

BIOL 106-3 – INTRODUCTION TO BIOLOGICAL INVESTIGATION

Fall 2015

Lecture: Olmsted Hall 266

R 3:10pm–4:25pm

Lab: Olmsted Hall 154

T 1:30pm–5:30pm

Lab intern: Amanda Horowitz

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Professor: Dr. Justin Touchon

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Phone: x7419

Office hours: R 1–3pm (or by appointment)

Email is the best way to contact me and I will try to respond promptly.

Do not expect a response before 9am, after 5pm or on weekends (although it may happen).

COURSE DESCRIPTION

The focus of this course is the process of doing science. This course is not intended to be an overview of the entire field of biology, but rather you will learn fundamental concepts in biology in a way that is relevant to experimental work in the laboratory or field. Hopefully, you will begin to learn how to think like a scientist. The fundamental concepts are taught in an integrative way across sub-disciplines of biology (e.g., genetics, ecology). You will test hypotheses for which the results are not known! In so doing, you will learn many experimental techniques that have become essential tools for biologists, including PCR (Polymerase Chain Reaction), bioinformatics, experimental design, assaying animal behaviors, ecological sampling and basic statistics. You will learn how to communicate your findings in a professional manner through writing and oral presentations.

The course is divided into three “**modules**” of 4–5 weeks each. Information about each module is detailed in a course **laboratory manual** that will be provided for you during the first laboratory session. **Reading the lab manual is very important!** The modules are:

Module 1: Understanding Individual Genetic Variation Sept. 3–Sept. 24

Analysis of human DNA samples to determine genotype variations

Module 2: Effect of White-Tailed Deer on Biodiversity Oct. 1–Oct. 29

Analyses of effects of deer browsing on plant and invertebrate growth and abundance

Module 3: Oviposition Behavior in *Callosobruchus maculatus* Nov. 5–Dec. 8

Experimental tests of hypotheses on behavior of an agricultural insect pest

COURSE RESOURCES

Reece, J. B., et al. *Campbell Biology, 10th Edition*. 2014. Pearson.

Other reading or resources will be posted throughout the semester to our course Moodle site.

It is very important that you read the assigned material *before* coming to class/lab so you will be prepared to discuss the articles.

Participation in class, beyond just attending the classes, is part of your grade (see below).

Moodle: There are *two* Moodle sites for this course. **One Moodle site is specific for our section** (“BIOL 106: Intro/Biological Investigation” with *only* my name listed as the instructor underneath this title) and will include material that is unique to our section (e.g., course syllabus, lecture schedule, specific class lectures, assignments). **The second Moodle site is a combined Moodle site** (“BIOL 106: Intro/Biological Investigation- Combined”) for material common to *all* sections (e.g., lab manual, notebook requirements, data, pdfs of readings). To make this as easy as possible, at the top of our section’s Moodle site, there is a link to this combined site (“BIOL-106 Moodle Site for All Sections”).

Each section’s Moodle site or the combined laboratory Moodle site will contain detailed information on readings and assignments. You are expected to read the assignments and manual carefully before class/lab.

GRADING	
<i>Grade breakdown</i>	
Module 1 – final assignment	10 %
Module 2 – final assignment	13%
Module 3 – final assignment	13 %
Other assignments/homework	15%
Quizzes (3) on concepts from each Module	18 %
<i>3rd quiz will be during final exam period</i>	
Lab Practicals (2)	6 %
Lab Practical Exam (cumulative)	10 %
<i>during final exam period</i>	
Laboratory Notebook	10 %
Collegiality *	5 %

The final assignments for each module are designed to teach you critical scientific skills for communicating your own ideas: designing experiments, data analysis, creating appropriate figures and tables, and scientific writing. More details will be given for each assignment.

*** Collegiality** - participation and contributions to class, attendance, and general effort to make this a positive learning experience for all students. Final course grade may be subject to penalty at the discretion of the instructor for repeated lateness, excessive absence, or class disruptions. **Cell phones, computers, and other electronic devices are not to be used during class presentations and discussions** unless necessary (e.g., for data analysis) or if you have an approved accommodation (see below).

Late assignments

It always benefits you to turn in assignments, even if they are very late. **There is a 5% penalty per day for late assignments**, with a maximum penalty of 50%. In addition, **it is mandatory to turn in the final assignments for each module and take all quizzes** in order to pass the course. That is, if you fail to turn in these assignments, you will not pass the class no matter your grade on remaining assignments. Hard copies of assignments are required unless otherwise directed.

ATTENDANCE

Attendance in every class and lab is very important. Missing class will only be permissible if you have an official excuse from the Dean of Studies office or Health Services. Should you have an excused absence, it is your responsibility to obtain the appropriate confirmation and to arrange to make up the work. Making up a laboratory may require extra time and effort on the part of faculty, technical staff, and interns to prepare the lab, so please plan ahead if you are aware of an unavoidable conflict. Do not assume that you can attend another lab without prior arrangements. **Unexcused absences will result in a 5% reduction in your course grade.**

If there are religious holidays that fall during our class times, I will help you make up any work in class you might miss (if you anticipate missing class due to a religious holiday, please let me know ahead of time). If attendance becomes poor, you will be contacted by the Dean of Studies office.

ACADEMIC ACCOMMODATIONS

Academic accommodations are available for students with disabilities who are registered with the Office of Accessibility and Educational Opportunity. Students in need of disability accommodations should schedule an appointment with me early in the semester to discuss any accommodations for this course that have been approved by Office of Accessibility and Educational Opportunity, as indicated in your AEO accommodation letter.

