

BI307L Syllabus

Fall 2015, 1 credit

Days and times:

Section 3: Thursday, 2:30 – 5:20PM, Henry Lab 2

Instructor: Dr Mike Dohm

Office: Henry 6

Office Hours: Mon, Fri 9:30AM –12:00PM; or by appointment

Phone: (739) 8543

E-mail: mdohm@chaminade.edu

Course website: <http://www.letgen.org/chaminade>

Special Attention: Laboratory safety policies as established by the Environmental Safety Office must be obeyed at all times during lab class: (1) No food or drink; (2) You must wear closed toes shoes; (3) You must wear a lab coat; (4) students are required to know location of MSDS and other [lab safety](#) equipment. Additional rules of conduct apply in the lab, which will be provided to you on our first meeting. Failure to comply with these rules will result in loss of points or depending on the infraction, you will be asked to leave the classroom. If you do not wear proper attire on Exam days, you will not be permitted to take the exam and will receive a failing grade for that task. Please respect the rules and do not make this an issue for us all.

Required textbook & reading: Lab manual (online), additional handouts, online sources, and articles given by instructor and amde available on the course website. Your lecture textbook, Essentials of Genetics, by Klug et al. will also be utilized, but it is not required.

Other required material: Students are required to obtain a laboratory coat, now available at the Division of Natural Sciences & Mathematics office for \$5. Safety goggles will be provided. A notebook (cloth bound) and pen are also required materials students must bring to each lab meeting. A 3-ring binder for course handouts is recommended, but not required.

Access to course website: All course handouts, including the syllabus, will be made available through our Moodle site. Quizzes will also be handled via Moodle. You may access the Moodle site directly at <http://www.letgen.org/chaminade>. Select BI307L Dr Dohm's Genetics Lab from the welcome screen and logon to the course. Your logon will be the first initial from your first name and your last name (e.g., Joe Key logon would be jkey). A password will be provided to you in class; you will be prompted to change the password on your first logon to the site.

Course description: Genetics Laboratory is a one semester introduction to how geneticists study and interpret patterns of heredity, isolate and manipulate DNA elements, and conduct genetics research by utilizing public data bases and computer software programs. Through hands-on exercises, discussion, and in-class projects, we will introduce genetic techniques (extraction of genetic material, electrophoresis, hybridization, amplification, data analysis) using model organisms (e.g., bacteria, Drosophila, yeast) in order to gain practical experience with the genetic basis of simple phenotypes and an appreciation for how geneticists explore these topics and reflect upon how genetics influences the environment and human society. Experiments in molecular genetics typically take several hours to complete; thus, data collection and analyses usually require 2 or 3 lab periods to complete.

Program outcome: This course will introduce students to the foundational concepts of Mendelian inheritance,

linkage, and molecular genetics. Students will enhance abilities to perform experimental work in genetics and molecular biology and to apply data to genetic concepts. Students will gain practice in record keeping and data collection, utilizing sterile technique, use of bioinformatics tools in genetics, and modern techniques for exploring the genome.

Student learning outcomes: This course will introduce students to fundamental techniques of Mendelian and molecular genetic analyses. On completion of this course, students will be expected to demonstrate knowledge and or competency in use of

1. Scientific method and its application to genetic problems in humans and model organisms.
2. Nucleotide (DNA, RNA) extraction protocols.
3. Gel electrophoresis for separation and scoring of molecular markers.
4. Primer design and PCR protocols for the amplification of sequences.
5. Use and analysis of molecular markers to study variation in development and in populations.
6. Online bioinformatics resources for investigating genetic problems.

Course prerequisites: Concurrent enrollment in BI307. Required courses: BI205/205L and BI206/206L. Recommended courses: CH 203/203L and 204/204L.

Course assessment: Your grade will reflect your work on weekly quizzes and homeworks (10), two lab reports, and pone group activity.

Quizzes: A short quiz will be given at the BEGINNING of some lab sessions, about one quiz every two-to-three weeks. The quizzes are open notes. The quiz will be based on the lab being conducted that day, so read over the lab material before coming to class. Questions are drawn from the lab materials. There will be five of these quizzes, each worth 10 points.

Homework: In lieu of quizzes, some labs will have worksheets for you to work on. A total of five are anticipated, each worth ten points.

Notebooks: Students are expected to keep a detailed and up-to-date notebook that includes protocols, results, and any relevant observations. The notebook will be collected along with your exams, but the notebook itself will not be graded. The notebook is an essential part of working in a laboratory and you will need it to be complete an accurate in order to do well on the exams.

Lab reports. Each student will complete two lab reports, standard scientific format, during the course of the semester. Each student will submit an electronic document via secured web site. One revision will be permitted before a final grade is assigned for the report. Lab reports will generally follow the following format.

1. A statement of the purpose of that laboratory including a description of the importance of the experiment.
2. An outline of the materials and procedures. This includes relevant details such as dates, times, number of specimens, etc.
3. Tables or figures of results, together with a short written explanation of what is contained in them.
4. Preliminary conclusions
5. Answers to questions in the lab manual.

Group work. Groups will work on and present in class on an issue of ethical and technical significance in genetics. More details on this assignment and the grading criteria will be provided in class. The purpose of the group activity is to learn how to work together to communicate and defend a point of view about a relevant topic in genetics from ethical and technical points of view. Groups will develop short Powerpoint presentation and participate in a pro-con style debate with another group assigned the same topic.

Laboratory work is typically viewed as a group homework activity, but lab reports are individual activities. In lab, we conduct experiments and record observations. We will introduce you to how to conduct the analyses required to interpret your experiments. However, you can expect to spend time outside of class completing analysis and writing up results and conclusions from the experiments. Write-ups and analyses are to be turned in by each student and the work must be the work of the student only. However, data belong to the group and so data are shared between two or sometimes the entire class of students. Periodically, we will break into groups to discuss topics or work on problems introduced in lab. The purpose of the group activity is to give you opportunities to be more active learners, but also to be responsible to each other for the material. You will be given material in advance, and you must come to class prepared to discuss the material with your classmates.

