

Course Syllabus, Vernal Term 2017 C.E. (Last updated 12 December 2016 C.E.)

BIO354: Cell Biology Laboratory
Section Number 14626
09 January - 28 April 2017 C.E.
Laboratory: T 13:45-16:30 CLCC367

Course Description:

This laboratory course is designed to complement the lecture course in Cell Biology (BIO353 or LSC353) and to illustrate in a concrete way the methods that biologists use to study the structure and activities of biological cells. Among the topics covered in the lecture course are 1) the general properties of biological molecules; 2) the structure and functions of proteins; 3) the packaging and expression of genetic information in the nucleus; 4) the organization of cell membranes and the transport of molecules across them; 5) the targeting and movement of proteins into different organelles; 6) the detection and transduction of external chemical signals; 7) the organization and functions of the cytoskeleton; 8) the process of cell division and its regulation; and 9) the structure of the extracellular matrix and the association of cells with one another. The study of these different aspects of cell biology usually involves a combination of microscopic, biochemical, genetic, and molecular techniques. This laboratory course is designed to introduce some of these techniques and to show how they can be applied to the study of different types of animal, plant, and microbial cells. The laboratory skills learned in this course will be used throughout the biology curriculum and will prepare students to perform research in many areas of modern biology.

Course Objectives:

Upon completion of the course, students should be able to:

- safely, efficiently, and accurately use the basic pieces of equipment found in an undergraduate laboratory, such as micropipettors, light microscopes, spectrophotometers, and centrifuges;
- set up and successfully perform simple spectrophotometric assays for the detection of proteins and other biochemicals;
- measure the activity of enzymes using both fixed-time and continuous assays;
- carry out electrophoresis using both vertical and horizontal gel systems;
- perform a variety of mathematical and statistical calculations involving cell sizes, biomolecules, and activity of enzymes;
- write laboratory reports in the standard scientific format and that are well organized, grammatically correct, concise, and technically accurate;
- use standard software programs such as Microsoft Word and Microsoft Excel.

Student Learning Outcomes:

In addition to bolstering fundamentals of cell biology, the successful student will gain experience with the following cytological techniques:

- microscopy
- spectrophotometry
- electrophoresis
- enzyme assay
- differential centrifugation
- column chromatography
- standard curve construction and use

Instructor Information:

Dr. Ty C.M. Hoffman
ty@asu.edu
6025432901
Office Hours: CLCC217B, W 09:55 - 10:55; F 10:30 - 11:30; and by appointment via email

Attendance:

You are required to attend every laboratory session. I do not grant you any points simply for attending, but you will certainly lose points for not attending. I also expect you to appear in the laboratory early enough so that you are completely ready to begin taking a quiz at the scheduled beginning of class. Tardiness is rude and disruptive, and it will result in loss of points or forfeiture of the right to take that session's quiz. If you are unable to make it to class on time, then you have enrolled in the wrong section, and you should withdraw.

Course Website:

As stated on Blackboard, you will be using my own (non-Blackboard) website. The URL for the general site is:

<http://www.public.asu.edu/~thoffman>

From that site, you can find the link to your specific section. Be sure to bookmark the site. You are REQUIRED to check the website daily, even if nothing changes. The website includes (or will include) various resources to help you succeed. It is also where official announcements will be posted (whether I make those announcements in class or not). Failure to notice an announcement posted on the website will not be a valid excuse, and it will not prevent you from losing points because of ignorance of a requirement, so check the website frequently.

Course Materials

BIO354 Student Laboratory Manual

The laboratory manual is required, and **you must have a usefully legible copy with you for every meeting**. It is available as a series of experimental protocols (in PDF form) on the course website. If you do not have a tablet computer or a laptop computer with which to view the manual during meetings, then you must print a hard copy of each meeting's corresponding PDF BEFORE meeting (**including the FIRST meeting**). A cell phone is not large enough to usefully display the content, so that will not count.

