

BIO 341: Medical Genetics

Winter 2019, Klamath Falls Campus

Instructor: Dr. Travis Lund

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Office Hours: TBD: _____

Study Session: TBD: _____

Class Info: OW 216 MWF, 11:00–11:50 3 Credits CRN: 20541 Prereq: BIO213/BIO233

Winter Term Holiday: Monday Jan 21st – no class, Martin Luther King, Jr. holiday

Course Description:

From the course catalog: “*Principles of heredity, chromosome mechanisms and molecular genetics applied to disease processes in humans. Review of case histories of selected inherited disorders. Discussion of genetic intervention therapies.*”

In this course, we will study a variety of simple and complex (multi-factorial) human genetic diseases. We will also examine areas (such as cancer) in which inheritance and the environmental factors are mixed together, as well as modern technological applications of genetics (genetic testing, gene therapy, forensic identification, etc.). As the study of human genetics has always been controversial, we will spend some time discussing scenarios in genetics in which there is a clear need for ethical decision-making.

Class periods may incorporate a mixture of lecture, discussion, and group problem solving times; your attendance and participation are essential to make discussion and learning possible for yourself and for others! As we proceed through the term, specific chapters (or particular subsections of chapters) of our textbook will be identified that you will be responsible for knowing. In our classroom sessions, we will often focus our time on the most important, most interesting, or most confusing concepts from these chapters, and may not always have time in class to cover every detail of the various chapter topics. Thus, your textbook, with the associated practice problems and study questions in Blackboard, will be an indispensable resource as you work to master the genetics content in this course.

Required Course Materials:

- **Textbook:** Cummings, Michael, *Human Heredity: Principles and Issues* (11th ed.)
 - Access to either a printed edition or an ebook “rental” is important for this course – the 11th edition ideally, though you can probably get by with the 10th if you are careful about practice problems and such.
- The only other required course materials will be posted to our Blackboard site (and often handed out in class as printed copies, as well). This will include online homework problems, copies of in-class worksheets, as well as each class period’s PowerPoint slides and any additional study materials.

Grading Policy – Your grade in BIO 341 will be based on the following five items:

1. **Online Homework.** Required homework questions will be administered via Blackboard. (*Additional, optional practice problems are also provided!*) Homework assignments should be completed by the deadline listed in order to earn course credit.
2. **In-Class Worksheets.** Periodic in-class “worksheets” will be provided, and should be turned in by the date indicated for course credit.
3. **Writing Assignments.** Several short(ish) writing assignments will be assigned. These will include short (paragraph) responses regarding ethical scenarios, as well as slightly longer “Reports” (such as a “Genetics in the News” paper). All will be submitted via Blackboard.

4. In-Class Quizzes. There will be 5 in-class quizzes, scheduled on alternating Fridays (the Fridays of Week 2, 4, 6, 8 and 10 of the term). Your lowest quiz score will automatically be dropped. Quizzes will emphasize material since the previous quiz, though the current content may rely or build on content from prior quizzes.

5. Final Exam (cumulative) on **Tuesday** of Finals Week from 12-2pm.

Anticipated point distributions (subject to minor adjustments if necessary) are as follows:

100	Homework (online)
100	Worksheets (in-class)
150	Writing assignments (submitted online)
400	Quizzes (five given, best four scores taken, 100 points each)
250	Final Exam (cumulative)
1000	Total

Grades will be posted on Blackboard shortly before the work is returned in class. Letter grades will be assigned as follows:

- A = 90.0% -100% of total possible points
- B = 80.0% - 89.9% of total possible points
- C = 70.0% - 79.9% of total possible points
- D = 60.0% - 69.9% of total possible points
- F = < 60% of total possible points

Grade disputes

If you feel that that you have been unfairly graded or that I made an error in grade calculation/entry, **please** let me know! Unless it's a clear error (such as me adding up points wrong – it definitely happens!), you may be asked to put in writing why you believe you should receive the points in question.

