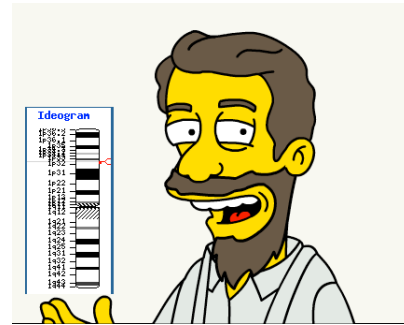


Course Syllabus

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Last updated 30 January 2023



BI 308L Molecular Biology II Laboratory Genomics and Epigenetics

Department of Biology, School of Natural Sciences & Mathematics

Spring Semester 2023

Credits: 1

Meeting times & location:

Section 1: Thursday 2:30pm – 5:20pm

Location: Lab 4 Henry Hall

Instructor: Michael Dohm PhD

Office: WSC 108

Office phone: (808) 739-8543

Office Hours: Monday & Wednesday 9 - 11am or by appointment (via CANVAS Messaging best option)

E-mail: mdohm [at] chaminade.edu (current students, please use CANVAS messaging)

A pdf version of the syllabus is available from the [Syllabus Archive \(https://syllabus.chaminade.edu/\)](https://syllabus.chaminade.edu/)

Special Attention:

Henry Lab 4 Safety and Proper Attire: We are obliged to follow applicable safety policies as established by the Environmental Safety Office: (1) No food or drink; (2) You must wear closed toes shoes; and (3) A lab coat and other appropriate PPE must be worn when directed by the instructor. Failure to comply with these rules will result in loss of points and you will be asked to leave the classroom until you are able to comply. Please make note: If you do not wear proper attire on Exam days, you will be asked to leave the class room until such time as you are able to comply with the lab safety rules; you will not be allowed to make up the exam and you will therefore receive a "0" for that exam. Please respect the rules and our obligation to provide a safe working environment for all of us. Do not make this an issue for us all.

Required textbook(s):

Instructor-provided lab manual (online), additional handouts, online sources, and articles given by instructor. A required CANVAS website will be available for your use during the semester:

<https://chaminade.instructure.com/24815>.

Recommended textbook(s):

It is highly recommended you have a copy of a good genetics textbook to refer to: Your required lecture textbook, *Genomes 4*, by TA Brown (ISBN: 978-0815345084), and the recommended lecture textbook, *Concepts of Genetics*, 12th edition, by Klug et al. (ISBN: 9780134604718) are good choices. ; and *Introduction to Genomics*, 2nd ed., 2012, by Arthur Lesk (ISBN: 978-0199564354). There will be additional recommended and required readings provided by the instructor throughout the course.

Access to course CANVAS website:

BI308L is a web-enhanced course, i.e., instruction takes place in the classroom, and technology, including the website, is used to complement and support face-to-face instruction. All lecture slides, course handouts, including this syllabus, will be made available to you at our web site. Quizzes typically will also be handled via the website, although other arrangements for taking quizzes may be available upon request.

You may access the website via <https://chaminade.instructure.com/24815>

You should already be enrolled. Select BI-308L-01-1. The web site uses CANVAS, which contains latest SSL security; your information is safe provided you use a decent password.

Connect to Chaminade's WI-FI: <https://metaaccess.myweblogon.com:8443/>
(<https://metaaccess.myweblogon.com:8443/>)

Course description:

Genomics & Epigenetics is a one semester introduction to the study of genomes (the entirety of an organism's heredity information) and epigenetics, the heritable changes in gene expression as a result of changes other than DNA sequence alterations in biological organisms. Since the late 1990s, the discipline of genomics has witnessed a revolution in methods and discovery. The impact of this revolution can be seen in the food we purchase, the way our diseases are diagnosed, and perhaps even how we view ourselves. Through lecture and discussion, we will explore these topics and reflect upon how the technology and discovery in genomics impacts the environment and human society. We will discuss genome structure and how to locate elements like a specific gene to a particular region of the genome, incorporating use of new technologies like genome wide mutant screens and RNA interference, and nonMendelian inheritance as a result of epigenetic changes to DNA. Students will be introduced and gain experience with software tools to interrogate genomic data.

Course prerequisites:

Concurrent enrollment in BI308. Required courses: BI207/207L or BI307/307L.