Writing Papers in the Biological Sciences, 4th edition (2006), McMillan. ISBN 9780312440831.

I am not requiring this book, but it could prove helpful in maximizing your scores for the paper-writing assignments. A used copy is usually available online for about ten dollars.

Each student should bring each of the following items to each meeting:

- the current meeting's protocol (PDF)
- a journal for raw data, notes, and answers to required questions
- a calculator with basic arithmetic and logarithmic functions
- pens and pencils
- closed-toe shoes

Rules Consent Form:

You will receive no credit for any portion of this course until you submit the electronic Rules Consent Form via the course website. I cannot overstress the importance of carefully reading, understanding, and obeying the form.

Casually signing the form without fully understanding its content can easily result in a score of zero, and that happens every term. I do not want you to be yet another student who finds that out the hard way.

Group Work:

All of the exercises will be conducted in groups, and a large fraction of your final grade will be based on group scores. It is imperative that you participate fully in your group's activities, including work outside of the classroom. Just as for cooperative activities in life outside of academia, you are expected to resolve any interpersonal problems as a group. Each group assignment will be submitted just once (by some member of the group). Each submitted assignment will list the names of participating members, and by submitting an assignment, the person who submits it thereby declares that each person listed has given authorization to submit that version. If a member does not contribute to an assignment (after reasonable attempts to get that member to contribute), then that member's name should be excluded from the assignment. Since group work involves the possibility of plagiarism by any single member affecting all members of the group, I strongly encourage each member to conduct a plagiarism check before authorizing the work to be submitted. I will provide slots on Blackboard for plagiarism checks. These will be separate from the slot for submitting the assignments to be graded.

Take this very seriously, because I am going to take all instances of plagiarism very seriously.

Google Docs:

To demonstrate and ensure that each group member is afforded ample opportunity to contribute to assignments that are graded as a group, **I am REQUIRING that each group use Google Docs** (docs.google.com) to share documents. The Revision History (accessible under File within Google Docs) will serve as documentation of contributions by the individual members of the group. If you simply send files to each other (e.g. as email attachments) without going through Google Docs, then you will lose points.

Schedule of Laboratory Exercises:

Week	Date	Laboratory Exercise Topic	Assignments Due
01	10 Jan	Exercise 1: Scientific Calculations and Basic Lab Techniques	Prior to this date, print or download the Student Laboratory Manual
02	17 Jan	Observance of TRDMLKJ Day (No meeting)	Deadline (23:59) for setting up Google Docs with access by all members of group
03	24 Jan	Exercise 2: Introduction to Microscopy	Datum Sheet for Exercise 1
04	31 Jan	Exercise 3: Spectrophotometric Analysis of Membrane Stability in Beet Root Cells	Datum Sheet for Exercise 2
05	07 Feb	Exercise 4: Determination of Protein Concentrations by Spectrophotometry	Datum Sheet for Exercise 3; Results Section for Exercise 3
06	14 Feb	Exercise 5: Measurement of β -Galactosidase Activity in Lactaid™ Tablets	Datum Sheet for Exercise 4; Materials & Methods Section for Exercise 4
07	21 Feb	Exercise 6: Analysis of RNA Content of Yeast Cells, Part A	Datum Sheet for Exercise 5;
08	28 Feb	Exercise 7: Analysis of RNA Content of Yeast Cells, Part B	Introduction Section for Exercise 5
09	07 Mar	Vernal Hiatus (No meeting)	
10	14 Mar	Exercise 8: Succinate Dehydrogenase Activity in Cauliflower Mitochondria	Datum Sheet for Exercises 6 & 7;
11	21 Mar	Exercise 9: Cell Behavior, Part A: Analysis of <i>Tetrahymena</i> Chemotaxis	Datum Sheet for Exercise 8
12	28 Mar	Exercise 10: Cell Behavior, Part B: Factors Controlling Phagocytosis in <i>Tetrahymena</i>	Discussion Section for Exercise 8
13	04 Apr	Exercise 11: Analysis of Proteins in Different Animal Organs, Part A	
14	11 Apr	Exercise 12: Analysis of Proteins in Different Animal Organs, Part B	Datum Sheet for Exercises 9 & 10
15	18 Apr	Exercise 13: Analysis of Proteins in Different Animal Organs, Part C	Comprehensive Laboratory Report for Exercises 9 & 10
16	25 Apr	Final Examination	Datum Sheet for Exercises 11 - 13

Disclaimer:

Course content and point allocation may vary from this outline to meet the needs of this particular group.

