Biology 141QW– Cell Biology and Genetics

Fall 2018

MWF 10:00-10:50AM
OSB 115

Lab:
Tuesday
9:45 am-12:45 am,
OSB 325

https://www.pinterest.com/pin/249527635581972275/

Course Description and Objectives:

The purpose of this course is to give you 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 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 this, with the two components of the course integrated through study, laboratory exercises, group work, scientific writing, and individual disciplined study.

Required Purchases:

Textbook: *Campbell Biology*, Reece, J.B., Urry, L.A., Cain, M.L., Wasserman, S.A., Minorsky, P.V., and Jackson, R.B. **11th edition**, Pearson, 2017

Practicing Biology, Heitz, Jean and C. Griffen. Pearson, 2017.

Laboratory Manual: SYMBOSIS: *Investigating Biology*, 9th ed. Morgan, J. G. and M. E. B. Carter. Pearson,B 2017. A customized new edition published for BIO 141 is available ONLY in the bookstore. ***Used lab manuals are not permitted***.

Highly Recommended:

MasteringBiology (*www.masteringbio.com*) provides online study materials, practice exams, learning activities and strategies for success.

Writing in Biology: *A Student Handbook for Writing in Biology*, Karen Knisely, 2013, 5th edition, W.H. Freeman and Co. Very useful for writing assignments.

Instructor: Sarah Fankhauser
Office: OSB 302
Email: Sarah.Fankhauser@emory.edu
Office Hours: Mondays 3-5pm or by appointment

Contents:

Tips for Success:

Take detailed class notes

Take notes in class, draw images, and keep it organized

Review your notes often, re-draw images and diagrams

Practice the problems (without the answers in front of you!)

Actually read the textbook

Read the relevant chapter(s) **before** class, take notes

Use www.masteringbiology.com. Complete assignments in *Practicing Biology*

Communicate, communicate, communicate

Ask questions IN class, answer questions, participate in group discussions

Email, call, telegram me! Come to my office hours, or set up a different time to meet

Attend SI!!!

Attend SI sessions; this is a time for you to work problems, ask questions and seek answers.

Your SI:

Sean Heflin

Sean.martin.heflin@emory.edu

Engage fully in the lab

Read each lab, pay attention to detail; complete the lab questions in lab

Note the lab exams and make use of *open* lab time.

How to study (yes you need a diagram for this)

Study all handouts and additional class resources…on a daily and weekly basis. YOU CANNOT wait until the week before the exam!

Read, in detail, the textbook; connect the material back to your notes and lectures. If there is a discrepancy then come talk to me or email me.

Make visuals, diagrams, pictures, flow charts and tables of the content. This will help connections emerge and help you identify areas or content that you still have questions about.

Practice all problems, worksheets and questions. Come see me to look at and discuss the answers. Do this daily and weekly, not right before the exam! Quiz yourself to see if you actually know the material

What Ways of Inquiry really means:

You will learn about cell biology and genetics in this course not just by learning information simply "given" to you. You will learn about the subject by practicing methods that led to the discovery of that knowledge in the first place - by asking questions, designing experiments, reading and writing critically, working independently, making connections, and thinking beyond the confines of the discipline.

Policies, requirements, etc…

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 Canvas.** Please follow the Honor Code in ALL aspects of this course and include your signature on your work as your pledge.

Exam Protocols: Do not come to any exam with notecards in your pockets or on your person. All cell phones are to be turned off and either in your bag in the front of the room or on the instructor's bench. Do not write notes or study material, or anything that could be construed as 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.

Class Participation: This is an interactive course. Participating in discussions, exercises and labs will only further help you make critical connections in biology.

Absences: The policy on absences is provided in a separate handout. Unexcused absences, tardiness, or a failure to follow the procedures outlined in that handout can result in a reduction in your grade. It is your responsibility to clearly communicate with the instructor as much in advance as possible about medical or family emergencies.

Cell Phones: The use of cell phones is strictly prohibited in the classroom and the laboratory, unless otherwise stated. Please turn off your phone before you come to class and leave your phone at the front during exams. Photography with camera phones is only permitted to gather evidence for your research project.

Personal Computer or Tablet: If you would like to take notes on your personal laptop or tablet in class you must first seek special permission from the instructor. Surfing the web, Facebook, Skype or other multitasking/ networking/chat during class is completely unacceptable and will not be tolerated.

Canvas Site: Canvas will have announcements, handouts, information about Practicing Biology questions, and more! Your SI and TA will email you from Canvas. You will upload all writing assignments on Canvas. The syllabus and other assignments for lecture and lab will be posted on Canvas.

Additional Sessions. We have one additional instruction session in this course for library and information technology. This sessions is held outside of class time and is critical for your laboratory assignments.

Accommodations:. In order to receive consideration for reasonable accommodations, please contact the OAS and complete the registration process. If you have a registered accommodation, please immediately coordinate a meeting with me to discuss a protocol to implement accommodations that will (or may) be needed over the course of the semester. This meeting should occur as early in the term as possible. Contact Megan Bohinc in OAS for more information at (770) 784-4690 or oas_oxford@emory.edu

Inclusivity: Oxford College of Emory University's ideals of inclusivity require that we foster an environment where people of diverse backgrounds, identities, abilities, and ideologies are affirmed, respected, and seen as a source of strength; where we strive to learn together, and ultimately thrive communally. If we at all fail to support these ideals, then we encourage discussion towards improvement, and we hope that this statement affirms your right to seek those discussions via dialogue with faculty, staff, your peers, and the use of the "Speak Up!" system when needed.

College-Wide Assessment: 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.

