



Molecular Biology I: Genes & Genetics Lab **Biological Science BI 307L**

Course Number: BI 307L

Course Title: Molecular Biology I: Genes & Genetics Lab

Department Name: Biology

College/School/Division Name: School of Natural Sciences and Mathematics

Class Meeting Days: Wednesdays

Class Meeting Hours: 2:30 - 5:20 pm

Class Location: Henry Hall Lab 2 ([link to campus map \(https://chaminade.edu/studentsuccess/nso/nso-campus-map/\)](https://chaminade.edu/studentsuccess/nso/nso-campus-map/))

Instructor Name: Dr. Mindy McDermott

Email: mindy.mcdermott@chaminade.edu

Office Location: Wesselkamper, Office 103

Office Hours: by appointment

Required Texts and Materials

No specific textbook is required for this lab. All necessary protocols and reading materials will be provided as handouts or made available on Canvas.

Your BI 307 lecture textbook, Concepts of Genetics, by Klug et al. will also be utilized.

Other required material

Students are required to obtain a laboratory coat, now available at the Division of Natural Sciences & Mathematics office (Wesselkamper, Room 115). Gloves and safety goggles will be provided to you in the lab. A personal computer or smart phone is also required material and must be brought to each week. A three-ring binder for course handouts is highly recommended.

Credit Hour Policy

This is a one-credit course requiring 45 hours of student engagement, per the official Chaminade University Credit Hour Policy. Students enrolled in this course are expected to spend about 40 hours in class, 15 - 20 hours on assignments, and at least 10 hours working on their final paper. Additionally, students can anticipate spending 2 hours per week studying for quizzes.

Course Overview

Molecular Biology I: Genes & Genetics Lab is a one-semester course that introduces how geneticists study heredity patterns, isolate and manipulate DNA, and conduct research using public databases and specialized software. Through hands-on activities, discussions, and in-class projects, we will explore genetic techniques such as DNA extraction, electrophoresis, hybridization, amplification, and data analysis. Using model organisms like bacteria, *Drosophila*, and yeast, students will gain practical experience with the genetic basis of simple phenotypes. This course also emphasizes understanding how geneticists investigate these topics and the broader impact of genetics on the environment and society. Given the nature of molecular genetics experiments, data collection and analysis typically span 2 to 3 lab sessions, as most experiments require several hours to complete.

Marianist and Native Hawaiian Values

Education is an integral value in both Marianist and Native Hawaiian culture. Both recognize the transformative effect of a well-rounded, value-centered education on society, particularly in seeking justice for the marginalized, the forgotten, and the oppressed, always with an eye toward God (Ke Akua). This is reflected in the 'Ōlelo No'eau (Hawaiian proverbs) and Marianist core beliefs.

1. Educate for Formation in Faith (Mana) E ola au i ke akua ('Ōlelo No'eau 364) May I live by God.
2. Provide an Integral, Quality Education (Na'auao) Lawe i ka ma'alea a kū'ono'ono ('Ōlelo No'eau 1957). Acquire skill and make it deep.
3. Educate in Family Spirit ('Ohana) 'Ike aku, 'ike mai, kōkua aku kōkua mai; pela iho la ka nohana 'ohana. ('Ōlelo No'eau 1200) Recognize others, be recognized, help others, be helped; such is a family relationship.
4. Educate for Service, Justice, and Peace (Aloha) Ka lama kū o ka no'eau ('Ōlelo No'eau 1430) Education is the standing torch of wisdom.
5. Educate for Adaptation and Change (Aina) 'A'ohe pau ka 'ike i ka hālau ho'okahi ('Ōlelo No'eau 203). All knowledge is not taught in the same school.

Alignment of Natural Sciences Courses with Marianist & Native Hawaiian values of the University

The Natural Sciences Division provides an *integral, quality education*: sophisticated integrative course content taught by experienced, dedicated, and well-educated instructors.

- *We educate in family spirit* – every classroom is an *Ohana* and you can expect to be respected yet challenged in an environment that is supportive, inclusively by instructors who take the time to personally get to know and care for you.
- *We educate for service, justice, and peace*, since many of the most pressing global issues (climate change, health inequity, poverty, justice) are those which science and technology investigate, establish ethical parameters for, and offer solutions to.
- *We educate for adaptation and change*. In science and technology, the only constant is change. Data, techniques, technologies, questions, interpretations, and ethical landscapes are constantly evolving, and we teach students to thrive on this dynamic uncertainty.