Point Distribution:

The scores for BIO354 will be allotted as follows:

Quizzes (up to 12)	15%
Datum Sheets (9 @ 30 points each; group work)	40%
Laboratory Report Sections (4 @ 10 points each; group work)	6%
Comprehensive Laboratory Report (individual work)	15%
Notebook (Checked twice randomly @ 15 points each)	3%
Peer and Instructor Evaluation (20 points each)	6%
Final Examination	15%

Quizzes

You should expect a quiz in every meeting (starting with the second meeting). All quizzes will be administered EXACTLY at the scheduled beginning of the laboratory period, which means that you will need to already be in your seat, with your personal items already put away, prepared to take the quiz. In other words, **you will not be allowed to be tardy at all**. If you arrive late for a quiz, the very least that will happen is that your score will be reduced by 10% for each whole or fractional minute that you are late. Yes, that means that showing up one second late will result in a 10% reduction. **So now that you know that, just don't let it happen**. If you arrive substantially late, you will receive a zero for the quiz. Each quiz will include a mix of question types (multiple-choice, short-answer, etc.) that will treat material from both the previous meeting and the current meeting. In other words, you'll need to know and understand what you did previously and what you'll be doing that day. The best way to study for quizzes is to carefully read the appropriate part of the Laboratory Manual, carefully listen to me (and take notes) when I address the class, carefully listen to the recordings, and make thorough and meaningful notes in your laboratory notebook so that you'll be able to refer to your own notebook as a resource for study. If you try to skip listening to the recordings or doing the reading, you will likely score poorly on the quizzes.

Course/Instructor Evaluation

The course/instructor evaluation for this course will be conducted online 7-10 days before the last official day of classes of each semester or summer session. Your response(s) to the course/instructor are anonymous and will not be returned to your instructor until after grades have been submitted. The use of a course/instructor evaluation is an important process that allows our college to (1) help faculty improve their instruction, (2) help administrators evaluate instructional quality, (3) ensure high standards of teaching, and (4) ultimately improve instruction and student learning over time. Completion of the evaluation is not required for you to pass this class and will not affect your grade, but your cooperation and participation in this process is critical. About two weeks before the class finishes, watch for an e-mail with "**NCIAS Course/Instructor Evaluation**" in the subject heading. The email will be sent to your official ASU e-mail address.

Withdrawals: The instructor will **NOT** withdraw students for any reason. Specifically, students should be aware that non-attendance will **NOT** automatically result in their being dropped from the course. Therefore, if a student does not attend class during the first week or for any extended period of time during the semester, they should not presume that they are no longer registered. **It is the student's responsibility to be aware of their registration status.**

Please note the following dates:

