BI307L Syllabus

Fall 2018, 1 credit
Days and times:

Tuesday, 2:30 – 5:20PM, Henry Lab 1

Instructor: Dr Mike Dohm
Office: Henry 6
OfficeHours: Tuesday & Thursday 10AM – 12PM; or by appointment
Phone: (739) 8543
E-mail: mdohm@chaminade.edu → Students, use course Messaging system
Course website: https://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 made available on the course website. Your lecture textbook, *Concepts 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. Please also bring your laptops – most, but not all labs will have a component that depends on access to a computer.

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 https://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). An initial password will be provided to you by email or in class; you will be prompted to change the password on your first logon to the site. If you are currently enrolled in Dr Dohm's lecture section of genetics, then you already have your username – they are the same for BI307 and BI307L.

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.

> Catalog description - BI 307L Molecular Biology I Laboratory – Genes and Genetics (1) Laboratory section accompanying BI 307. Concurrent registration in BI 307 required. Materials intensive fee applies. Prerequisites: BI 210L, BI 216 and BI 216L.

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 assessment: Your grade will reflect your scores on Worksheets, Notebook, and Reports. Each lab is accompanied by questions or a worksheet, which are intended to help you with calculations, problem solving, or troubleshooting protocols -- these are turned in as part of your lab notebooks and are evaluated as part of your lab notebook record.

Notebooks: Students are expected to keep a detailed and up-to-date notebook that includes your responses to protocols, results, relevant observations plus analyses. The notebook will be used by you to assist you with your reports and exams; the notebook itself will be evaluated twice during the semester. 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. You will keep a digital notebook with the software OneNote. We will talk more in class about keeping a good lab notebook.

Lab reports. Each student will complete two lab reports, following standard scientific format and abiding by APA 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.

For each report graded elements are draft (30 pts), peer evaluation components (15 pts), and final report (15 pts). The final report must include revisions to your manuscript which address the peer evaluations and instructor comments.

Peer evaluation. As part of each report grade you will evaluate two or three papers from your peers. Details will be provided along with the assignments.

Worksheets. Topic questions from each lab will be provided in handouts, and form the basis of quizzes and exams in the course. These topics will be discussed during lab procedures and are part of your reading assignments. Many of these questions will be used as the basis for quizzes. 120 points total.

A note on working together. Laboratory work is a typically to be 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.

Grading

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

Assignment	Points	Dates
Worksheets (6) & quizzes (4)	120 pts, 12 pts each	2 – 3 per month
Reports (2) includes draft, final version, and peer evaluations	120 pts, 60 pts each	9th and 15th week
Notebook	60 pts	Mid and end of semester
Total	**300 pts**	

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

Percent of total	Letter grade
90 – 100%	A
80 – 89%	B
70 – 79%	C
60 – 69%	D
< 60%	F

Policy reminders and notices

1. Macbook lab use. This computer classroom was designed and is now maintained by Chaminade's Department of Information Technology and 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 abused or stolen computers. Therefore, each person has the

responsibility to use the computers responsibly. By using these facilities, you agree to abide by the Computer Room 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).

2. Attendance and tardiness. Students are expected to attend regularly all courses for which they are registered. Students should notify their instructors when illness or other extenuating circumstances prevents them from attending class and make arrangements to complete missed assignments. Notification may be done by sending a text message from within the course Moodle site. Other modes include emailing the instructor's Chaminade email address, calling the instructor's campus extension or by leaving a message with the instructor's division office (Natural Science and Math 1 (808) 440-4204). It is the instructor's prerogative to modify deadlines of course requirements accordingly. Any student who stops attending a course without officially withdrawing may receive a failing grade. Class begins and ends each time exactly on the scheduled start time. Unexcused absences equivalent to more than a week of classes may lead to a grade reduction for the course. Any unexcused absence of two consecutive weeks or more may result in being withdrawn from the course by the instructor, although the instructor is not required to withdraw students in that scenario. Repeated absences put students at risk of failing grades.
3. Policy on communication. The University provides a Chaminade email address for all students. Official Chaminade communications will be sent to the students' Chaminade email address and instructors will use only this email to communicate with students. It is the responsibility of the student to check their email frequently. Report email-related problems to the Helpdesk at 808-735-4855 or helpdesk@chaminade.edu.
4. Electronic devices. Use of music devices and cell phones is prohibited during all Natural Science and Mathematics classes at Chaminade, unless specifically permitted by your instructor (see 5). 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.
5. BI307L Electronic devices policy: You are encouraged to bring and use your laptops and tablets to genetics lab. Calculators will be provided for your use on Exam days. Cell phone use as calculators is not permitted while taking exams.
6. Getting help in this course. Please utilize the Ask Dr Dohm forum. Most of the questions you have about genetics lab, others will have too. It is important and an expectation of the course that you participate and regular use of the forum is a great way to accomplish this. Use my official office hours or make an appointment via the Moodle site if you wish to discuss genetics.
7. Policy on make-up assignments. No make up quiz, exam, or presentation time will be granted for unexcused absences. For excused absences, if a student cannot attend a class in which a quiz has been scheduled, the student must provide written verification of the need to miss class at least one day prior to the scheduled due date. This includes any activities sponsored by Chaminade (athletics, etc.) -- it is the responsibility of the student to adhere to this policy. In the event of

illness, a Doctor's note will be expected.

