BI308 Syllabus

Molecular Biology II Genomics and Epigenomics

Spring 2017 meeting days/times: MWF 10:30 – 11:20 AM, Henry Hall room 109
Instructor: Dr Mike Dohm, **Office**: Henry Hall, room 6; **Phone**: 808-739-8543
Email: mdohm@chaminade.edu
Office hours: Tuesday 9AM – 12PM; Other times may be possible, but by appointment only.

Required textbook:

Introduction to Genomics, 2nd ed., 2012, by Arthur Lesk (ISBN: 978-0199564354)

Recommended textbooks:

It is highly recommended you have a copy of a good genetics textbook to refer to. *Concepts of Genetics*, 11th edition, by Klug et al. (ISBN: 978-032194891); *Genomes 3, 2006*, by T. A. Brown (ISBN: 978-0815341383). There will be additional recommended and required readings provided by the instructor throughout the course.

Course description:

Molecular Biology II: 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.

The course is necessarily cumulative – you can expect topics covered build on concepts from the first semester; you can also expect that each exam includes material from previous weeks.

Catalog description:

BI 308 Molecular Biology II Genomics and Epigenomics (3) Components and architecture of genomes. Linkage, physical mapping, and DNA sequencing. Comparing genomes of different species. Role of gene expression and gene networks in differentiation and morphogenesis. Role of DNA methylation and chromatin remodeling in regulation of genes. Role of regulatory RNAs in gene expression. *Prerequisites: BI 307*

Course 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.

Student learning outcomes and linkages to Program Learning Outcomes (PLO)*:

Students will be expected to demonstrate an understanding of

1. Organization of genomes (PLO: #1, #2. #3, #4, #5, #6, #7).
2. How sequencing technologies, software, and prior knowledge is incorporated into a genome assembly (PLO: #1, #2. #3, #4)
3. How to locate a gene (or other element) by molecular genetic and bioinformatic approaches (PLO: #1, #2. #3, #4).
4. Local and genomic control of gene expression (PLO: #2. #3, #4, #5, #6).
5. The role of sequence and imprinting on allele-specific patterns of inheritance (PLO: #1, #2. #3, #4, #5, #6).

* See Chaminade University 2016-2017 Undergraduate Catalog

Access to course website

BI 308 is a web-enhanced courses, i.e., instruction takes place in the classroom, and technology, including the website, are 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 Chaminade's Canvas. You should already be enrolled. Select BI-308 -01-1. The Canvas site uses latest SSL security; your information is safe provided you use a decent password. 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 BI 308 is part of your participation in the course. For a satisfactory score on this element, you are expected to spend about an active hour each week on the site.

Service Learning:

Students will be required to provide 10 hours during the semester for an organization or in an activity that is related to human genetics. More information on the opportunities will be provided in the first few weeks of class. A 2-3 page reflection paper will be due during Week 14 on the activities. If you complete the service earlier in the semester, you are encouraged to submit the paper earlier in the semester, as in within two weeks of completing the service.

Course assessment:

Your grade will be the result of points earned from quizzes, worksheets, and exams.

Quizzes and Worksheets, hereafter simply referred to as Quizzes, consist of testing of concepts (multiple choice) and from case studies with instructions on a particular genomics or bioinformatics problem. Work will include: use of online databases and bioinformatics tools and will be supported by work in laboratory exercises. Quizzes will be administered in class.

Three exams, each based on 8-9 lectures from up to five chapters from the lectures, quizzes, worksheets and required textbook. Exams will include between 15 and 20 questions (approximately 80% multiple choice, 20% short answer).

Each exam will include opportunities for bonus points (5% per exam).

The third exam will be scheduled for finals week. A total of 300 points may be earned throughout the semester; each item has the following value.

The next table summarizes the graded elements in this course.

Item	*How many?*	*How often?*	*How many points?*	*Total points towards final grade*
Quizzes/Worksheets	*10*	*every 1-2 weeks*	*3*	*30*
Service learning reflection paper	1	*10 hours during semester*	30	30
Exams	*3*	*every 3-4 weeks*	*80*	*240*

Final grade:

Your letter grade will be based on the following point distribution out of 300 points possible.

Points earned	*Percent of total*	*Letter grade*	*Interpretation (page 42, CUH 2016-17 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
180-209	*60-69%*	*D*	Inferior work of the lowest passing grade, not satisfactory for fulfillment of prerequisite coursework.
< 179	*< 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). Details of Chaminade's implementation of FERPA are available in your Student Handbook (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. 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.

7. 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.
8. Return of graded paper material will be within ten business days after you take the graded assignment.
9. 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.
10. 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.
11. You may not record audio, images, or video in the classroom without expressed permission of the instructor.
12. 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.
13. 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).
14. 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.
15. 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.

BI308 Exam, quiz, and lecture schedule (tentative, subject to change by instructor)

Weeks 1 – 6: Genetics review (Klug text); Introduction (Lesk: Ch01) & Genomes are the hub of biology (Lesk: Ch02) No class 16 January Quiz01 = Week1 = TOSL Exam Quiz02 = Week3 Quiz03 = Week5 Week 3 = time in class for Service learning project   Review: in class 17 February Exam01 in class 22 February
Weeks 6 – 12: Genome mapping, sequencing, annotation (Lesk: Ch03); Comparative genomics (Lesk: Ch04); Evolution & Genomic change (Lesk: Ch05); Genomes of Prokaryotes & Viruses (Lesk: Ch06) Quiz04 = Week7 Quiz05 = Week8 Quiz06 = Week9 Quiz07 = Week11 Week 6 = time in class for Service learning project Week 10 – Spring recess (20 - 24 March) Review: in class 31 March Exam02 in class 03 April
Weeks 12 – 16: Comparative genomics (Lesk: Ch04); Evolution & Genomic change (Lesk: Ch05); Genomes of Eukaryotes (Lesk: Ch07); Humans (Lesk: Ch08) Quiz08 = Week14 Quiz09 = Week15 Quiz10 = Week16 Week 14 = Service learning reflection paper due by 21 April Review: in class 05 May Finals Week: Exam03 BI308-01 – 11 May 11:00AM – 1:00PM