Tentative Course Outline: (subject to change):

Unit	Week	Chapters*	Topics	(Quiz)
Introduction and Foundations	Week 1	(1, 2)	Intro, review	Quiz 1
	Week 2	3	Mendelian inheritance	
Transmission Genetics	Week 3	4	Pedigree analysis	Quiz 2
	Week 4	5	Complex traits	
Cytogenetics and Altered Genes	Week 5	6, (10)	Cytogenetics, Phenotypes	Quiz 3
	Week 6	11	Mutations and epigenetics	
Cancer and Molecular Genetics	Week 7	12	Cancer genetics	Quiz 4
	Week 8	(13, 14)	Genetic technologies & society	
Special Topics	Week 9	15, (16)	Genomes & genomics, Therapies	Quiz 5
	Week 10	(7, 19)	Sex determination, Ancestry, Race	

***Chapter notes:**

- Chapters in parentheses will be covered more briefly, or only partially (by excluding particular sections).
- Chapters 8 & 9 contain topics that are covered in Biochemistry (CHE 450, 451, 452).
- Chapters 17 (Immunity), 18 (Behavior), & much of 19 (Population Genetics) will not be covered.
(For these topics, see BIO 436: Immunology, PSY 339: Biopsychology, and BIO 426: Evolutionary Biology!)

General Policies

Digital Device Policy

The use of digital devices such as laptops, tablets, and cell phones in the classroom is permitted for course-related uses only. Non-course related activities (including texting, checking social media, emailing, gaming, etc.) are prohibited out of respect for your neighbors and your instructor. If an emergency requires the personal use of these devices, you may excuse yourself from the room and return when you are finished.

Classroom Attendance

If you **miss class**, you are still responsible for the material and homework assigned. If you know you will miss class for an official excused absence (e.g., school sports), let me know **well in advance via email**, and we can arrange for you to make up the relevant work (quiz, worksheet, etc)

Classroom Conduct

Your conduct in the classroom should promote a positive learning environment. Conversations and comments should always be respectful; demeaning comments and offensive language will not be tolerated. Students are expected to abide by the OIT Student Conduct Code (<http://www.oit.edu/docs/default-source/Student-Affairs-/student-handbook/student-conduct-code.pdf>).

Obstruction or disruption of teaching, research, administration, disciplinary procedures, or other institutional activities on institutionally owned or controlled property is strictly prohibited by Oregon Tech's code of student conduct and may result in disciplinary action.

Academic Integrity

If found guilty of cheating, plagiarism, or any other form of academic dishonesty, you will receive a zero on your assignment, and a report will be sent to the Student Affairs office, who has responsibility for enforcing OIT's Student Conduct Code. Further information, including definitions of plagiarism and cheating, can be found in OIT's statement on Student Academic Integrity (<http://www.oit.edu/docs/default-source/Student-Affairs-/student-handbook/student-academic-integrity-policy.pdf>).

In cases of suspected academic dishonesty, procedures outlined in OIT's "Student Academic Integrity" policy will be strictly followed. (This includes the instruction to faculty that "*all academic dishonesty cases will be reported to the Office of Student Affairs.*") As both the nature of our classroom seating and also my policy of allowing re-quizzing provide particular temptations, I always include items that will provide indications that cheating has occurred, and I will not hesitate to report instances of academic dishonesty. You should know that the typical penalty at Oregon Tech for a second academic integrity violation is suspension from the university for somewhere between a term and a full academic year.

Accommodations

If you may need a course adaptation or academic accommodation because of a disability, or if you might need special arrangements in case the room or building must be evacuated, please see me as soon as possible. I rely on the Disability Services for assistance in verifying the need for accommodations and developing accommodation strategies. If you have not previously contacted that office, I encourage you to do so. You may call 541-885-1031 or 541-851-5227 for further assistance. Disability Services is located in LRC 230B.