Topic questions from each lab will be provided in handouts, and form the basis of quizzes in the course. These topics will be discussed during lab procedures and are part of your suggested reading assignments.

Data days: At three times during the semester, points will be awarded for attendance and participation: these are days set aside for data summary and analyses plus the last day of the semester which will be used for lab cleanup.

A total of 400 points may be earned throughout the semester; each item has the following value.

Assignment	Points	Dates
Quizzes	100 pts, 20 pts each	Bi-monthly
Homework	100 pts, 20 pts each	Bi-monthly
Reports	100 pts, 50 pts each	Bi-monthly
Group activity	80 pts	End of semester
Data days and lab clean-up	20 pts	Mandatory attendance
Total	400 pts	

Final grade: Your grade will be based on the following.

Points earned	Percent of total	Letter grade
360 – 400	90 – 100%	A
320 – 359	80 – 89%	B
280 – 319	70 – 79%	C
240 – 279	60 – 69%	D
< 239	< 60%	F

Reminders and notices:

1. By enrolling in this class, you agree to abide by and follow all laboratory policies and related safety regulations. The [lab safety](#) regulations are established by the office of the Dean of the Division of Natural Science and Mathematics apply to EVERYONE who uses the laboratories. These rules include, but are not limited to, proper use of instrumentation, use of personal protective equipment when directed to do so, use of lab coats during lab class, the requirement that you wear closed toe shoes and refrain from any eating or drinking in the lab. Please respect laboratory policies regarding proper attire; if you do not, you will be asked to leave and will be subject to fine under Division policy.
2. In keeping with the computational demands of modern genetic analysis, Henry Lab 2 includes twelve laptops for our use. This mobile computer facility was designed and is now maintained by the Division of Natural Sciences and Mathematics so that you would have access to a state-of-the art academic computing environment. Money is simply not available to repair damaged, abused, or stolen computers. Therefore, each person has the obligation to use the computers responsibly. By using these facilities, you agree to abide by the Computer Use Policies posted in the classroom. These rules include, but are not limited to
 - No food or drink
 - You agree to adhere to the account setup procedures and use restrictions

- No alterations of software or hardware configurations
 - No use of the computers for personal or commercial activities, (except where such activities are otherwise permitted or authorized under applicable University policies).
3. Class begins each time exactly at 2:30PM. Please be on time. Chronic tardiness will be viewed as absence from class. Class ends at 5:20PM. Please do not make a habit of asking about the length of a given lab assignment – all efforts have been taken to make sure exercises can be completed in the allotted time provided we come prepared. If you miss or are tardy for class, please note that we will proceed without you and you will miss material; it is your responsibility to obtain missed topics from your classmates who were in attendance. Missed laboratory exercises only rarely can be made up after the fact.
 4. No make up exam will be granted in the event of an absence. If a student cannot attend a class in which a exam has been scheduled, the student must notify the instructor no later than the class prior to the scheduled quiz. For example, if an exam is scheduled for Thursday, then student must approach and receive permission for the absence no later than Wednesday; if an exam is scheduled for Monday, then student must approach and receive permission for absence no later than Friday . In the event of illness, a Doctor's note will be expected and accommodations will be made on a case-by-case basis. Lacking an authorized excuse, you may still be allowed to take the exam at a later time, but you will not be able to earn full credit for the assignment, in fairness to those students who took the exam on time.
 5. Use of music devices and cell phones is prohibited during all Natural Science and Mathematics classes at Chaminade, unless specifically permitted by your instructor. Use of cellphones and music devices in laboratories is a safety issue. In addition, use of cellphones and music devices in any class is discourteous and may lead to suspicion of academic misconduct. Students who cannot comply with this rule will be asked to leave class and may be subject to laboratory safety violation fines. Please refer any questions to the Dean of Natural Sciences and Mathematics.
 6. You are expected to have read and to abide by the "Student Rules of Conduct" which are available in your copy of Chaminade University's Student Handbook.
 7. Students with special needs who meet criteria for the Americans with Disabilities Act (ADA) provisions must provide written documentation of the need for accommodations from the CUH Counseling Center (Dr. June Yasuhara; phone 735-4845) by the end of week three of the class, in order for the instructor to plan accordingly. Failure to provide written documentation will prevent your instructor from making the necessary accommodations. Please refer any questions to the Dean of Students and review the procedures at http://www.chaminade.edu/student_life/sss/counseling_services.php.

Tentative Lab Schedule

Week 1	Introduction to the course; Lab manuals
Week 2	Mendelian genetics of single genes; Introduction to the flies
Week 3	Mendelian genetics of two or more genes; Linkage; Fly crosses
Week 4	Fly crosses; Fly chromosomes; Morphometrics; Bioinformatics I
Week 5	Bioinformatics I; Fly crosses; Nucleic acid extraction
Week 6	Lab Exam 1; Notebooks due
Week 7	Report1 due; Bioinformatics II; Fly crosses; Oxidative stress and induced mutations
Week 8	Bioinformatics II; PCR; Genetic markers
Week 9	Bioinformatics III; PCR; Genetic markers; Electrophoresis
Week 10	Bioinformatics III; Genetics markers; Gel documentation
Week 11	Fly crosses; Evolutionary genetics
Week 12	Bioinformatics IV; Evolutionary genetics
Week 13	Bioinformatics IV; Evolutionary genetics
Week 14	Report2 due this week; no class (Thanksgiving break)
Week 15	Lab Exam 2; Notebooks due