The study of science and technology can be formative, exploring human creativity and potential in the development of technologies and scientific solutions, the opportunity to engage in the stewardship of the natural world, and the opportunity to promote social justice. We provide opportunities to engage with the problems that face Hawai'i and the Pacific region through the Natural Sciences curriculum, in particular, those centered around severe challenges in health, poverty, environmental resilience, and erosion of traditional culture. The Marianist Educational

Values relate to Native Hawaiian ideas of *mana*, *na'auao*, *ohana*, *aloha* and *aina*. We intend for our Natural Sciences programs to be culturally-sustaining, rooted in our Hawaiian place, and centered on core values of *Maiau*, be neat, prepared, careful in all we do; *Makawalu*, demonstrate foresight and planning; *Ai*, sustain mind and body; *Pa`a Na`au*, learn deeply.

Student (Course) Learning Outcomes

1. Equip students with the skills needed for success in advanced biology laboratory courses and related fields.
2. Introduce core methods and techniques, along with the proper instruments, used in genetic studies.
3. Encourage investigative and problem-solving skills through observational and experimental approaches.
4. Foster the ability to critically analyze scientific journal articles.
5. Promote the value of collaboration and teamwork in group settings.
6. Highlight the significance of using model organisms in research.

Biology Program Learning Outcomes (PLO)

Upon completion of a B.S. degree program in Biology the student will be able to:

1. Utilize the scientific method in the design and testing of hypotheses.
2. 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 and employ computational resources in the resolution of biological problems.
4. Recognize the chemical and physical principles that underlie all life forms, as well as 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. Embark upon career pathways towards the major post-graduate fields of research, education, and the health professions of their choice.

Alignment of Course Learning Outcomes (CLO) to Biology Program Outcomes (PLO)

Course Learning Outcomes	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6
1. Describe and utilize the Scientific Method: Apply the Scientific Method to observable phenomena by formulating appropriate scientific questions and hypotheses. Understand the relationship between the structure and function of genes and proteins.	X	X	X			
2. Graph, analyze, and interpret scientific data: Accurately graph, analyze, and interpret data derived from scientific experiments.		X	X			
3. Perform and understand experimental techniques: Conduct experiments involving DNA extraction, PCR, sequencing, bioinformatics, and	X	X	X			

Mendelian inheritance, with a clear understanding of the methodologies used.						
4. Write scientific papers and lab reports: Develop the ability to write clear and structured scientific papers and lab reports.	X	X	X	X		

*Adopted Dr. Jolene Cogbill

Strategies for Success

1. **Prepare in Advance:** Read your textbook and other materials before attending class.
2. **Be Present:** Attend all labs and study sessions consistently.
3. **Engage Fully:** Participate actively in all activities without dividing the work or copying from others.
4. **Allocate Study Time:** Dedicate a specific block of time each day to your coursework.
5. Aim to spend 1-2 hours studying at home for every hour spent in the classroom.
6. **Establish a Study Routine:** Create a study schedule and adhere to it.
7. **Avoid Procrastination:** Stay on top of your assignments and study regularly.
8. **Practice Memorization:** Develop and regularly practice the skill of memorization.
9. **Diversify Your Learning:** Approach the material in multiple ways and connect it to things that are meaningful to you.
10. The more diverse and meaningful your learning approach, the easier it will be to remember the information.
11. **Collaborate with Peers:** Work with classmates to stay motivated and form study groups.
12. **Seek Help Early:** If you encounter difficulties with the course, seek assistance promptly.

Grading Policies

Grading Procedure

Grades will reflect an overall understanding of topics covered in class. Attendance, completion of assigned readings, and attentiveness in the lab will ensure satisfactory performance in the class. Demonstrating a thorough understanding of course material and intelligent engagement in course discussions constitutes high achievement in the course. We will have in-class work and lab activities to do to facilitate class discussion, which may range from group activities, reviews of current literature, media, articles, and class discussions. Group activities may consist of brief oral reports or short written reports. For written coursework, you will be graded on your ability not only to answer the question, but also in how effectively you can defend your answer/position using your knowledge of the subject & applying what you learned through the use of appropriate facts and examples.

Working Together: A Note on Collaboration.

