Biology 141 – Cell Biology and Genetics
Course Syllabus
Fall 2010

Faculty Information: Dr. Nitya Jacob, *Office*: Room 104, Pierce Hall; *Phone*: 770-784-8346
Office Hours: W: 1:30-2:30 PM; Th: 11 AM-12 PM
Email: Learnlink or njacob@emory.edu

Lecture: MWF 9:35-10:25 AM, Room 102, Pierce Hall
Laboratory: Monday 2:00-5:00PM, Room 125, Pierce Hall

Required Texts: (1) *Biology*, N.A. Campbell and J.B. Reece, 2008, 8th edition, Benjamin/Cummings Publishing Co., Inc. The optional Study Guide is available on reserve in the library. (2) *Practicing Biology*, Heitz, Jean and C. Griffen. Benjamin/Cummings Publishing Co., Inc. 2008. A terrific workbook that is useful alone or in study groups.

Required Lab Text: *Investigating Biology*, 6th ed. Morgan, J. G. and M. E. B. Carter. Benjamin/Cummings Publishing Company, Inc. 2008. 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 - Fall 2010 Lecture Schedule
Dr. Nitya Jacob

Date	Topic	Assigned Reading
W, Aug 25	Science as a Way of Knowing	1
F, Aug 27	Major themes in Biology	1
M, Aug 30	Hierarchies: beginning with living chemistry and water	2,3
W, Sept 1	Building biological macromolecules: carbohydrates and lipids	4,5
F, Sep 3	Proteins and nucleic acids	5
F, Sep 3	*Scientific Literature and Research (Required) 1-2 pm and 2-3 pm – in the Library. Sign up with the Instructor.*	
M, Sep 6	** Labor Day **	
W, Sep 8	Structure and function revealed in cells	6
F, Sep 10	Cellular Case Studies	
M, Sep 13	Membrane structure and cellular transport	7
W, Sep 15	Transport problems	
F, Sep 17	Fundamentals of energy transformations: enzymes, ATP and electron carriers	8
M, Sep 20	*Presentation of Scientific Data – Pierce 125*	
Tues, Sep 21	**EXAM I 8:00 - 9:30 a.m. (through membrane transport)**	
W, Sep 22	Cellular respiration I - Glycolysis	9
F, Sep 24	Cellular respiration II - Transition and the Krebs Cycle	9
M, Sep 27	Cellular respiration III - Chemiosmosis and the Electron Transport System	9
W, Sep 29	Review and recapitulation: Accounting Day	
F, Oct 1	Photosynthesis I: the light dependent reactions	10
M, Oct 4	Photosynthesis II: the light independent reactions and variations (C4 and CAM)	10
W, Oct 6	Cell reproduction: cell cycle, mitosis	12
F, Oct 8	Sexual life cycles and meiosis	13
M, Oct 11	*** Fall Break***	
W, Oct 13	Chromosomal mutations	15 pp. 297-300
Thur, Oct 14	**EXAM II – 8:00 – 9:30 a.m. (through photosynthesis)**	
F, Oct 15	Mendelian principles; genes and chromosomes	14, 15 pp. 286-288

Date	Topic	Assigned Reading
M, Oct 18	Patterns of inheritance	14, pp. 271-280
W, Oct 20	Chromosomal theory and linkage	15
F, Oct 22	Genetics problems and review	14, 15
F, Oct 22	*Effective Presentations Workshop - Pierce 206 (1-2pm; 2-3 p.m in P206)*	
M, Oct 25	DNA structure	16
W, Oct 27	DNA replication	16
F, Oct 29	Gene to Protein I: transcription and the genetic code	17
M, Nov 1	Gene to Protein II: translation and genetic mutations	17
W, Nov 3	Molecular genetics workshop	
F, Nov 5	Charles Darwin and development of evolutionary concepts	22
F, Nov 5	*Scientific Papers – "Ask the Experts"- 2:00 p.m. Library*	
M, Nov 8	Evidence for evolution **Research papers due in class – Nov 8**	22,25, pp. 481-495
W, Nov 10	Evolutionary processes	23
F, Nov 12	Population Genetics and Hardy Weinberg	23
M, Nov 15	Microevolution: genetic drift, gene flow and mutation	23
Tues, Nov 16	**EXAM III - 8:00 – 9:30 a.m. (through genetics)**	
W, Nov 17	Genetic variation and selection	23
F, Nov 18		
M, Nov 22	Evolution of land plants:	29
W, F 24-26	** Thanksgiving Break **	
M, Nov 29	Bryophytes and seedless vascular plants	29
W, Dec 1	Seed plants: gymnosperms and angiosperms	30
F, Dec 3	Evolutionary trends in land plants	
M, Dec 6	The Big Themes Revisited	

