

Biology 141 – Cell Biology and Genetics
Course Syllabus
Fall 2011

Faculty Information: Dr. Nitya Jacob, *Office:* Room 104, Pierce Hall; *Phone:* 770-784-8346
Office Hours: Wednesdays 3:30-4:30; Thursdays 10-11AM
Email: Learnlink or njacob@emory.edu

Lecture: MWF 9:35-10:25 AM or 10:40-11:30 AM, Room 101, Pierce Hall

Laboratory: Monday 2:00-5:00PM or Tuesday 2:30-5:30 PM, Room 125, Pierce Hall

Required Texts: (1) *Biology*, N.A. Campbell and J.B. Reece, 2011, 9th edition, Benjamin/Cummings Publishing Co., Inc.
(2) *Practicing Biology*, Heitz, Jean and C. Griffen. Benjamin/Cummings Publishing Co., Inc. 2011, 4th edition. A terrific workbook that is useful alone or in study groups.

Required Lab Text: *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.*

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 also on reserve in the library.

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

Course Objectives: The purpose of this course is to give you, the student, a firm foundation in the underlying themes of biology. To study living organisms, the knowledge of cell structure and function, genetics and evolution is vital. 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, this course will help you comprehend crucial tasks conducted by cells; particularly how cells transport components across membranes, and how energy is generated within cells. Thirdly, you will learn the basic mechanisms of cell duplication, inheritance of biological traits and processing of genetic information. You will also become familiar with the study of gene transmission within a population and how genes are responsible for the evolution of organisms. A fourth objective of this course is for you to use your knowledge of cellular mechanisms towards understanding 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 the above goals. Upon grasping these fundamental themes of biology, you will be prepared to further probe into more intricate and specialized areas of this field.

Biology 141 Lecture Schedule

Date	Topic	Assigned Reading
W, Aug 24	Science as a Way of Knowing	1
F, Aug 25	Major themes in Biology	1
M, Aug 29	Hierarchies: beginning with living chemistry and water	2,3
W, Aug 31	Building biological macromolecules: carbohydrates and lipids	4,5
Th, Sep 1	<i>Scientific Literature and Research (Required)</i> 8-9 AM or 9-10 AM- in the Library. Sign up with the Instructor. <i>Library Assignment due 9/9</i>	
F, Sep 2	Proteins and nucleic acids	5
M, Sep 5	** Labor Day **	
W, Sep 7	Structure and function revealed in cells	6
F, Sep 9	Cellular Case Studies	
M, Sep 12	Membrane structure and cellular transport	7
W, Sep 14	Transport problems	
Th, Sep 15	<i>Presentation of Scientific Data (Required) – Room TBA</i> 8:15-9AM or 9-9:45AM. Sign up with the Instructor.	
F, Sep 16	Fundamentals of energy transformations: enzymes, ATP and electron carriers	8
M, Sep 19	Overview of cellular respiration	9
Tues, Sep 20	EXAM I 8:00 - 9:30 a.m. (through membrane transport)	
W, Sep 21	Cellular respiration I - Glycolysis	9
F, Sep 23	Cellular respiration II - Transition and the Krebs Cycle	9
M, Sep 26	Cellular respiration III - Chemiosmosis and the Electron Transport System	9
W, Sep 28	Review and recapitulation: Accounting Day	
F, Sep 30	Photosynthesis I: the light dependent reactions	10
M, Oct 3	Photosynthesis II: the light independent reactions and variations (C4 and CAM)	10
W, Oct 5	Cell reproduction: cell cycle, mitosis	12
F, Oct 7	Sexual life cycles and meiosis	13
M, Oct 10	*** Fall Break***	
W, Oct 12	Chromosomal mutations	15 pp. 297-300
Thur, Oct 13	EXAM II – 8:00 – 9:30 a.m. (through photosynthesis)	
F, Oct 14	Mendelian principles; genes and chromosomes	14, 15 pp. 286-289

Biology 141 Lecture Schedule

Date	Topic	Assigned Reading
M, Oct 17	Patterns of inheritance	14, pp. 271-281
W, Oct 19	Chromosomal theory and linkage	15
F, Oct 21	Genetics problems and review	14, 15
M, Oct 24	DNA structure	16
W, Oct 26	DNA replication	16
F, Oct 28	Gene to Protein I: transcription and the genetic code	17
F, Oct 28	Effective Presentations Workshop - Pierce 206 (1-2pm; 2-3 p.m in P206 - at least one group member must attend)	
M, Oct 31	Gene to Protein II: translation and genetic mutations	17
W, Nov 2	Molecular genetics workshop	
F, Nov 4	Charles Darwin and development of evolutionary concepts	22
M, Nov 7	Evidence for evolution	22,25
W, Nov 9	Evidence for evolution	22,25
F, Nov 11	Population Genetics and Hardy Weinberg	23
M, Nov 14	Microevolution: genetic drift, gene flow and mutation	23
Tues, Nov 15	EXAM III - 8:00 - 9:30 a.m. (through genetics)	
W, Nov 16	Genetic variation and selection	23
F, Nov 18	Evolution of land plants	29
F, Nov 18	Scientific Papers - "Ask the Experts"- 2:00 p.m. Room TBA	
M, Nov 21	Bryophytes and seedless vascular plants	29
Research papers due in instructors office - Nov. 22nd no later than 3:00 PM		
W, F 23-25	** Thanksgiving Break ** No Class	
M, Nov 28	Seed plants: gymnosperms and angiosperms	30
W, Nov 30	Flowering plants	30
F, Dec 2	Evolutionary trends in land plants - review	
M, Dec 5	The Big Themes Revisited	
*** FINAL EXAMINATION ***		
9A Section - Thursday, December 8, 2011: 9AM-12PM		
10A Section - Monday, December 12, 2011: 2-5PM		

