

**BIOLOGY 141 (INQ, WR) CELL BIOLOGY AND GENETICS SYLLABUS**  
**SPRING SEMESTER 2012** **SECTION 9A**

**Professor:** Dr. M. Eloise Brown Carter

**Office:** Pierce Hall #107(side porch of Pierce)

**Phone:** (770) 784-8343

**Lecture Hours:** Monday, Wednesday, Friday; 9:35 a.m. – 10:25 a.m. **Room:** Pierce 101

**Lab Hours:** Monday 2 p.m. – 5 p.m.

**Room:** Pierce 123

**Office Hours:** Monday and Wednesday – 11:15 a.m. to noon. Thursday 6:00 p.m. – 7:00 p.m. Students are encouraged to see Dr. Carter 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*, 7<sup>th</sup> 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. This is a new edition of the lab manual. *Used lab manuals are not permitted.*

**Optional Writing Book:** *A Student Handbook for Writing in Biology*, Karen Knisely, 2008, 3<sup>rd</sup> edition, W.H. Freeman and Co. This is a great resource for writing, and is also on reserve in the library. **NOTE:** This course fulfills the Writing Requirement.

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

<u>Date</u>	<u>Topic</u>	<u>Assigned Reading</u>
W, Jan 18	Science as a Way of Knowing	1
F 20	Major themes in Biology	1
M 23	Hierarchies: beginning with living chemistry and water	2,3
W 25	Building biological macromolecules: carbohydrates and lipids	4, 5
F 27	Proteins and nucleic acids	5
M 30	Structure and function revealed in cells	6
W, Feb. 1	Cellular Case Studies	
F 3	Membrane structure and cellular transport	7
M 6	Transport problems	
W 8	Fundamentals of energy transformations: enzymes, ATP and electron carriers	8
Th 9	<i>Scientific Literature &amp; Research (Library - Required) 8:00 – 8:45am and 9:00 – 9:45am</i>	
F 10	Cellular respiration I - Glycolysis	9
M 13	Cellular respiration II - Transition and the Krebs Cycle	9
F 15	Cellular respiration III – Chemiosmosis and The Electron Transport System	9
Th 16th	<b>EXAM I 8:00 - 9:30 a.m. (through membrane transport)</b>	
W 17	Presentation of Scientific Data – bring your lab data to class	

M	20	Review and recapitulation: Accounting Day	
W	22	Homage to photosynthesis	10
F	24	Photosynthesis I: the light dependent reactions	10
M	27	Photosynthesis II: the light independent reactions and variations (C4 and CAM)	10
W	29	Cell reproduction: cell cycle, mitosis	12
F, Mar. 2		Sexual life cycles and meiosis	13
M	5	Chromosomal mutations	15 pp. 297-300
W	7	Mendelian principles; genes and chromosomes	14, 15 pp. 286-288
Th	8th	<b>EXAM II – 8:00 – 9:30 a.m. (through photosynthesis)</b>	
F	9	Patterns of inheritance	14 pp. 271-281
March 12 - 16		<b>***SPRING BREAK**</b>	
M	19	Chromosomal theory and linkage	15
W	21	Genetics problems and review	14, 15
F	23	DNA structure	16
M	26	DNA replication	16
W	28	Gene to Protein I: transcription and the genetic code	17
TH	29	<i>8:00 – 8:45, 9:00 – 9:45 a.m. - Effective Presentations Workshop - Pierce 206 (optional)</i> <i>Mark Frankel Lecture – Time and Location TBA</i>	
F	30	Gene to Protein II: translation and genetic mutations	17
M, Apr. 2		Modeling Beyond Watson and Crick	
W	4	Molecular genetics workshop	
F	6	Charles Darwin and development of evolutionary concepts	22
M	9	Evidence for evolution	22, 25 pp. 510-512; 519-530
W	11	Population Genetics and Hardy Weinberg <i>Dr. Alison Foster Lecture – Time and Location TBA</i>	23
TH	12	<b>EXAM III - 8:00 – 9:30 a.m. (through genetics)</b>	
F	13	Microevolution: genetic drift, gene flow and mutation <i>Scientific Papers – “Ask THE EDITORS” 2-3 PM P101</i>	23
M	16	Genetic variation and selection	23
W	18	Evolution of land plants <i>Research papers due in class</i>	29
F	20	Sexual Encounters of the Floral Kind	38 pp. 801-807
M	23	Bryophytes and seedless vascular plants	29
W	25	Seed plants: gymnosperms and angiosperms	30
F	27	Evolutionary trends in land plants	
M	30	The Big Themes Revisited	