Session Date & Deadlines	Session A 01/09/2017 – 02/28/2017	Session B 03/13/2017 – 04/28/2017 (ASU Online & iCourses may end on 05/02/2017)	Session C 01/09/2017 – 04/28/2017 (Final Exams May 1-6, 2017)
Classes Begin	January 9, 2017	March 13, 2017	January 9, 2017
Drop/Add Deadline (w/out College approval)	January 10, 2017	March 14, 2017	January 15, 2017
Tuition & Fees 100% Refund Deadline	January 15, 2017	March 19, 2017	January 22, 2017
Martin Luther King Jr. Holiday Observed – University Closed	January 16, 2017	January 16, 2017	January 16, 2017
University 21 st Day	January 30, 2017	April 3, 2017	January 30, 2017
Academic Status Report #1	January 21-25, 2017	March 22-26, 2017	February 13-20, 2017
Deadline to Apply for Graduation	February 15, 2017	February 15, 2017	February 15, 2017
University 45 th Day	February 22, 2017	February 22, 2017	February 22, 2017
Tuition Fee Payment Deadline (registration from 1/19-2/18/2017)	February 25, 2017	February 25, 2017	February 25, 2017
Course Withdrawal Deadline	January 27, 2017	March 31, 2017	April 2, 2017
Complete Session Withdrawal Deadline	February 28, 2017	April 28, 2017	April 28, 2017
Spring Break - Classes Excused	March 5-12, 2017	March 5-12, 2017	March 5-12, 2017
Academic Status Report #2	NA	N/A	March 23 -30, 2017
Tuition Fee Payment Deadline (registration from 2/19-3/18/2017)	March 25, 2017	March 25, 2017	March 25, 2017
Classes End/Last Day to Process transactions	February 28, 2017	April 28, 2017	April 28, 2017
Final Exams	Last day of classes	Last day of classes	May 1-6, 2017
Final Grades Due	March 3, 2017	May 1-8, 2017	May 1-8, 2017
Commencement	May 8, 2017	May 8, 2017	May 8, 2017
Degree Conferral Date	May 8, 2017	May 8, 2017	May 8, 2017
Grade Replacement/Academic Standing Processing	May 9-10, 2017	May 9-10, 2017	May 9-10, 2017

Any withdrawal transaction must be completed by the deadline date in accordance to the appropriate session at the registrar's office. If not, you will still be officially enrolled and you will receive a grade based on your work completed.

*As part of a complete session withdrawal a student must withdraw from all classes in a session. Beginning the first day of classes, undergraduate students are required to work with a Student Retention Coordinator to facilitate the withdrawal process. Please refer to <http://students.asu.edu/StudentRetention>

For additional information about ASU's withdrawal policy and the possible consequences of withdrawing from a class, contact Registration Services or your academic counselor.

Students are responsible for their registration status!

The Grade of Incomplete: A grade of incomplete will be awarded only in the event that a documented emergency or illness prevents a student who is doing acceptable work from completing a small percentage of the course requirements at the end of the semester. The guidelines in the current general ASU catalog regarding a grade of incomplete will be strictly followed. **A grade of incomplete will NOT be awarded unless there is documented evidence of extreme personal or immediate family hardship.** Changes in work hours, child-care emergencies, or other similar personal problems will not be approved as reasons for awarding incompletes. The Director of the School of Mathematical and Natural Sciences must approve all incomplete grade requests.

Reasonable Accommodations for Students with Disabilities: The Disability Resource Center (DRC) provides information and services to students with any documented disability who are attending ASU West. Individualized program strategies and recommendations are available for each student as well as current information regarding community resources. Students also may have access to specialized equipment and supportive services and should contact the instructor for accommodations that are necessary for course completion.

Academic Integrity and Code of Conduct:

As defined in the *ASU Student Academic Integrity Policy*: <http://provost.asu.edu/academicintegrity>.

Each student has an obligation to act with honesty and integrity, and to respect the rights of others in carrying out all academic assignments. A student may be found to have violated this obligation and to have engaged in academic dishonesty if during or in connection with any academic evaluation, he or she:

- Engages in any form of academic deceit;
- Refers to materials or sources or employs devices (e.g., audio recorders, crib sheets, calculators, solution manuals, or commercial research services) not authorized by the instructor for use during the academic evaluation;
- Possesses, buys, sells, obtains, or uses, without appropriate authorization, a copy of any materials intended to be used for academic evaluation in advance of its administration;
- Acts as a substitute for another person in any academic evaluation;
- Uses a substitute in any academic evaluation;
- Depends on the aid of others to the extent that the work is not representative of the student's abilities, knowing or having good reason to believe that this aid is not authorized by the instructor;
- Provides inappropriate aid to another person, knowing or having good reason to believe the aid is not authorized by the instructor;
- Engages in plagiarism;
- Permits his or her work to be submitted by another person without the instructor's authorization; or
- Attempts to influence or change any academic evaluation or record for reasons having no relevance to class achievement.

