BI305 Syllabus

Genetics and Genomics

Spring 2017 meeting days/times: Tues & Thurs 5:30 – 6:50 AM, Hale Hoaloha room 109

Instructor: Dr Mike Dohm, **Office**: Henry Hall, room 6; **Phone**: 808-739-8543

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Office hours: Tuesday 9AM – 12PM; Other times may be possible, but by appointment only.

Required textbook:

Human genetics: Concepts and applications, 11th ed., 2015, by Ricki Lewis (ISBN: 978-0073525365)

Course description:

This course is intended to provide training in the basic concepts of genetics and genomics and their applications in human medical practices to third year nursing students in the Chaminade School of Nursing. Topics that include personalized medicine, gene therapy and family histories of genetic diseases will be covered. A service learning component is included to expose students to organizations that assist and counsel patients with defined genetic disorders such as muscular dystrophy and chromosomal aneuploidies such as Down Syndrome as well as congenital birth defects. Topics include family history, risk assessment, interventions, genetic testing and counseling, ethical and social issues and use of genetics and genomics to improve clinical practice.

Catalog description:

BI 305 Genetics and Genomics (3) Nursing required course. Basic concepts in genetics and genomics, Current research, new ways to diagnose genetic conditions and genetic technologies that provide understanding of the genetic component to common chronic diseases are explored. Topics include family history, risk assessment, interventions, genetic testing and counseling, ethical and social issues and use of genetics and genomics to improve clinical practice. Restricted to students accepted in the CUH Nursing major. *Prerequisites: BI 152/BI 152L, BI 250/250L, CH 250, NUR 202, NUR 203.*

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 learning outcomes:

This course will introduce students to the foundational concepts of genetics and genomics. 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:

At the conclusion of the BI305 course, students will demonstrate the ability to

1. Define basic genetic terminology.
2. Describe the basic genetic information and its relationship to genes, phenotypes and mutations.

3. Construct and analyze pedigrees, e.g. family genetic histories, from information collected over a minimum of three generations.*
4. Ascertain patterns of inheritance in pedigrees of human traits that result from pure Mendelian laws as well as factors that can skew Mendelian ratios including phenomena such as multifactorial traits, epigenetics, penetrance and variable expressivity.
5. Write up case studies that incorporate genetics and genomics into health and disease assessments. *
6. Calculate simple genetic risk assessments and make recommendations. *
7. Diagram the composition and organization of the genetic material in the human genome.
8. Identify resources that provide genetic and genomic information including services such as genetic testing. *
9. Describe basic cytological and molecular genetic tests for the major genetic disorders.
10. Explain the concept of personalized medicine particularly as it applies to pharmacogenomics and cancer and gene therapies. *
11. Synthesize the ethical, legal and social issues in the area of genetics and genomics in the context of human health.

*Essential Nursing Competencies Guidelines for Genetics and Genomics, 2008.

Course assessment:

Your grade will be the result of points earned from 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. Three exams, each based on 4-5 weeks of lectures from up to five chapters from the lectures, quizzes, worksheets and required textbook. Exams will include between 15 and 20 questions (all multiple choice). 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.

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

Access to course website

BI 305 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-305 -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 305 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.

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.

BI305 schedule (tentative, subject to change by instructor)

Week	Dates	Topic	Readings*	Supplemental Reading	Assignments/Quizzes
1	Jan 17 & 19	Intro to Genetics & Genomics; Cells	1,2		Q1 = TOSL
2	Jan 24 & 26	Cells, Meiosis, & reproduction; DNA structure & replication	2 ,3, 9		
3	Jan 31 & Feb 02	Mitosis; Mendel & genes Patterns of Inheritance; Probability; Multifactorial traits	4, 5, 7	*Cutting (2015) Cystic fibrosis genetics: from molecular understanding to clinical application, Nat Rev Genet. 16(1):45-56*	Q2
4	Feb 07 & 09	Patterns of Inheritance; Chromosomes; Transcription & Translation	4, 5, 6, 10	*Taylor et al (2015) An Overview of the Metabolic Syndrome,J Nurs Scholarsh. 2013 Mar; 45(1): 52–59.*	Q3 Case Study 1
5	Feb 14 & 16	Family History & Pedigree Construction; Gene expression Review	6, 11	Deans, C., and Maggert, K.A. (2015) What do you mean,“epigenetic”? Genetics, 199:887-896.	Q4
6	Feb 21 & 23	Exam 1 Mutations; Chromsomes	12, 13	*Exam 1 on Feb 21; all materials through Feb 16*	
7	Feb 28 & Mar 02	Mutations; Chromosomes	12, 13		Q5 Case Study 2
8	Mar 07 & 09	PopGen, Carrier Screening & Genetic Risk	14, 15	*Chakravarti, A. (1999). Population genetics—making sense out of sequence. Nature genetics, 21, 56-60.*	
9	Mar 14 & 16	PopGen, Carrier Screening & Genetic Risk	14, 15, 16		Q6
	SPRING BREAK –Monday – Friday Mar 20-24.				
11	Mar 28 & 30	Review Exam 2		*Exam 2 on Mar 30; all materials through Mar 28*	

Week	Dates	Topic	Readings*	Supplemental Reading	Assignments/Quizzes
12	Apr 04 & 06	Genetic & Genomic Testing,	19, 20	Katsanis, S. H., & Katsanis, N. (2013). Molecular genetic testing and the future of clinical genomics. Nature Reviews Genetics, 14(6), 415-426.	Q7
13	Apr 11 & 13	Cancer Genetics & Genetic Risk	17, 18		Q8
14	Apr 18 & 20	CVD Disorders; Psychiatric Disorders	8, 20		Q9 Service Learning Papers due Apr 13
15	Apr 25 & 27	Genomics	22		Q10
16	May 02 & 04	Ethics and policies in nursing	19, 20, 21		Case Study 3
17	Week of May 08	FINAL EXAM TBA		*Exam 3; all materials through May 4*	

*Readings from 11th edition Lewis textbook