Laboratory work is generally treated as a group activity, but assignments are individual tasks. During lab sessions, we will conduct experiments and document observations. We will guide you on how to carry out the necessary analyses to interpret your experiments. However, expect to dedicate time outside of class to complete the analysis and write up the results and conclusions from the experiments. Each student must submit their own, write-up and analysis, ensuring that the work is done independently. However, the data collected during experiments belong to the group. Occasionally, we will form groups to discuss topics or tackle problems introduced in the lab. These group activities aim to foster active learning. Materials will be dispersed ahead of time, and it is essential to come to class prepared to engage in discussions with your classmates.

<u>Specific Assignment</u>	<u>% Of Grade</u>	<u>Due Date</u>
Assignments/Quizzes	35%	Each week semester long
Participation	15%	Each week semester long
Lab Work	35%	Each week semester long
Final Assignment	15%	Final week of semester

Grading Scale

Letter grades are given in all courses except those conducted on a credit/no credit basis. Grades are calculated from the student's daily work, class participation, tests, reports, and examinations. They are interpreted as follows:

- A (90% & above) Outstanding scholarship and an unusual degree of intellectual initiative
- B (80–89%) Superior work done in a consistent and intellectual manner
- C (70–79%) Average grade indicating a competent grasp of subject matter
- D (60–69%) Inferior work, not satisfactory for fulfillment of course
- F (59% & below) Failed to grasp the minimum subject matter; no credit given

Tutoring and Writing Services

Chaminade is proud to offer free, one-on-one tutoring and writing assistance to all students. Tutoring and writing help are available on campus at Kōkua `Ike: Center for Student Learning in a variety of subjects (including, but are not limited to biology, chemistry, math, nursing, English, etc.) from trained Peer and Professional Tutors. Please check Kōkua `Ike's website (<https://chaminade.edu/advising/kokua-ike/>) for the latest times, list of drop-in hours, and information on scheduling an appointment. Free online tutoring is also available via Smarthinking. Smarthinking can be accessed 24/7 from your Canvas account. Simply click Account – Notifications – Smarthinking. For more information, please contact Kōkua `Ike at tutoring@chaminade.edu or 808-739-8305.

Course Policies

Late Work Policy

Assignments are expected on the due date. If you are unable to make the due date, a conversation must be had with me PRIOR to the due date for an extension. Unexcused late work will receive a reduced grade.

Grades of "Incomplete"

Students and instructors may negotiate an incomplete grade when there are specific justifying circumstances. When submitting a grade, the "I" will be accompanied by the alternative grade that will automatically be assigned after 90 days. These include IB, IC, ID, and IF. If only an "I" is submitted the default grade is F. The completion of the work, evaluation, and reporting of the final grade is due within 90 days after the end of the semester or term. This limit may not be extended.

Instructor and Student Communication

Questions for this course can be emailed to the instructor at [mindy.mcdermott@chaminade.edu]. Online, in-person, and phone conferences can be arranged. Response time will take place as soon as possible, usually within one day.

Cell phones, tablets, and laptops

Out of consideration for your classmates, please set your cell phone to silent mode during class. Students are encouraged to bring laptops or tablets to class as the instructor will assign online activities and readings that will require the use of a laptop or tablet. Laptops and tablets should not be misused, such as checking distracting websites. Use your best judgment and respect your classmates and instructor.

ADA Policy

Pursuant to 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 the basis of disability and are eligible for reasonable accommodations or modifications in the academic environment to enable them to 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 in the Student Support Services Building, Room 101, by phone at (808) 735-4845 or email: counselingcenter@chaminade.edu for further information. Web: studentaffairs.chaminade.edu/counseling-center/counseling-services

Title IX Compliance

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. If you or someone you know has been harassed or assaulted, you can find the appropriate resources by visiting Campus Ministry, the Dean of Students Office, the Counseling Center, or the Office for Compliance and Personnel Services.

Attendance Policy

Students are expected to regularly attend 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 emailing the instructor's Chaminade email address, or by leaving a message with the instructor's division office. 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. 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.

Students with disabilities who have obtained accommodations from the Chaminade University of Honolulu ADA Coordinator may be considered for an exception when the accommodation does not materially alter the attainment of the learning outcomes. Federal regulations require continued attendance for continuing payment of financial aid. When illness or personal reasons necessitate continued absence, the student should communicate first with the instructor to review the options. Anyone who stops attending a course without official withdrawal may receive a failing grade or be withdrawn by the instructor at the instructor's discretion.

Academic Conduct Policy

The success of the Honor Code is made possible only with the acceptance and cooperation of every student. Each student is expected to maintain the principles of the Code. Example of Honor Code violations include, but are not limited to:

- Giving or receiving information from another student during an examination;
- Using unauthorized sources for answers during an examination;
- Illegally obtained test questions before the test;
- Any and all forms of plagiarism – submit all or part of someone else’s work or ideas as your own;
- The destruction and/or confiscation of school and/or personal property.

