Class Time: Tues/Thurs 10:30-11:45 in MCZ 101
Discussion Section: 1 hour discussion section:
Tuesday 3-4pm (Location TBA)
or Thursday 1:30-2:30pm (Location TBA)
or Thursday 9:00-10:00am (Location TBA)
Instructors:
Robin Hopkins: (rhopkins@fas.harvard.edu) Office hours in Herbarium (HUH) Room 224: Tuesday 9:00 AM â€“10:00 AM or by appointment.
Dan Hartl: (dhartl@oeb.harvard.edu) Office hours in BioLabs 2119: Monday 10:00 AM â€“ 11:00 AM or by appointment.
Teaching Fellows:
Kelsie Lopez: (kelsielopez@g.harvard.edu) Office hours Monday 4:00-5:00 (Location TBA)
Christina Steinecke: (christinasteinecke@fas.harvard.edu) Office hours Tuesday 4:00-5:00 (Location TBA)
Valeria Schmidt: (vschmidt@g.harvard.edu) Office hours Thursday 2:30-3:30 (Location TBA)

SYLLABUS
PODCASTING RESOURCES

Course Description: In this course we discuss foundational concepts in genetics and genomics from the perspectives of: (1) a body of knowledge pertaining to genetic transmission, function, mutation, and evolution in eukaryotes and prokaryotes; and (2) an experimental approach for the study of biological processes such as development and behavior. Topics include structure, function, transmission, linkage, mutation, and gene manipulation; genetic approaches in experimental studies of biological processes; and analysis of genomes in individuals and populations. Related ethical issues include genetically modified organisms, gene therapy, genetic testing, personalized medicine, and genetic privacy. **Emphasis is on engagement with the material by problem solving!**

Course Objectives:

- To understand fundamental concepts in genetics and genomics
- To gain, enhance, and practice problem solving skills
- To relate concepts in genetics to social, political, and personal events and interactions outside of the classroom.
- To understand the, sometimes fallible, practice of scientific inquiry

Course Structure and Expectations: This class meets in person twice a week for lectures interspersed with questions, discussion, and group problem solving. The class is divided into smaller groups for weekly in-person section meetings.

Course Schedule (Look here for everything you need to do weekly)

Date	Class	Topic/notes	Readings for class	P-set due	Other Assignments
Tues, Sep 3	1	*Introduction*			Section Survey
Thurs, Sep 5	2	*Genetic Variation* In-class problems	*Text Book Reading*		
No discussion section this week: Welcome to OEB 50!					
Tues, Sep 10	3	*Chromosomes & Meiosis* In-class problems	*Text Book Reading*		
Thurs, Sep 12	4	*Chromosomal Misbehavior* In class problems	*Text Book Reading*		
Section 1: Read "She Has Her Mother's Laugh" Prologue and Chapter 1					
Tues, Sep 17	5	*Transposable Elements* In class problems	Text Book Reading	P-Set 1 (classes 2-4)	

				Key	
Thurs, Sep 19	6	*Simple Mendelian Genetics* In class problems	Text Book Reading New translation		Storytelling and recording audio assignment due
Section 2: Read "She Has Her Mother's Laugh" Chapter 2					
Tues, Sep 24	7	*Recombination and CRISPR* In class problems	Text Book Reading Paper reading	P-Set 2 (class 5 & 6) KEY	
Thurs, Sep 26	8	*Conditional Probability* In class problems	Text Book Reading		
Section 3: Read "She Has Her Mother's Laugh" Chapter 3 & 4					
Tues, Oct 1	9	*Bok Center Visit* Take-Home Exam 1		P-Set 3 (class 7 & 8) KEY	
Thurs, Oct 3	10	*Sex Chromosomes* In class problems	Text Book Reading		
Friday, Oct 4					**Take Home Exam 1 Due Key**
No Section					
Tues, Oct 8	11	*Non-Mendelian Inheritance* In class problems	Text Book Reading		
Thurs, Oct 10	12	*Pedigree Analysis* In class problems	Text Book Reading		
Section 4: Read "She Has Her Mother's Laugh" Chapter 5 & 6					
Tues, Oct 15	13	*Gene Expression* In class problems	Text Book Reading Background reading	P-Set 4 (class 9,10 & 11) KEY	
Thurs, Oct 17	14	*RNA Regulation* In class problems	Text Book Reading Background reading		Podcast Topic Selection
Section 5: Read "She Has Her Mother's Laugh" Chapter 7 & 8					
Tues, Oct 22	15	*Epigenetics* In class problem	Text Book Reading	P-Set 5 (class 12 & 13) KEY	
Thurs, Oct 24	16	*Duplication* In class problems	Text Book Reading		

Section 6: Read "She Has Her Mother's Laugh" Chapter 10					
Tues, Oct 29	17	*Why many research reports turn out to be wrong* Take Home Exam 2 Exam 2 pdf	Text Book Reading	P-Set 6 (class 14 & 15) p-set 6 pdf KEY	
Thurs, Oct 31	18	*Bacteria and Viruses* In class problems	Text Book Reading		
Fri, Nov 1					**Take Home Exam 2 Due Key**
No Section					
Tues, Nov 5	19	*Epistasis* In class problems	Text Book Reading		
Thurs, Nov 7	20	*Gene X Environment Interactions* In class problems	Text Book Reading		
Section 7: Read "She Has Her Mother's Laugh" Chapter 11 & 12					
Tues, Nov 12	21	*Complex Traits* In class problems	Text Book Reading	P-Set 7 (classes 16-19) KEY	
Thurs, Nov 14	22	*Population Genetics* In class problems	Text Book Reading		Podcast scripts/ outlines due
Section 8: Read "She Has Her Mother's Laugh" Chapter 15 & 16					
Tues, Nov 19	23	*Evolutionary Genetics* in class problems	Text Book Reading	P-Set 8 (class 20 & 21) KEY	
Thurs, Nov 21	24	Eugenics			
Section 9: Read "She Has Her Mother's Laugh" Chapter 17 &18 (19 optional)					
Tues, Nov 26	25	Genomes Take-Home Exam 3		P-Set 9 (class 22 & 23) KEY	
Thurs, Nov 28	26	**THANKSGIVING**			
No Section					
Tues, Dec 3	27	Podcast presentation Party			**Take Home Exam 3 Due**