**\*\*\* FINAL EXAMINATION \*\*\*May 3<sup>rd</sup>, Thursday 2-5 p.m.\*\*\***

**BIOLOGY 141**  
**MONDAY LABORATORY SCHEDULE**  
**SPRING 2012**  
**DR. ELOISE CARTER**

<u>Date</u>	<u>Lab Topic (#)</u>	<u>Writing Assignment*</u>
Jan. 23	Scientific Investigation	Materials and Methods
30	Microscopes and Cells	Review table**
Feb. 6	Diffusion and Osmosis	Title page; Introduction, References
13	Enzymes	Results; Table; Figure
20	Cellular Respiration and Fermentation	Title page; Table; Discussion & References
<b>23 (Thur.) LAB EXAM (thru Enzymes) (Sign up for exams at 6:00 p.m. or 6:30 p.m.)</b>		
27	Mitosis and Meiosis	Comparison Table**
Mar. 5	Research Teams: Proposal Development	
	<i>Proposals submitted to conference ON FRIDAY, MARCH 9<sup>TH</sup> by 9 am</i>	
12 - 16	<b>*** SPRING BREAK ***</b>	
19	Field Research: Ecology and Evolution on the Outcrops	
<b>22 (Thur.) LAB EXAM (Respiration, Mitosis, and outcrops) (6:00 p.m. or 6:30 p.m.)</b>		
26	Microbial Diversity (Bacteriology)	<i>Research papers due in class 4/18</i>
Apr. 2	Research Symposium	
	<i>(Technology Rehearsal – 9 a.m. – Pierce 101; one team member must be there)</i>	
9	Molecular Biology	Map**
16	Plant Diversity I & II	
23	Bioinformatics: Molecular Phylogeny of Plants	<i>Report completed in lab</i>
<b>26<sup>th</sup> (Thurs.) LAB EXAM (Bacteriology, Molecular Biology and Plant Diversity I &amp; II) (6:00 p.m. or 6:30 p.m.)</b>		

**\*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.**






# 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 Cell Biology and Genetics. If you do not understand everything in this handout, you should ask for clarification.


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, demanding that you learn detailed and complex information, organize this information around conceptual themes and apply your knowledge. This knowledge will be essential to your success in other biology courses, where your competence in fundamental biology will be assumed. Many of you will be taking examinations to enter graduate or professional schools, and the knowledge you gain here will be required for your success.


**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 develop an understanding of the biochemical molecules that make up the structure of cells and how these molecules govern cell function. You will study the fundamentals of cell function, including transport across cell membranes, and energy transformation in living cells. Then you will explore cell reproduction, inheritance of biological traits and processing of genetic information. You will study the genetics of populations and how genes are responsible for evolution and biological diversity. Finally, a very important objective of this course is teaching you to “think and work like a scientist” through methods of scientific inquiry and the practice of scientific thinking. 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. *This course fulfills the Inquiry (INQ) and Continuing Writing Requirement (WR).*


**Tips for Success:** Biology 141 is an intensive course and requires time and commitment. 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.**
-  **Take good notes.** Detailed and well-organized notes provide the fundamental framework for studying and learning in this course. 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. The work of taking notes can be important to learning.
-  **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 text book as well as images and diagrams from your text and masteringbiology.com.
-  **Review material and do Practicing Biology problems on a regular basis.** 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. Attend your SI sessions on a regular basis. Take advantage of my office hours to get individual assistance.
-  **Learn the facts and think scientifically.** While studying, keep two things in mind: FIRST is to **master the facts of biology** and most importantly, **understand the connections** among these biological facts. SECOND – it is crucial to remember that this course is designed to make you **think** and not just to recall facts. Learning the facts is important to establish a knowledge base, but it is not sufficient! You must be able to **apply your knowledge to**

**think logically and analytically.** Therefore you should be confident of what you know, what it means, and how it relates to major themes in biology.

 **Be an active learner.** Develop study guides, comparison charts, and concept maps. Use the MasteringBiology ([www.masteringbiology.com](http://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 hard work!

 **Be prepared for laboratory and invest time and effort in lab each week.** Read the lab and review terminology and diagrams BEFORE lab each week. During lab complete all components of the lab. Take good notes and make detailed observations. Answer all questions in the lab manual during or after lab. Immediately after lab review the objectives and prepare a study guide for the lab materials and activities. Be serious about completing the writing assignments!

 **Writing to learn and learning to write:** This course is a "Writing Course" in which you will learn by writing – in class responses, case study reports, and exam essays. Scientists communicate their work and ideas through clear and concise writing that utilizes evidence to support their conclusions. You will practice scientific writing by first writing individual sections of a scientific paper for laboratory investigations. As part of your team research, you will design your own investigation and write a proposal. After completing your research, you will write a complete scientific paper.

**Supplemental Instruction.** SI is provided for all students in BIO 141. The instructor 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 Caroline Schwaner this semester.

**Examinations.** There will be three lecture exams (100 pts. each) that will be a combination of multiple choice, short answer, problems, and short essay questions. Exams will cover all material covered in lecture in addition to assigned readings in the text. The final examination is comprehensive (175 pts.). There are three laboratory practical exams that include a written portion (50 pts. each). These exams cover the laboratory topics and exercises. Students should feel free to ask for clarification about any question during the exams.

**Team Research Project.** Students will work in teams to design and perform an independent research investigation in the laboratory. You write a proposal, organize your team and complete the research project. Together you will prepare a PowerPoint presentation and individually write a complete scientific paper. Specific instructions will be provided in lab. Students will evaluate individual and group performance.

**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.

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

**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**.

**Absences.** The policy on absences and being late to class is provided in a separate handout. Unexcused absences or a failure to follow the procedures outlined in that handout **will result in a significant reduction in your grade**. Any questions about absences should be asked immediately. This is essential for the laboratory portion of the course.

**Evaluation.** Students are evaluated on their performance in the classroom and laboratory. Plus and minus grades are given. The assignment of points will be:

300 points 3 lecture exams  
150 points 3 laboratory exams  
175 points final examination  
40 points scientific writing  
60 points lab project

**725 points total**

Final grade determination:

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