***** FINAL EXAMINATION ***Wednesday, December 15, 9:00-12:00 PM**

BIOLOGY 141 LABORATORY SCHEDULE
Fall 2010
Dr. Eloise Carter, Dr. Nitya Jacob, Dr. Amanda Pendleton

Date	**Lab Topic (#)**	**Writing Assignment***
Aug 30, 31 Sept 1, 2	Scientific Investigation	*Title page, Introduction, References*
Sept 6**	**Labor Day – Monday lab students meet on Friday Sept 10th**	
7,8,9	Microscopes and Cells	Review table+
13, 14, 15, 16	Diffusion and Osmosis	*Results, Table, Figure*
20, 21, 22, 23	Enzymes	(*Table, Figure), Discussion, References*
27, 28, 29, 30	Cellular Respiration Introduction to Research	*Materials and Methods* *Proposal completed in lab*

Sept. 30th (Thurs.) LAB EXAM I (through enzymes) begins at 6:00 pm.

Oct. 4, 5, 6, 7	Mitosis; Independent Research Projects	*Research Paper (due 11/8)*
11, 12	****Fall Break*** No Lab This Week*	
18, 19, 20, 21	Molecular Biology	Map+
25, 26, 27, 28	Research Symposium	*Research papers due in class 11/8*

(Technology Rehearsal – 9:00 a.m. – Pierce 101 – one team member must be present)

Nov. 1, 2, 3, 4	Ecology and Evolution on the Outcrops	

Nov. 4th (Thurs.) LAB EXAM II (respiration, mitosis, molecular biology) begins at 6:00 pm.

8, 9, 10, 11	Microbial Diversity(Bacteriology)	
15, 16, 17, 18	Plant Diversity I & II	
22, 23, 24, 25	****Thanksgiving Break*** No Lab This Week*	
Nov. 29, 30 Dec. 1, 2	Molecular Phylogeny of Plants	*Report completed in lab*

Dec. 2nd (Thurs.) LAB EXAM (outcrops, microbial diversity, plant diversity) begins at 6:00 pm.

***Writing assignments are due one week later at the beginning of the lab period.**
+These assignments are not turned in for a grade.

Important Dates for Biology 141 (includes lab and out of class sessions)

September:

3 *Literature workshop, preliminary references due (required – 1-2 pm or 2-3 pm)*
TBA Title page, Introduction and references due
20 *Data presentation workshop in class*
21 **Exam I**
TBA Results, Table, and Figure due
27 Discussion , Table, Figure, and references due
30 **Lab Exam I**

October:

4 Materials and Methods due in lab; Proposals completed in lab
16 **Exam II**
22 *Effective presentations workshop (optional, 1 group member must attend)*
26 Research symposium

November:

4 **Lab Exam II**
5 *"Ask the Experts" session*
8 **Research paper due in class**
16 **Exam III**
29 Molecular phylogeny report completed in lab

December:

2 **Lab Exam III**
15 **Final Exam, 2-5pm**

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.

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.

- **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. 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 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 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 **Nasir Kanji**.

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 in class you must seek special permission from the instructor. Use of laptops for surfing the web, 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 for a different time.

LearnLink Class Conference and Blackboard Site: A class conference labeled "Jacob 141" 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. The syllabus and weekly lab instructions will also be posted under the Biology 141 conference – check the folders. A Blackboard site is also set up for any additional materials and large files.

Additional Sessions: We have two required additional instruction sessions in this course for library and effective oral presentations. 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
150 points	3 laboratory exams
175 points	final examination
40 points	scientific writing
60 points	lab project
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725 points	total

Final grade determination

90 - 100%	A
80 – 89%	B
70 – 79%	C
60 – 69%	D
<60	F

Plus and minus grades are given