					Exam 3 Key

Final Podcasts due at 5pm December 2nd and podcast party will be in class Dec. 3rd

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Course Policies and Expectations: This course requires engagement. The main reason for poor performance in OEB50 is lack of engagement. As a student, you are expected to attend the lectures twice a week and section once a week and to participate in group discussions and problem solving. We encourage group study and interaction outside class, but when it comes to exams and other individual assessments, we expect all students to adhere to Harvard's honor code (see below).

Course Materials and Readings: No textbook is required. Relevant weekly readings from Hartl and Ruvolo 2012 *Genetics: Analysis of Genes & Genomes*, 8th ed. are provided on the course website. An updated and streamlined version of this textbook is also available (Hartl 2018 *Essential Genetics and Genomics,* 7th ed.).

Assignments and Grading policy: Throughout the course you will have the opportunity to earn a total of 100 points towards your grade. These points will come from exams, participation, and projects.

Take-home exams (45%): There will be three take-home exams. Each take-home is worth 15 points for a total of 45 points towards the final grade.

Final project (17%): There will be one group final-project worth 17 points. Each group will prepare a podcast of ~10 minutes about a topic relevant to genetics or genomics.

Problem sets (18%): There will be 9 Problem Sets made available on Thursday to be completed and handed in on the following Tuesday. Each Problem set is worth 2 points. The Problem Sets are graded on effort and legibility, not on whether the answers are right or wrong. The Problem Sets are composed of problems of the same or very similar sort as will appear on the take-home exams.

Discussion section (20%): There will be 9 weekly sections. Attendance and participation in each section is worth 2 point and leading a section is worth 2 points.

Academic Integrity: Discussion and exchange of ideas are essential to academic work. As noted, we encourage students to form study groups, do practice problems together, review in-class problems together, and learn from each other as much as possible. The final project will require group work. You will be asked to evaluate your own efforts and the efforts of group members on this work. Please remember to be courteous to all members, attempt to participate fairly and equally, and respect the diverse backgrounds and experiences of all group members. **Take-home exams are open-book but collaboration is not allowed**. These exams are expected to be your own work. All participation is expected to be your own; it will be a breach of academic integrity to misrepresent yourself by impersonating another or to allow another to impersonate you. We expect adherence to Harvard's honor code, which reads as follows: "*Members of the Harvard College community commit themselves to producing academic work of integrity â€“ that is, work that adheres to the scholarly and intellectual standards of accurate attribution of sources, appropriate collection and use of data, and transparent acknowledgement of the contribution of others to their ideas, discoveries, interpretations, and conclusions. Cheating on exams or problem sets, plagiarizing or misrepresenting the ideas or language of someone else as oneâ€™s own, falsifying data, or any other instance of academic dishonesty violates the standards of our community, as well as the standards of the wider world of learning and affairs.*"

Use of Generative Artificial Intelligence (GAI) The default expectation is that GAI is not (repeat, not) permitted unless we explicitly state that it can or should be used. In particular, we expect all problem sets and exams to be completed without the use of GAI.

That said, we encourage students to use GAI to fill in background information of gaps in knowledge (e.g.., What is a SNP? How do I do a chi-square test for goodness of fit? etc.) GAI is especially useful for this purpose. Be aware, however, that GAI is known to generate a great deal of nonsense, and it is each student's responsibility to assess the accuracy and validity of any GAI output and treat it as if the output were created by oneself.

For the final creative podcast assignment, students may use GAI for inspiration or ideas, but the scripts for the podcast must be written by the students and not generated by GAI. As always, students must take individual responsibility for assessing the accuracy and reliability of any GAI output.

Accommodations for Students: Students needing academic adjustments or accommodations because of

documented disabilities must present their Faculty Letter from the AEO to one of the faculty instructors by September 16. Failure to do so may result in the instructorsâ€™ inability to respond in a timely manner. All discussions will remain confidential between the instructors, students, and AEO.

Statement of Diversity and Inclusion We believe academic strength derives from diversity of ideas, experiences, and perspectives. We acknowledge that the field of genetics has not always held these beliefs and has been historically built on a small subset of privileged (and sometimes racist and sexist) voices. As instructors, we strive to articulate how and where injustice was perpetuated by the field and to simultaneously give voice to a diversity of identities including women and people of color who have made significant contributions to the field. Furthermore, we want to create a learning environment for students that supports diversity of thought and perspectives and honors your identities. As participants in the course we expect that you will respectfully communicate, supportively collaborate, and actively listen. Some of the material in class (and section) may evoke strong emotions and responses. Please be respectful of othersâ€™ reactions and mindful of your own. While we may all try to be patient and courteous, unintended interpretations, and covert biases may lead to discomfort or offense. We believe mistakes and misinterpretations in speaking and listening deserve attention and, as instructors, are available to discuss and mediate difficult interactions. We are still learning how to create a more diverse and inclusive classroom environment; please contact us, as instructors, if there are ways in which you think we can improve our efforts in this course.