Catalog: BI 308L Molecular Biology II Laboratory Genomics and Epigenetics (1)

Laboratory section accompanying BI 308. Concurrent registration in BI 308 required. Prerequisites: BI 307L. Materials intensive

fee applies

Student Learning Outcomes:

This course will introduce students to the foundational concepts of molecular genetics, genomics, and bioinformatics. Students will enhance abilities to discuss potential benefits and risks of genetic technology to the environment and or to human health and society. After taking this course, students will be expected to demonstrate an understanding of

1. Formulate hypothesis and design, analyze, and interpret experiment (in vivo, in vitro, in silico). How to collect, organize, and analyze data to test hypothesis in genomics and systems biology (PLO1, PLO2, PLO3).
2. Use of bioinformatics software and databases to develop and test hypotheses (PLO1, PLO2, PLO3, PLO4).
3. Apply experimental design principles and select appropriate instrumentation to examine molecular genetic hypotheses about genome structure and patterns of inheritance (PLO4, PLO5).
4. Demonstrate working knowledge of bioinformatics tools and gene annotation (ontologies) (PLO1, PLO2).
5. Demonstrate knowledge of how to study gene expression, from primer design to use of $\Delta\Delta C_T$ method (PLO2, PLO3, PLO4).
6. Create and maintain a digital notebook for an accurate, complete accounting of the work done in the semester (PLO2)

Biology Program Learning Outcomes (PLO)

Upon completion of the B.S. degree program in Biology the student will demonstrate the following:

1. Apply the scientific method in the design and testing of hypotheses
2. Transform and display, statistically evaluate, validate, and interpret scientific data and communicate the results of such analyses effectively both orally and in writing.
3. Acquire and comprehend information from published scientific literature, databases and bioinformatics software to extract and interpret biological data
4. Recognize the chemical and physical principles that underlie all life forms, and the biological organization at the molecular, cellular, tissue, organ, organism, and system levels that emerge from these principles
5. Define the components and processes of genetic and epigenetic information transmission, and their determinant effects on the adaptive and evolutionary processes that they drive

6. Evaluate the etiology of major human disease burden in terms of, pathophysiological mechanisms, epidemiology within populations and possible therapeutic approaches
7. Integrate an awareness of bioethical issues to positively influence the application of science to service, justice and peace in the solution of societal problems

Course assessment:

Your grade will reflect your work on one(1) report, up to ten (10) worksheets, and ten (10) quizzes. You are also expected to keep a laboratory notebook of your work.

Lab reports and Worksheets. Lab work is focused on exploring projects that continue and build on preceding work throughout the semester. Reports are used to synthesize and results and analysis derived from the long projects. Worksheets, questions and problems to solve, provide links to concepts introduced or developed throughout the projects. Reports are to be organized as PowerPoint slide presentations and submitted via the course website site. Worksheets are intended to be completed in class. Expectations and formats for Reports and Worksheets will be provided by the instructor.

Quizzes will be presented with each new topic. These topics will be discussed during lab procedures and are part of your reading assignments. For your convenience, quizzes will be provided as online, multiple choice questions.

A note on expectations:

Think of the genomics lab as wet lab and dry lab. Most weeks you will need your computer, but should also expect to work with plants, yeast cells or extracted nucleic acids. In lab, we conduct experiments, both in vitro and in silico, 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.

Each student is responsible to make sure worksheets are completed, quizzes are answered, and reports are submitted on time. 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.

Individual meetings with instructor: To better help you with some of the analytical work required in this course the instructor will require you to meet with him twice during the semester; more on this requirement will be discussed at the appropriate time.

<i>Assignment</i>	<i>Points</i>	<i>Dates due</i>
Reports	100 pts	End of the semester, but parts due along the way; see schedule for dates

Worksheets (10)	100 pts	Every 1 - 2 weeks
Lab notebook	50 pts	Share url (5pts), 6 th week(5pts) + 15 th week (40 pts)
Online quizzes	50 pts	Every 1 - 2 weeks
Total	300 pts	

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

Points earned	Percent of total	Letter grade	Interpretation (University catalog)
270 – 300	90 – 100%	A	Outstanding scholarship and an unusual degree of intellectual initiative
240 – 269	80 – 89%	B	Superior work done in a consistent and intellectual manner
210 – 239	70 – 79%	C	Average grade indicating a competent grasp of subject matter
180 – 219	60 – 69%	D	Inferior work of the lowest passing grade, not satisfactory for fulfillment of prerequisite coursework.
< 180	< 60%	F	Failed to grasp the minimum subject matter; no credit given

Course and University Policy, Reminders, and Notices:

1. Chaminade University abides by all aspects of the [Family Educational Rights and Privacy Act \(FERPA\)](http://ed.gov/policy/gen/guid/fpco/ferpa/students.html). Details of Chaminade's

implementation of FERPA are available in your [Student Handbook](http://www.chaminade.edu/student_life/handbook.php) (http://www.chaminade.edu/student_life/handbook.php) (SH).