Non-Attendance

Teaching faculty are required to report non-attendance during the first two weeks of the term from a class if the student has not attended. Students will be administratively withdrawn from the course based on non-attendance.

Title IX Employee & Mandatory Child/Vulnerable Populations Reporting Obligations

Oregon Tech faculty and staff are committed to creating and maintaining a safe and equitable learning environment for the Oregon Tech community. Pursuant to U.S. Dept. of Education requirements, all Oregon Tech faculty and staff (other than designated confidential staff) must report any information they become aware of regarding gender-based bias, sexual harassment, sexual assault, sexual misconduct, relationship violence, or stalking involving a student to the University Title IX Coordinator.

In addition, Oregon law requires a mandatory report to the Oregon Department of Human Services of any physical or emotional abuse of a child or other protected person, including elders and people with disabilities, or when a child or other protected person is perceived to be in danger of physical or emotional abuse.

If you are the victim of sexual or physical abuse and wish to speak with confidential staff to explore your options confidentially you may: contact the Integrated Student Health Center and ask to speak to Counseling Staff (541-885-1800); visit the Confidential Advocate in the Women's Resource Center (College Union Room 225C) during drop-in hours; and/or report an incident using Oregon Tech's Anonymous Safe Campus Incident Report form on the Title IX site at <http://www.oit.edu/title-ix>, and select the "Report an Incident" button. For more information about your options, please visit <http://www.oit.edu/title-ix>.

TIPS FOR SUCCESS

- 1) Please stop by my office if you are struggling -- or just to say hi and grab some candy!
- 2) Come to class!!! Then....
- 3)Engage actively in class. Don't just "follow along" if we are working a problem, but try to mentally stay one step ahead. Ask questions if you don't understand a concept.
- 4) Come to study sessions regularly.
- 5) Familiarize yourself with how our brains learn new information! I highly recommend the recent book *Make It Stick* – [check it out from the library](#) and at least read chapter 1! For many decades, education researchers have been studying closely how we learn new material. After years of experiments and data collection in real, several things are clear: (*The items below are adapted from a book review of Make It Stick: <https://rkbookreviews.wordpress.com/2014/06/06/make-it-stick-summary>*)
 - a) We are poor judges of when we are learning well and when we're not. When the going is harder and slower and it doesn't feel productive, we are drawn to strategies that feel more fruitful, unaware that the gains from these strategies are often temporary.
 - b) Learning is deeper and more durable when it's effortful. Learning that feels "easy" is like writing in sand, here today and gone tomorrow.
 - c) Rereading text and "massed" practice of a skill or new knowledge are by far the preferred study strategies of learners of all stripes, but they're also among the least productive. By massed practice we mean the single-minded, rapid-fire repetition of something you're trying to burn into memory, the "practice-practice-practice" of conventional wisdom. Cramming for exams is an example. Rereading and massed practice give rise to feelings of fluency that are taken to be signs of mastery, but for true mastery or durability these strategies are largely a waste of time.
 - d) Retrieval practice — the act of recalling facts or concepts or events from memory — is a more effective learning strategy than review by rereading. Periodic practice halts the biological process of "forgetting", strengthens retrieval routes, and is essential for hanging onto the knowledge you want to gain.
 - e) When you space out practice at a task and get a little rusty between sessions, or you "interleave" (mix together) the practice of two or more subjects, retrieval is harder and feels less productive, but the effort produces longer lasting learning and enables more versatile application of it in later settings.
 - f) Trying to solve a problem before being taught the solution leads to better learning, even when errors are made in the attempt.
 - g) Rereading has three strikes against it: It is time consuming. It doesn't result in durable memory. And it often involves a kind of unwitting self-deception, as growing familiarity with the text comes to feel like mastery of the content.
 - h) In virtually all areas of learning, you build better mastery when you use frequent, low-stakes testing (including self-testing, as with flash cards) as a tool to identify and bring up your areas of weakness. The very act of answering a test question is itself an act of retrieval, which strengthens your mental connections.