BIO354 follows the ASU Academic Integrity Policy in the administration of all course examinations and assignments. Violations of the University Academic Integrity policy will not be ignored. Penalties include reduced or no credit for submitted work, a failing grade in the class, a note on your official transcript that shows you were punished for cheating, suspension, expulsion and revocation of already awarded degrees. The university requires that the

implementation of any of these penalties for violations of the academic integrity policy be reported to the Dean's office. The Integrity Policy defines the process to be used if the student wishes to appeal this action.

In BIO354 you are expected to follow the *ASU Student Code of Conduct* (<http://students.asu.edu/srr/code>) especially when communicating with your peers, instructors, and teaching assistants. Violations of the student code of conduct may result in withdrawal from the class.

Missed Work/Exam Make-up Policy: Due dates for assignments and exam dates are not flexible. Late work will not be accepted, and missed exams cannot be made up, without prior approval of the instructor and without appropriate documentation of a medical or other emergency. The instructor has the right to deduct 10% of the value of the assignment, per day, for any late work or exams that are accepted. The instructor also may add additional provisions to this policy as dictated by course requirements.

Final Exam Make-up Policy: The final exam schedule listed in the Schedule of Classes will be strictly followed. Exceptions to the schedule and requests for make-up examinations can be granted only by the director of the School of Mathematical and Natural Sciences for one of the following reasons:

- 1) religious observances
- 2) the student has more than three exams scheduled on the same day
- 3) two finals are scheduled to occur at the same time

Make-up exams will **NOT** be given for reasons of non refundable airline tickets, vacation plans, work schedules, weddings, family reunions, or other such activities. Students should consult the final exam schedule before making end-of-semester travel plans.

If there is a last-minute personal or medical emergency, the student may receive a grade of Incomplete and makeup the final within one calendar month. The student must provide written documentation and be passing the class at the time to receive an Incomplete. A signed "Request for Grade of Incomplete" must be submitted by the student and approved by the student's instructor and the Director of the School of Mathematical and Natural Sciences.

The instructor reserves the right to make changes to this syllabus as needed.

If you find it necessary to leave a note for this instructor, please contact the administrative reception desk of the School of Mathematical and Natural Sciences located at CLCC II 265

Title IX:

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at <https://sexualviolenceprevention.asu.edu/faqs>

Policy against Threatening Behavior:

In the classroom and out students are required to conduct themselves in a manner that promotes an environment that is safe and conducive to learning and conducting other university-related business. All incidents and allegations of violent or threatening conduct by an ASU student will be reported to the ASU Police Department (ASU PD) and the Office of the Dean of Students. Such incidents will be dealt with in accordance with the policies and procedures described in Section 104-02 of the Student Services Manual (<http://www.asu.edu/aad/manuals/ssm/ssm104-02.html>).

Potentially Offensive Content:

A notification such as the following should be included in the syllabus if appropriate for the class in question.

If you find any of the content of his class offensive, please bring your concerns to the instructor immediately.

Power Outage:

In the event of a campus power outage or other event affecting the ability of the University to deliver classes, any decision to cancel classes will be announced using the ASU emergency notification system. For this reason, it is imperative that students register with the ASU emergency notification system at: <https://cfo.asu.edu/emergency-alert>. In cases in which a limited number of buildings are affected, students should check the university website and/or call the School office at (602) 543-6050.

Emergency Evacuation Plan:

Students should be aware of the evacuation route posted on the exit door of each classroom. Students who cannot walk down stairs should notify the instructor as early in the course as possible so the instructor can provide information regarding the location of the designated meeting area on each upper floor of the building (marked with a blue sign that states Emergency Evacuation Response Area).