8. Academic honesty. You are encouraged to work together; however, all graded material must be your own. Cheating in the form of plagiarism, collusion, deception and will not be tolerated and will negatively affect your grade. You are also 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.
9. ADAA Statement. Pursuant to several federal and state laws, including the Americans with Disabilities Act of 1990, as amended by the ADA Amendments Act of 2008, and Section 504 of the Rehabilitation Act of 1973, all qualified students with disabilities are protected from discrimination on basis of disability and are eligible for reasonable accommodations or modifications in the academic environment to enable them to enjoy equal access to academic programs, services, or activities. If a student would like to determine if they meet the criteria for accommodations, they should contact the Counseling Center at 808-735-4845 for further information.
10. Title IX Declaration. Chaminade University of Honolulu recognizes the inherent dignity of all individuals and promotes respect for all people. Sexual misconduct, physical and/or psychological abuse will NOT be tolerated at CUH. If you have been the victim of sexual misconduct, physical and/or psychological abuse, we encourage you to report this matter promptly. As a faculty member, I am interested in promoting a safe and healthy environment, and should I learn of any sexual misconduct, physical and/or psychological abuse, I must report the matter to the Title IX Coordinator. Should you want to speak to a confidential source you may contact the following: Chaminade Counseling Center| 808 735-4845; Any priest serving as a sacramental confessor or any ordained religious leader serving in the sacred confidence role.
11. The instructor may modify elements of this syllabus or schedule according to the operational needs of the class.

BI307L – Schedule of labs, graded items due

Week	Date	Topics	Items due (end of the week)
1	8/21	Introduction Experimental design	Worksheet 1
2	8/28	Mendelian genetics Yeast culture & genotoxicity assays *Allium* & genotoxicity assays Bioinformatics I	Worksheet 2
3	9/4	Population genetics Yeast culture & Growth curves PCR & qPCR, Primer design Analysis: Yeast, *Allium* *Arabidopsis*: Mendelian & quantitative genetics	Worksheet 3
4	9/11	No class; Assigned work outside of class	Quiz 1
5	9/18	DNA extractions PCR Bioinformatics II Analysis: Yeast, Allium *Arabidopsis*: Mendelian & quantitative genetics	Worksheet 4
6	9/26	RNA extractions qPCR Analysis: Yeast, Allium *Arabidopsis*: Mendelian & quantitative genetics	Quiz 2 Notebook check
7	10/2	Gels *Arabidopsis*: Mendelian & quantitative genetics	Worksheet 5
8	10/9	Gels *Arabidopsis*: Mendelian & quantitative genetics	
9	10/16	Individual meetings *Arabidopsis*: Mendelian & quantitative genetics	Report 1 due
10	10/23	Bioinformatics III *Arabidopsis*: Mendelian & quantitative genetics	Quiz 3
11	10/30	Forensic DNA work	Worksheet 6
12	11/6	Forensic DNA work	
13	11/13	Forensic DNA work	Quiz 4
14	11/20	Individual meetings	
15	11/27	*Arabidopsis*: Mendelian & quantitative genetics	Notebook due Report 2 due

BI307L tentative lab schedule

Week(s)	Project titles	Description	Work due (start of lab)
1 – 3	Introduction to semester Lab safety Mendel problems Working with yeast	Lab safety and overview of genetics lab for the semester; Cell culture and sterile techniques; Use of autoclave; Solutions, dilutions and cell culture media prep; Basics of yeast cell culture; lifecycle; Cryo storage; Experiment 1: Establishing growth rate in yeast cell lines: ancestors; setup continuous cultures: RT vs 30C; Mendel worksheets	Week 3 Lab notebook Report 1 assigned
4 – 7	Mutagenesis Measuring phenotypes Linkage analysis	Respiration; growth rate; cell death; cell counts; lifespan; reproduction; Mutagenesis (chemical, UV); selective media prep growth data reporting ==> graphs Linkage worksheets	Wk5 Report 1 draft Wk6 Peer review Wk7 Report 1 final
7 – 10	PCR & Bioinformatics	PTC Alu mtDNA pMCT118 Primer design	Wk7 Lab notebook Wk7 Report 2 assigned
11 – 12	Bioinformatics Data analytics	Bioterrorism Flu detective	
13	Thanksgiving Holiday	No labs this week	
14 – 15	Report writing	End of semester cleanup Attendance mandatory	Wk14 Report 2 draft Wk15 Peer review
16			Wk16 Report 2 final Wk16 Lab notebook