Date	Topic	Assigned Reading
W, Aug 29	Science as a Way of Knowing	1
F 31	Major themes in Biology	1
M, Sep 3	Labor Day	
W 5	Hierarchies: beginning with living chemistry and water	2,3
Th 6	*Scientific Literature & Research (OSB115) 8:00 – 8:45am and 9:00 – 9:45am*	
F 7	Building biological macromolecules: carbohydrates and lipids	4, 5
M, 10	Proteins and nucleic acids	5
W 12	Structure and function revealed in cells	6
F 14	Cell biology - Problems/Case Study Strategies for Success	6
M 17	Membrane structure and cellular transport	7
W 19	Transport problems	
F 21	Fundamentals of energy transformations: enzymes, ATP and electron carriers	8
M 24	Cellular respiration I - Glycolysis	9
W 26	Cellular respiration II – Glycolysis and Transition	9
Th 27	**EXAM I 8:00 - 9:30 a.m. (through membrane transport)**	
F 28	Cellular respiration III- Krebs Cycle	
M, Oct 1	Cellular respiration IV – Chemiosmosis and The Electron Transport System	9
W 3	Review and recapitulation: Accounting Day	
F 5	Homage to photosynthesis	10
October 8 & 9	****FALL BREAK****	
W, Oct 10	Photosynthesis I: the light dependent reactions	10
F 12	Photosynthesis II: the light independent reactions and variations (C4 and CAM)	10
M 15	*Team research proposal development part I* (Class held in 301)	
W 17	*Team research proposal development part II* *Team research proposals due on Canvas October 18th* by 9am	
F 19	Cell reproduction: cell cycle, mitosis	12
M 22	Sexual life cycles and meiosis	13
W 24	Mendelian principles; genes and chromosomes	14, 15 pp 294-297
Th 25	**EXAM II – 8:00 – 9:30 a.m. (through photosynthesis)**	
F 26	Patterns of inheritance	14 pp. 278-283
M 29	Chromosomal theory and linkage	15
W 31	Genetics problems and review	14, 15
F, Nov 2	DNA structure	16
M 5	DNA replication	16
W 7	Gene to Protein I: transcription and the genetic code	17
F 9	Gene to Protein II: translation and genetic mutations	17

M	12	Molecular genetics workshop	
W	14	Charles Darwin and development of evolutionary concepts	22
Th	**15**	**EXAM III - 8:00 – 9:30 a.m. (through genetics)**	
F	16	Evolution for evolution	22, 25 pp 523-535
M	19	Genetic Variation, Population Genetics and Hardy-Weinberg	23

November 21-24 ****Thanksgiving Break****

M	26	*Ask the editors* (optional)	
W	28	Microevolution: genetic drift, gene flow and mutation	23
F	30	Evolution of land plants	29
		Research papers due in class November 30th	
M, Dec	3	Bryophytes and seedless vascular plants	29
W	5	Seed plants: gymnosperms and angiosperms	30, 38 pp 826-830
F	7	Sexual Encounters of the Floral Kind	38 pp. 821-829
M	10	Evolutionary trends in land plants and Big Themes Revisited	

BIO 141 Tuesday AM Laboratory Schedule

Fall 2018

Date		**Lab Topic**	**Writing Assignment**[1]
Sept	4	Scientific Investigation	Introduction and Reference
	11	Microscopes and Cells	Review table[2]
	18	Diffusion and Osmosis	Methods and Title Page
	25	Enzymes	Table; Figure
	26	*Respiration Proposals uploaded to Canvas by 2:30 p.m.*	
Oct	2	Cellular Respiration and Fermentation	Figure; Results; Discussion; References
	4	**(Thur.) LAB EXAM (thru Enzymes)** [3]	
.	8-9	***** FALL BREAK *****	
	16	Mitosis and Meiosis	Comparison Table[2]
	23	Field Research: Ecology and Evolution on the Outcrops	

	30	Microbial diversity (Bacteriology)
Nov	**1**	**(Thur.) LAB EXAM (Mitosis and Meiosis)[3]**
	6	Research Symposium *Technology Rehearsal - Upload and check your presentation at 9:30!* *Research papers due in class 11/30*
	13	Molecular Biology
	20	**No lab this week**
	27	Plant Diversity I and II
Dec	**4**	**No lab this week.**
	6	**(Thur.) LAB EXAM (Bacteriology, Molecular Biology and Plant Diversity I & II)[3]**

[1]Writing assignments are due one week later at the beginning of the lab period unless otherwise noted. All assignments should be uploaded to Canvas

[2]These assignments are **not** turned in for a grade

[3]Lab exams are scheduled in several sessions on Thursday afternoon and evening. Sign up in class for a time.

Important Dates for Biology 141

(Includes lab and out of class sessions)

September:

6	Scientific Literature Workshop, preliminary references due
11	Introduction; References due on Canvas
18	Materials & Methods; Title page due on Canvas
26	Respiration/Fermentation proposal due by 2:30pm on Canvas
27	**Exam I**

October:

2	Table; Figure due on Canvas
4	**Lab Exam I**
16	Figure; Results; Discussion; References due in lab
18	Team Research Proposal submitted by 9am on Canvas
25	**Exam II**

November:

1 **Lab Exam II**
6 Research Symposium
15 **Exam III**
Have you read this far in the syllabus?? Great job! Send evidence of your meticulous efforts by emailing me your favorite biology joke.
19 **Final rewrites for writing assignments are due**
26 *"Ask the Editors" session in class*
30 **Research paper due on Canvas**

December:

6 **Lab Exam III**

OSB 115, WEDNESDAY December 19th 2-5pm

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
135 points	3 laboratory exams
165 points	final examination
25 points	scientific writing
75 points	lab project
700 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