2. 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 (SH).
3. Success in this class is in your control. The more you do, the better the results will be for you. You are expected to attend class and to come prepared: read your text before the material is to be presented in class; preview the lecture slides available on the course web site; use the web site forum to ask questions and to discuss concepts; ask questions in class if you are unsure of material. I will suggest problems or questions from each chapter in your text or from the publisher's website for you to consider. If you have purchased access to Pearson's online content that accompanies your text book, please do take advantage of this marvelous resource. Neither the suggested problem sets nor the work on Pearson's supplemental material will be graded, nor are they required. However, the more you do, the more practice and exposure you get to the material, the better you will do on my exams. Exams are based on the same concepts and problems that the text questions address.
4. Class begins and ends each time exactly on the scheduled start time. Regular attendance is expected and essential for your progress in this class. The goal of lecture and discussion will be to provide the needed context to remove barriers to your understanding of the material – going it alone is not recommended.
5. It is university policy that any student who stops attending a course without officially withdrawing may receive a failing grade (SH, p. 34). Unexcused absences equivalent to more than a week of classes will lead to a grade reduction for the course.
6. About CANVAS and your course grade. Although CANVAS provides a Grading feature, this feature is for you to monitor your progress only; your official grades for the course are maintained by Dr Dohm in his grade book in his office.

Use of CANVAS for BI308L is part of your participation in the course. For a satisfactory score on this element, you are expected to check the website regularly. Minimally, you are expected to check the website before class time for expectations for the lab session.

7. 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 an exam or 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. Please utilize my official office hours or make an appointment via the course website. You are encouraged to use the Ask Dr Dohm forum – if you have a question, there is an excellent chance that others in the class have similar questions – use of Ask Dr Dohm forum counts as participation.

9. Return of graded paper material will be within ten business days after you take the graded assignment.
10. 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 item 10 and 11). 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.
11. You are encouraged to bring and use your laptops or tablets to genetics lecture and workshops. However, on exam days, calculators will be provided for your use; you may not use your smartphones, tablets, or laptops during exams.
12. You may not record audio, images, or video in the classroom without expressed permission of the instructor.
13. 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.
14. You are encouraged to work together; however, all graded material must be your own. Cheating in the form of plagiarism (offering of work of another as one's own, SH, p. 33), collusion, and deception will not be tolerated and will negatively affect your grade. Because the university is an academic community with high professional standards, its teaching function is seriously disrupted and subverted by academic dishonesty. Such dishonesty includes, but is not limited to, cheating, which includes giving/receiving unauthorized assistance during an examination; obtaining information about an examination before it is given, using inappropriate/prohibited sources of information during an examination; altering answers after an examination has been submitted; and altering the records on any grade. (Refer to the CUH 2016-17 catalog for further information).
15. 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.

16. 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. 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 CUH Counseling Center (Dr. June Yasuhara, 735-4845) by the end of the third week of classes. Failure to provide written documentation will prevent your instructor from making necessary accommodations.

Assignment schedule

Digital Notebook

Submit url

Week 6, status check

Week 15, final status check

Quizzes & Worksheets

Weekly quizzes and/or worksheets

Project report


Weekly assignments













Week 15, Final report due














Click [here to review BI308L Lab Schedule](#)











/MD

Course Summary:

Date	Details	Due
Thu Jan 12, 2023	 Lab safety https://chaminade.instructure.com/courses/24815/assignments/277692	due by 5:30pm

