

Autumnal Term 2016 C.E.

LSC348 Section 75370

Fundamentals of Genetics Laboratory (Last updated: 21 August 2016 C.E.)

Tuesdays 15:00 - 17:45 CLCC356

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Office Hours: CLCC217B, T 13:30-14:30, R 13:55-14:55, and by appointment via email

Course Description

Laboratory exercises are designed to provide students with hands-on experiences in conducting genetic investigations. This course is intended to provide a general survey of the field of genetics. Topics include chromosomal structure and function, classical Mendelian genetics, and molecular genetics. The laboratory course is intended to complement the accompanying lecture course, LSC347. This course is usually taken concurrently with LSC347, but it may be taken after completing LSC347.

Course Goals

- Learn to read, understand and follow written laboratory protocols.
- Learn to ask questions, observe, and keep records of scientific experiments.
- Understand the application of basic statistical techniques to the study of genetics.
- Apply principles of classical Mendelian genetics to demonstrate an understanding of monohybrid and dihybrid crosses of independently assorting and linked genetic traits.
- Map linked genes in dihybrid crosses.
- Examine and understand several of the extensions of Mendelian inheritance.
- Study relationships between structure and function of DNA and chromosomes.
- Understand and perform PCR to analyze the genotype of organisms.
- Understand the Central Dogma of Molecular Biology using bacteria and *Drosophila melanogaster* as model organisms.

Required Items

Various documents appearing on the course website must be downloaded, printed, and brought to the laboratory. In addition, you must bring a bound, composition-type notebook to the laboratory each meeting.

Rules Consent Form

You will not receive any credit in this course unless and until you electronically submit the Rules Consent Form found on the website. I cannot overstate how important it is to fully read and understand that form. You can easily receive a zero if you take this lightly. Believe me; it happens every semester.

Attendance

I expect you to attend every meeting. Doing so is important to earning a satisfactory grade. I do not grant you any points simply for attending, but you will lose points for not attending. I also expect you to appear in the classroom or laboratory early enough so that you are completely ready to begin the activity at the scheduled beginning of class. If you walk through the door at the time the class is scheduled to begin, then you are late. Tardiness is rude and disruptive, and it will result in loss of points. Chronic tardiness will result in failure of the course. If you are unable to make it to class on time, then you have enrolled in the wrong section.

Grading Thresholds

A+	97%	B+	87%	C+	77%
A	93%	B	83%	C	70%
A-	90%	B-	80%	D	60 %

Scoring

Quizzes	25% total
Notebook Checks (2)	10% each
Introduction Section (<i>Drosophila</i> exercise)	5%
Abstract Section (<i>Drosophila</i> exercise)	5%
Abstract, Materials & Methods, Results, and Discussion Sections (GMO exercise)	15%
Complete Report (pGLO exercise)	20%
Final Examination	10%

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. In some cases, the Laboratory Manual will instruct you to read something else (like a section of the lecture textbook) to study for a quiz. If you read these sources and assure yourself that you understand the concepts, techniques, or problem-types, then you should do well on the quizzes. If you try to skip listening to the recordings or doing the reading, you will likely score poorly on the quizzes.

Writing Assignments

Published scientific papers are written in standardized sections, including Abstract, Introduction, Materials & Methods, Results, and Discussion. You will be required to write isolated sections pertaining to various exercises. All writing assignments must be written individually. Specific instructions will appear on the website. Also see the Scoring section above.

Laboratory Notebook

You must maintain a scientific notebook during each meeting. Guidelines appear in the Laboratory Manual. This notebook will be graded at least twice during the semester, but individual notebooks may be spot-checked at any time. Your scores for the notebook checks will be based on three criteria: neatness and organization; answers to questions or problems; and raw data.

Laboratory Safety

You will be required to wear closed-toe shoes at all times while in the laboratory. If you do not bring closed-toe shoes, you will receive a zero for the meeting. You must also bring goggles to every meeting. No food or drink will ever be allowed on the laboratory workspaces.

