Biology 141QW– Cell Biology and Genetics

Spring 2018

1A –
MWF 1:15-2:20 PM
OSB 115

Lab:
Wednesday
2:30 pm-5:30 pm,
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, 4th edition, W.H. Freeman and Co. Very useful for writing assignments.

Instructor: Sarah Fankhauser
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Office Hours: Tuesday 10-11 and by appointment

Contents:
How to be successful 2
Policies, requirements, etc 3
Grading scale and syllabus..... 4-end

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:

Jerry Yue

jerry.yue@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!

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 **UnPlag 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. 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 two required additional instruction sessions in this course for library and information technology. These sessions are held outside of class time and are 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	Chapters Assigned
W, Jan 17	Science as a Way of Knowing	1
F 19	Major themes in Biology	1
M 22	Hierarchies: beginning with living chemistry and water	2,3
W 24	Building biological macromolecules: carbohydrates and lipids	4, 5
F, 26	Proteins and nucleic acids	5
M 29	Structure and function revealed in cells	6
W 31	Cell biology - Problems/Case Study	
F Feb 2	Membrane structure and *Strategies for success*	
	Anatomy of a scientific paper	
M 5	Cellular Transport 7	
W 7	Cells and Transport problems	
Th 8	*Scientific Literature & Research (OSB115 and 101 - Required) 8:00 – 8:45am and 9:00 – 9:45am*	
F 9	Fundamentals of energy transformations: enzymes, ATP	
	and electron carriers	8
M 12	Cellular respiration I - Glycolysis	9
W 14	Cellular respiration II - Transition and the Krebs Cycle	9
Th 15	**EXAM I 8:00 - 9:30 a.m. (through membrane transport)**	
F 16	*Presentation of Scientific Data – bring your lab data and laptop to class*	
M 19	Cellular respiration III – Chemiosmosis and The Electron Transport System	9
W 21	Review and recapitulation: Accounting Day	
F 23	Homage to photosynthesis	10
M, 26	Photosynthesis I: the light dependent reactions	10
W 28	Photosynthesis II: the light independent reactions	
	and variations (C4 and CAM)	10
F Mar 1	Cell reproduction: cell cycle	
M 5	Mitosis and control of cell cycle	12
W 7	Sexual life cycles and meiosis	13
Th 8	**EXAM II – 8:00 – 9:30 a.m. (through photosynthesis)**	
F 9	Chromosomal mutations	15 pp. 306-309
Mar 12-16	**SPRING BREAK**	
M 19	Mendelian principles; genes and chromosomes	14, 15 pp 294-297
W 21	Patterns of inheritance	14 pp. 278-283
F 23	Chromosomal theory and linkage	15
M 26	Genetics problems and review	14, 15
W 28	DNA structure	16
F 30	DNA replication	16
M Apr 2	Gene to Protein I: transcription and the genetic code	17

W	4	Gene to Protein II: translation and genetic mutations	17
F	6	Molecular genetics workshop	
M	9	Charles Darwin and development of evolutionary concepts	22
W	11	Evidence for evolution	22, 25 pp 523-535
Th	**12**	**EXAM III - 8:00 – 9:30 a.m. (through molecular genetics)**	
		Scientific Papers – "Ask THE EDITORS" 5:00 – 6:00 p.m. OSB 115	
F	13	Genetic Variation, Population Genetics and Hardy-Weinberg	23
M	16	Microevolution: genetic drift, gene flow and mutation	23
W	18	Selection and Speciation	23, 24 pp 504-513
F	20	Evolution of land plants , bryophytes and seedless vascular plants	29
		Research papers due in class	
M	23	Seed plants: gymnosperms and angiosperms	30, 38 pp 822-826
W	25	Sexual Encounters of the Floral Kind	38 pp. 821-829
F	27	Evolutionary trends in land plants	
M	30	Big Themes Revisited	

***** FINAL EXAMINATION ***May 3rd, Thursday, 9am-12pm.*****

Bio 141 Wednesday Laboratory Schedule
Spring 2018

Date		Lab Topic (#)	Writing Assignments[1]
Jan.	24	Scientific Investigation	Materials and Methods; Title page
	31	Microscopes and Cells	Review table[2]
Feb	7	Diffusion and Osmosis	Introduction; References
	14	Enzymes	Table; Figure
	16	*Respiration Proposal*	*posted to Canvas by 1 p.m.*
	21	Cellular Respiration and Fermentation	Figure; Results; Discussion; References
	22	**(Thur.) LAB EXAM (thru Enzymes)[3]**	
	28	Mitosis and Meiosis	Comparison Table[2]
Mar	7	Research Teams: Proposal Development	
	9	*Team Research Proposal submitted to Canvas on Friday by 2:30 p.m.*	
	14	***** SPRING BREAK *****	
	21	Field Research: Ecology and Evolution on the Outcrops	*Read and complete bacteriology pre-lab*
	22	**(Thur.) LAB EXAM (Mitosis and Meiosis)[3]**	
	28	Microbial Diversity (Bacteriology)	*Research papers due in class 4/20*
Apr	4	Research Symposium *Technology Rehearsal - Upload and check your presentation at by 9:15am!*	
	11	Molecular Biology	Map[2]
	18	Plant Diversity I & II	
	25	Bioinformatics: Molecular Phylogeny of Plants	*Report completed in lab*
	26	**(Thur.) LAB EXAM (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.**
[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)

January:

31 Materials & Methods; Title page due in lab

February:

8 *Scientific Literature Workshop, preliminary references due (required)*
14 Introduction; References due in lab
15 Exam I
16 *Effective Data Presentation Workshop – bring your data and laptops to class*
16 Respiration proposal due on Canvas by 1 p.m.
21 Table; Figure due in lab
22 Lab Exam I
28 Figure; Results; Discussion; References due in lab

March:

2 *Team Research Proposal submitted to Canvas by 2:30 p.m.*
8 Exam II
22 Lab Exam II

April:

4 Research Symposium
12 Exam III
12 "Ask the Editors" session 5 p.m.
20 Research paper due in class
25 Molecular phylogeny report completed in lab
26 Lab Exam III

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
35 points	scientific writing
75 points	lab project
710 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