Date	Details	Due
Wed Jan 18, 2023	 My computer... https://chaminade.instructure.com/courses/24815/assignments/272157	due by 11:59pm
	 Submit your notebook URL https://chaminade.instructure.com/courses/24815/assignments/272170	due by 11:59pm
Thu Jan 19, 2023	 Enter tomato germination results https://chaminade.instructure.com/courses/24815/assignments/278774	due by 6pm
	 Submit PheGenI results: Gene of interest https://chaminade.instructure.com/courses/24815/assignments/272161	due by 11:59pm
Wed Jan 25, 2023	 Submit PheGenI results: Phenotype of interest https://chaminade.instructure.com/courses/24815/assignments/272162	due by 11:59pm
	 Submit PheGenI results: SNP associations https://chaminade.instructure.com/courses/24815/assignments/272163	due by 11:59pm
Thu Jan 26, 2023	 Germinate tomatoes https://chaminade.instructure.com/courses/24815/assignments/277691	due by 5:30pm
Fri Feb 3, 2023	 Enter tomato data from images https://chaminade.instructure.com/courses/24815/assignments/272152	due by 11:59pm
	 Quiz: Introduction to bioinformatics https://chaminade.instructure.com/courses/24815/assignments/272147	due by 11:59pm
	 Submit: GOI gene family here https://chaminade.instructure.com/courses/24815/assignments/272171	due by 11:59pm
Tue Feb 7, 2023	 Submit: SNP by functional class https://chaminade.instructure.com/courses/24815/assignments/272172	due by 11:59pm
	 Submit: SNP variants and mutation type https://chaminade.instructure.com/courses/24815/assignments/272173	due by 11:59pm

Date	Details	Due
Wed Feb 15, 2023	 First Lab notebook Check (https://chaminade.instructure.com/courses/24815/assignments/272154)	due by 12:59pm
Wed Feb 22, 2023	 Submit Report 1 paper (https://chaminade.instructure.com/courses/24815/assignments/272164)	due by 11:59pm
Tue Feb 28, 2023	 Quiz: More Week 5 questions (https://chaminade.instructure.com/courses/24815/assignments/272150)	due by 11:59pm
Tue Feb 28, 2023	 Quiz: Week 5, Alignment (https://chaminade.instructure.com/courses/24815/assignments/272144)	due by 11:59pm
Sun Mar 5, 2023	 Submit 13 Plus 1 Accession List here (https://chaminade.instructure.com/courses/24815/assignments/272159)	due by 11:59pm
Sun Mar 5, 2023	 Lab 7: Primer design for Tomato project (https://chaminade.instructure.com/courses/24815/assignments/272155)	due by 11:59pm
Tue Mar 7, 2023	 Quiz: Trees and Newick files (https://chaminade.instructure.com/courses/24815/assignments/272148)	due by 11:59pm
Tue Mar 7, 2023	 Report 2: What is it about? (https://chaminade.instructure.com/courses/24815/assignments/272158)	due by 11:59pm
Thu Mar 9, 2023	 Submit Newick file here (https://chaminade.instructure.com/courses/24815/assignments/272160)	due by 11:59pm
Thu Mar 9, 2023	 Quiz: Tree reconciliation (https://chaminade.instructure.com/courses/24815/assignments/272146)	due by 11:59pm
Tue Mar 14, 2023	 Submit results: Rate tests (https://chaminade.instructure.com/courses/24815/assignments/272168)	due by 11:59pm
Tue Mar 14, 2023	 Submit Results: Tree Reconciliation exercise (https://chaminade.instructure.com/courses/24815/assignments/272166)	due by 11:59pm
Fri Mar 17, 2023	 Quiz: Week 8, PCR (https://chaminade.instructure.com/courses/24815/assignments/272145)	due by 11:59pm

Date	Details	Due
Fri Mar 31, 2023	 Submit your molecular clock files here https://chaminade.instructure.com/courses/24815/assignments/272169	due by 11:59pm
Mon Apr 3, 2023	 Submit Slope and R2, Molecular Clock https://chaminade.instructure.com/courses/24815/assignments/272167	due by 11:59pm
Tue Apr 4, 2023	 CRISPR-Part 1 https://chaminade.instructure.com/courses/24815/assignments/272151	due by 11:59pm
Thu Apr 6, 2023	 Course Evaluation https://chaminade.instructure.com/calendar?event_id=29128&include_contexts=course_24815	7pm
Tue Apr 11, 2023	 Essential or not? https://chaminade.instructure.com/courses/24815/assignments/272153	due by 11:59pm
Mon Apr 17, 2023	 Student Course Evaluation https://chaminade.instructure.com/calendar?event_id=29129&include_contexts=course_24815	12am
Fri Apr 28, 2023	 Last Lab notebook Check https://chaminade.instructure.com/courses/24815/assignments/272156	due by 11:59pm
Wed May 3, 2023	 Submit Report 2 slides https://chaminade.instructure.com/courses/24815/assignments/272165	due by 11:59pm
Thu May 4, 2023	 Quiz Evolutionary Rates https://chaminade.instructure.com/courses/24815/assignments/272149	due by 11:59pm
	 got a draft of Report 2 to share with me? https://chaminade.instructure.com/courses/24815/assignments/272174	