Laboratory Schedule

Date	Exercise(s)	Assignment(s) Due	Required Preparatory Reading
23 Aug	Introduction Gene Products		Lab One: The Central Dogma of Molecular Biology
30 Aug	Monohybrid and Dihybrid Crosses Genetics with Live Organisms Prepare media, analyze phenotypes, prepare crosses: female $b^+b^+vg^+vg^+$ X male $bbvgvg$ female $s^+s^+vg^+vg^+$ X male $ssvgvg$		Lab Two: Genetics of Maize Lab Three: Genetic Experiments with <i>Drosophila</i>
06 Sep	Observance of Labor Day (no meeting) Staff will remove P generation.		
13 Sep	Genetics with Live Organisms (cont.) Prepare media, analyze F_1 , transfer to new vials Restriction Enzyme Mapping		Lab Three: Genetic Experiments with <i>Drosophila</i> Lab Eight: Restriction Enzyme Mapping
20 Sep	Genetics with Live Organisms (cont.) Remove F_1 Extensions of Mendelian Inheritance		Lab Three: Genetic Experiments with <i>Drosophila</i> Lab Four: Analysis of Variable Phenotypes in <i>Drosophila</i> Mutants
27 Sep	Genetics with Live Organisms (cont.) Count F_2 Monohybrid and Dihybrid Crosses	<i>Drosophila</i> Introduction	Lab Three: Genetic Experiments with <i>Drosophila</i> Lab Two: Genetics of Maize (if needed)
04 Oct	Genetics with Live Organisms (cont.) Count F_2 (if needed) Chromosome Structure and Function		Lab Three: Genetic Experiments with <i>Drosophila</i> Lab Five: Chromosomal Structure in Wild Type and Abnormal Cells
11 Oct	Autumnal Hiatus (no meeting)		
18 Oct	Genetically Modified Crops		GMO (Exercise Six), Lessons 1 & 2
25 Oct	Genetically Modified Crops (cont.)	<i>Drosophila</i> Abstract	GMO (Exercise Six), Lessons 3 & 4
01 Nov	pGLO Transformation		pGLO Transformation (Exercise Seven, Part One)
08 Nov	pGLO Transformation (cont.) Analyze plates, confirm phenotypes, perform SDS-PAGE, check fluorescence, stain gels	GMO Abstract, Materials & Methods, Results, and Discussion	GFP SDS-PAGE (Exercise Seven, Part Three)
15 Nov	pGLO Transformation (cont.) Analyze gels, perform GFP folding activity		GFP Folding Activity
22 Nov	pGLO Transformation (cont.) Prepare bacterial lysates, column chromatography		GFP Purification (Exercise Seven, Part Two)
29 Nov	Final Examination		
06 Dec		pGLO Complete Report	

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 (7.5 Week Session) Aug 18 – Oct. 7, 2016	Session B (7.5 Week Session) Oct 12 – Dec 2, 2016	Session C (15 Week Session) Aug 18 – Dec 2, 2016 (Final Exams Dec 5 -10, 2016)
Classes Begin	August 18, 2016	October 12, 2016	August 18, 2016
Drop/Add Deadline (w/out College approval)	August 19, 2016	October 13, 2016	August 24, 2016
Tuition & Fees 100% Refund Deadline	August 24, 2016	October 18, 2016	August 31, 2016
Labor Day Holiday Observed – University Closed	September 5, 2016		
University 21 st Day	September 7, 2016	November 1, 2016	September 7, 2016
Course Withdrawal Deadline	September 7, 2016	November 1, 2016	November 2, 2016
Complete Session Withdrawal Deadline	October 7, 2016	December 2, 2016	December 2, 2016
Veteran's Day Observed – University Closed	November 11, 2016		
Thanksgiving Observed – University Closed	November 24-25, 2016		
Deadline to Apply for Graduation	October 3, 2016		
Classes End/Last Day to Process transactions	October 7, 2016	December 2, 2016	December 2, 2016
Final Exams	Last day of classes	Last day of classes	December 5-10, 2016
Final Grades Due	October 10, 2016	December 5-12, 2016	December 5-12, 2016
Degree Conferral Date	December 12, 2016		

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.

LSC348 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 LSC348 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 <http://sexualviolenceprevention.asu.edu/faqs/students>.

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).