GENDER PRONOUNS

If you prefer to use gender neutral or other alternative pronouns, please feel free to let me know. Similarly, if you prefer to be called by a name other than what is given to me by the college, just let me know.

TENTATIVE LECTURE SCHEDULE

Date	Module	Topic	Reading
Sept. 3	1	The origins of genetic variation	Campbell: 16.2, 17.5, 20.1 (pgs. 414–416), 20.2 (pg. 422), 20.4
Sept. 10	1	Analyzing genetic variation	Campbell: 20.1 (pgs. 413–414)
Sept. 17	1	Genetic sequencing	Campbell: 20.1 (pgs. 409–412), 21.1–21.3
Sept. 24	1	Evolution and population genetics	Campbell: 23 (all), 15.3 (pg. 302)
Oct. 1	2	Biodiversity and ecology	Campbell: 54.2, 54.3, 54.4, 56.1
Oct. 8	2	Experimental design and biological diversity	Campbell: 56.2; Lab Manual Appendix D
Fall Break (week of October 12–16)			
Oct. 22	2	Nutrient cycling and intro to statistics	Campbell: 54.1, 55.1–55.4
Oct. 29	2	Biodiversity and statistics continued	Campbell: 56.4, 56.5; Primary article by Tanentzap et al. 2011
Nov. 5	3	Intro to animal behavior	Campbell: 24 (all)
Nov. 12	3	Evolution and speciation	Campbell: 53.4
Nov. 19	3	Life history evolution	Lab Manual Appendix D
Nov. 26	Thanksgiving Break – No class		
Dec. 3	3	Sexual selection and the evolution of sex	Campbell: 51.3
Dec. 8 (Tuesday)	3	End of semester review	Cardwell and Krauss 2014 (NY Times article)

GRADING SYSTEM (FROM THE VASSAR CATALOG):

<u>Percentage Points</u>	<u>Final Grade</u>
100–94	A
93.9–90	A-
89.9–87	B+
86.9–83	B
82.9–80	B-
79.9–77	C+
76.9–72	C
71.9–70	C-
69.9–67	D+
66.9–60	D
59.9 and below	F

A indicates achievement of distinction. It involves conspicuous excellence in several aspects of the work.

B indicates general achievement of a high order. It also involves excellence in some aspects of the work, such as the following:

- Completeness and accuracy of knowledge
- Sustained and effective use of knowledge
- Independence of work
- Originality

C indicates the acceptable standard for graduation from Vassar College. It involves in each course such work as may fairly be expected of any Vassar student of normal ability who gives to the course a reasonable amount of time, effort, and attention. Such acceptable attainment should include the following factors:

- Familiarity with the content of the course
- Familiarity with the methods of study of the course
- Evidence of growth in actual use both of content and method
- Full participation in the work of the class
- Evidence of an open, active, and discriminating mind
- Ability to express oneself in intelligible English

C-, **D+**, and **D** indicate degrees of unsatisfactory work, below standard grade. They signify work which in one or more important respects falls below the minimum acceptable standard for graduation, but which is of sufficient quality and quantity to be counted in the units required for graduation. Work evaluated as **F** may not be counted towards the degree.

A word about academic integrity:

Even though you will often work with a partner (or partners) in the laboratory, you must keep an **independent record** of your work in your own notebook. Discussion of the results with your lab partner, classmates, or professor is encouraged, however, your assignments must be done ***independently and written entirely in your own words***. Your writing will contain descriptions of ideas and experiments from other people's written work. (*e.g.* from the primary literature). In preparing a description of others' work or ideas, you must paraphrase, using your ***own*** words, and you must cite that work and provide the reference information. You will be taught the standard method for citing and referencing the work of others in scientific writing.

In science writing, it is ***very rare*** to quote others directly (we usually paraphrase). Only quote authors if there is a truly compelling reason, such as a famous quote.

The following information is from the Vassar Student Handbook:

Integrity of Academic Work

The Vassar degree should represent not only a high quality of intellectual achievement but also the performance of all work in the pursuit of that achievement in accordance with the highest standards of academic honesty and integrity. The basic principles inherent in such honesty and integrity are as follows:

1. Each student's work shall be the product of the student's own effort.
2. Each student shall give due and appropriate acknowledgment of the work of others when that work is incorporated into the writing of papers.
3. No student shall infringe upon the rights of others to have fair and equal access to library or other academic resources.
4. No student shall submit the same work to more than one instructor without prior approval of the instructor involved.
5. In accordance with these principles the following regulations have been set up concerning:

..... B. Plagiarism

Any form of plagiarism violates the integrity of the student's work. In cases of doubt, students should ask instructors, and instructors are requested to be definite and explicit in explaining the proper procedure for the work involved. The following are, however, general rules which apply in all cases:

1. Quotations must be clearly marked and sources of information or of an idea or opinion not the student's own must be indicated clearly on all written work, including examinations. This applies to paraphrased ideas as well as direct quotations.
2. Unless otherwise directed, every student working in a laboratory is expected to make all necessary measurements, drawings, etc., independently, from his or her own observations of the material provided. All records, including numerical data for working out results, are to be used by the student independently and as initially recorded. Unless otherwise indicated, all laboratory materials are to be kept in the laboratory.
3. Collaboration in preparation of written work may take place only to the extent approved by the instructor. This applies to prepared examination