emory.edu

LearnLink Class Conference and Blackboard Site: A class conference labeled "Bio 141 Baker" has been set up for this course on LearnLink. Please use the conference regularly to communicate with each other and to ask questions. I will use this conference to correspond with you about items we may have missed in class or lab or provide timely item. A Blackboard site is also set up for any additional materials and large files.

Additional Sessions: We have several additional instruction sessions in this course for scientific literature research and data presentation. These sessions are held outside of class time and are critical for your laboratory assignments. Check your syllabus; some are required meetings and others are optional.

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

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

"Student work submitted as part of this course may be reviewed by Oxford College and Emory College faculty and staff for the purposes of improving instruction and enhancing Emory education."