Violations of Academic Integrity: Violations of the principle include, but are not limited to:

- Cheating: Intentionally using or attempting to use unauthorized materials, information, notes, study aids, or other devices in an academic exercise.
- Fabrication and Falsification: Intentional and unauthorized alteration or invention of any information or citation in an academic exercise. Falsification is a matter of inventing or counterfeiting information for use in any academic exercise.
- Multiple Submissions: The submission of substantial portions of the same academic work for credit (including oral reports) more than once without authorization.
- Plagiarism: Intentionally or knowingly presenting the work of another as one’s own (i.e., without proper acknowledgment of the source).
- Abuse of Academic Materials: Intentionally or knowingly destroying, stealing, or making inaccessible library or other academic resource materials.
- Complicity in Academic Dishonesty: Intentionally or knowingly helping or attempting to help another to commit an act of academic dishonesty.

Plagiarism includes, but is not limited to:

- Complete or partial copying directly from a published or unpublished source without proper acknowledgement to the author. Minor changes in wording or syntax are not sufficient to avoid charges of plagiarism. Proper acknowledgement of the source of a text is always mandatory.
- Paraphrasing the work of another without proper author acknowledgement.
- Submitting as one’s own original work, however freely given or purchased, the original exam, research paper, manuscript, report, computer file, or other assignment that has been prepared by another individual.
- Use of generative artificial intelligence (AI) without permission by instructor. Sentences, paragraphs, or entire papers written by AI are not original work.

**Students are encouraged to utilize change tracking and history functions of their word processing software to help document that a work is original to the student.*

Consequences of academic honesty violations:

From the [Chaminade University catalog](https://catalog.chaminade.edu/generalinformation/academicaffairs/policies/academichonesty)

(<https://catalog.chaminade.edu/generalinformation/academicaffairs/policies/academichonesty>) :

Academic honesty is an essential aspect of all learning, scholarship, and research. It is one of the values regarded most highly by academic communities throughout the world. Violations of the principle of academic honesty are extremely serious and will not be tolerated. Students are responsible for promoting academic honesty at Chaminade by not participating in any act of dishonesty and by reporting any incidence of academic dishonesty to an instructor or to a

university official. Academic dishonesty may include theft of records or examinations, alteration of grades, and plagiarism, in addition to more obvious dishonesty. Questions of academic dishonesty in a particular class are first reviewed by the instructor, who must make a report with recommendations to the Dean of the Academic Division. Punishment for academic dishonesty will be determined by the instructor and the Dean of Academic Division and may include an “F” grade for the work in question, an “F” grade for the course, suspension, or dismissal from the University.

**Additional information on student conduct can be found in the student handbook.*

Course Schedule (subject to change as instructor deems necessary)

Week	Dates	Topic	Assignments
1	Aug 21	Introduction, Lab Safety, and The Scientific Process	See Canvas
2	Aug 28	Mitosis & Meiosis: Socks Lab	See Canvas
3	Sept 4	Principles of Probability & Chi Square	See Canvas
4	Sept 11	Quantitative Genetics: Virtual Drosophila Lab	See Canvas
5	Sept 18	Quantitative Genetics: Virtual Drosophila Lab	See Canvas
6	Sept 25	Synthetic Biology: Promoter Function	See Canvas
7	Oct 2	Synthetic Biology: Promoter Function	See Canvas
8	Oct 9	Synthetic Biology: Promoter Function	See Canvas
9	Oct 16	Synthetic Biology: Promoter Function	See Canvas
10	Oct 23	Investigation of Single Nucleotide Polymorphisms	See Canvas
11	Oct 30	Investigation of Single Nucleotide Polymorphisms	See Canvas
12	Nov 6	Investigation of Single Nucleotide Polymorphisms	See Canvas
13	Nov 13	Investigation of Single Nucleotide Polymorphisms	See Canvas
14	Nov 20	DNA Repair: Study of Impact of UV Light	See Canvas
15	Nov 27	Review & Final Paper	See Canvas

Note: Every effort has been made to ensure that the material in this syllabus is accurate and complete. However, occasionally changes must be made in the printed schedule. Thus, the instructor reserves the right to make any changes in the contents of this syllabus that she deems necessary or desirable. These changes, if any, will be announced as soon as the need for them becomes apparent.