BIOLOGY 141 LABORATORY SCHEDULE

Fall 2011

Dr. Nitya Jacob and Dr. Steve Baker

<u>Date</u>	<u>Lab Topic (#)</u>	<u>Writing Assignment*</u>
Aug 29, 30, 31	Scientific Investigation	Title page, Introduction, References; (due 9/9)
Sept 5**	Labor Day – Monday lab students meet on Friday Sept 9th	
6, 7, 9	Microscopes and Cells	Review table+
12, 13, 14	Diffusion and Osmosis	Results, Table, Figure (due 9/23)
19, 20, 21	Enzymes	(Table, Figure), Discussion, References (due 10/3)
26, 27, 28	Cellular Respiration	Materials and Methods (due 10/7)
	Introduction to Research Project	Research Proposal (due 10/17)
Sept. 29th (Thurs.) LAB EXAM I (through enzymes) begins at 6:00 pm.		
Oct. 3, 4, 5	Mitosis and Meiosis	
10, 11	***Fall Break*** No Lab This Week	
17, 18, 19	Molecular Biology	Map+
24, 25, 26	Ecology and Evolution on the Outcrops	
Oct. 30, Nov. 1, 2	Microbial Diversity (Bacteriology)	
Nov. 3rd (Thurs.) LAB EXAM II (respiration, mitosis, molecular biology) begins at 6:00 pm.		
7, 8, 9	Research Symposium	Research papers (due 11/22 by 3pm)
(Technology Rehearsal – 9:00 a.m. – Pierce 101 – one team member must be present)		
14, 15, 16	Plant Diversity I & II	
21, 22, 23	***Thanksgiving Break*** No Lab This Week	
Nov. 28, 29, 30	Molecular Phylogeny of Plants	Report completed in lab
Dec. 1st (Thurs.) LAB EXAM III (outcrops, microbial diversity, plant diversity) begins at 6:00 pm.		

*Writing assignments are due on the specified date in class (at the beginning).

+These assignments are not turned in for a grade.

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.

Biology 141 is designed for students who **plan to major in 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. The course demands that you learn detailed and complicated information, organize this information within the major concepts of biology, and apply your knowledge. In addition, there are multiple exams and assignments associated with this course. Your competence in basic biology will be assumed in other Biology courses, therefore it is crucial for you to succeed in this course. Many of you will be taking examinations to enter graduate or professional schools, and the knowledge you will gain in this course will be required for these tests.

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.

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

- * **Keep up with assigned readings.** The readings listed against each lecture in the syllabus must be done BEFORE the lecture.
- * **Take good notes.** In lecture, I will explain the most significant concepts from your readings. At times I will present examples that may not be given in your textbook. You are responsible for all of this information. Ask questions in class to help you connect with the concepts. Review your notes after every lecture and before the next class.
- * **Review lecture notes, Power Point slides, and readings on a weekly basis.** Every week, you must review your lecture notes and your textbook readings as you go through lecture Power Point slides on Blackboard. 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. In addition, connect the concepts learned in

lecture to the lab exercises. Study the diagrams in your text and lecture handouts. Practice writing out pathways and linking concepts. Use the blank figures handed out in class for your study.

- * **Take advantage of SI and Instructor availability.** Attend your SI sessions on a regular basis. Take advantage of my office hours to get individual direction.
- * **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. Many of the test questions will revolve around applying your knowledge. Therefore you should be confident of what you know and what it means.
- * **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. Your Biology 141 **SI leader** is Caroline Schwaner.

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. 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 njacob@emory.edu

Blackboard Site: A Blackboard Site is set up for this class. Please log into classes.emory.edu to find this course. All **announcements** from the instructor, SI leader, and laboratory TA will be posted or emailed via Blackboard. Lecture and laboratory resources will be posted here as well. In addition, there will be **occasional quizzes** that will be posted which you can complete as a review and for participation.

Additional Sessions: We have two required 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.

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	
150 points	3 laboratory exams	90 - 100%	A
175 points	final examination	80 - 89%	B
10 points	Blackboard Quiz participation	70 - 79%	C
40 points	scientific writing	60 - 69%	D
60 points	lab project	<60	F

735 points	total	Plus and minus grades are given	