



HS 4212: Genetics

Prerequisites: HS 3311 - Epidemiology

Course Description:

This course introduces students to a wide range of topics in the burgeoning field of genetics and evolutionary biology. Topics to be covered include the structure and function of DNA; Mendelian inheritance and deviations from this assumption; aspects of evolution including the neutral theory; selection; drift; and evolutionarily stable strategies; sexual versus asexual reproduction; behavioral genetics and the concept of heritability; and gene-by-environment effects. Through the use of educational technology, students explore their own analyses of these areas throughout the course.

Required Textbook and Materials: UoPeople courses use open educational resources (OER) and other materials specifically donated to the University with free permissions for educational use. Therefore, students are not required to purchase any textbooks or sign up for any websites that have a cost associated with them. The main required textbooks for this course are listed below and can be readily accessed using the provided links. There may be additional required/recommended readings, supplemental materials, or other resources and websites necessary for lessons; these will be provided for you in the course's General Information and Forums area, and throughout the term via the weekly course Unit areas and the Learning Guides.

- OpenStax. (2016). *Biology*. Licensed under Creative Commons Attribution License 4.0. Retrieved from <https://openstax.org/details/books/biology>
 - [Introduction - Chapter 10](#)
 - [Chapters 11 - 20](#)

Other readings are available in the course Learning Guides

Software Requirements/Installation: No special requirements.

Learning Objectives and Outcomes:

By the end of this course students will be able to:

1. Apply the Hardy-Weinberg Law in analyzing population genetics for gene frequency, sex linkage, equilibrium, and heterozygote frequency.
2. Examine processes of transcription, translation, replication, and mutation
3. Analyze Mendel's experiments and laws and explain how they affect generational phenotypes
4. Compare processes of mitosis and meiosis, sexual and asexual reproduction
5. Calculate broad and narrow sense heritability
6. Examine environmental impact on the expression of the human genome
7. Differentiate types of evolution and consider the impact of evolution on genetics



Course Schedule and Topics: This course will cover the following topics in eight learning sessions, with one Unit per week. The Final Exam will take place during Week/Unit 9 (UoPeople time).

Week 1: Unit 1 - DNA Structure and Expression

Week 2: Unit 2 - Mendelian Genetics with Some Deviations

Week 3: Unit 3 - Population Genetics

Week 4: Unit 4 - Mutations and Selection

Week 5: Unit 5 - Mitosis, Meiosis, Sexual Reproduction, and Asexual Reproduction

Week 6: Unit 6 - Evolutionarily Stable Strategies and Heritability

Week 7: Unit 7 - Gene Expression and Environment Interactions

Week 8: Unit 8 - Evolution and Phylogenetics

Week 9: Unit 9 - Course Review and Final Exam

Learning Guide: The following is an outline of how this course will be conducted, with suggested best practices for students.

Unit 1: DNA Structure and Expression

- Read the Learning Guide and Reading Assignments
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Complete an entry in the Learning Journal
- Take the Self-Quiz

Unit 2: Mendelian Genetics with Some Deviations

- Peer assess Unit 1 Written Assignment
- Read the Learning Guide and Reading Assignments
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Complete an entry in the Learning Journal
- Take the Self-Quiz

Unit 3: Population Genetics

- Read the Learning Guide and Reading Assignments
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Complete and submit the Written Assignment
- Complete an entry in the Learning Journal
- Take the Self-Quiz
- Take the Graded Quiz



Unit 4: Mutations and Selection

- Peer assess Unit 3 Written Assignment
- Read the Learning Guide and Reading Assignments
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Complete and submit the Written Assignment
- Complete an entry in the Learning Journal
- Take the Self-Quiz

Unit 5: Mitosis, Meiosis, Sexual Reproduction, and Asexual Reproduction

- Peer assess Unit 4 Written Assignment
- Read the Learning Guide and Reading Assignments
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Complete and submit the Written Assignment
- Complete an entry in the Learning Journal
- Take the Self-Quiz

Unit 6: Evolutionarily Stable Strategies and Heritability

- Peer assess Unit 5 Written Assignment
- Read the Learning Guide and Reading Assignments
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Complete an entry in the Learning Journal
- Take the Self-Quiz
- Take the Graded Quiz

Unit 7: Gene Expression and Environment Interactions

- Peer assess Unit 6 Written Assignment
- Read the Learning Guide and Reading Assignments
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Complete and submit the Written Assignment
- Complete an entry in the Learning Journal
- Take the Self-Quiz

Unit 8: Evolution and Phylogenetics

- Peer assess Unit 7 Written Assignment
- Read the Learning Guide and Reading Assignments
- Participate in the Discussion Assignment (post, comment, and rate in the Discussion Forum)
- Complete an entry in the Learning Journal
- Take the Self-Quiz
- Complete and submit the anonymous Course Evaluation
- Read the Unit 9 Learning Guide carefully for instructions on the Final Exam
- Take the Review Quiz



Unit 9: Course Review and Final Exam

- Read the Learning Guide and take the Review Quiz, if you haven't already done so
- Prepare for, take, and submit the Final Exam
- The Final Exam will take place during the Thursday and Sunday of Week/Unit 9 (UoPeople time); exact dates, times, and other details will be provided accordingly by your instructor

Course Requirements:

Discussion Assignments & Response Posts/Ratings

Some units in this course require that you complete a Discussion Assignment. You are required to develop and post a substantive response to the Discussion Assignment in the Discussion Forum. A substantive response is one that fully answers the question that has been posed by the instructor. In addition, you must extend the discussion by responding to at least three (3) of your peers' postings in the Discussion Forum and by rating their posts. Instructions for proper posting and rating (out of a 10 point scale) are provided inside the Discussion Forum for each week. Discussion Forums are only active for each current and relevant learning week, so it is not possible to contribute to the forum once the learning week has come to an end. Failure to participate in the Discussion Assignment by posting in the Discussion Forum and responding to peers as required may result in failure of the course.

Written Assignments & Assessment Forms

Some units in this course require that you complete a Written Assignment. You are required to submit your assignments by the indicated deadlines and, in addition, to peer assess three (3) of your classmates' assignments according to the instructions found in the Assessment Form, which is provided to you during the following week. During this peer assessment period, you are expected to provide details in the feedback section of the Assessment Form, indicating why you awarded the grade that you did to your peer. Please note that each assignment grade is comprised of a combination of your submission (90%) and your peer assessments (10%). Failure to submit Written Assignments and/or Assessment Forms may result in failure of the course.

Learning Journals

Your instructor may choose to assign specific topics and/or relevant questions as a weekly Learning Journal entry for you to complete, but you are still encouraged to also use it to document your activities, record questions/problems you may have encountered, reflect on the learning process, and draft answers for other course assignments. The Learning Journal must be updated on a weekly basis because its entries will be assessed by your instructor directly as a part of your final grade. The Learning Journal will only be seen by your instructor.

Quizzes

This course will contain three types of quizzes – the Self-Quiz, the Graded Quiz, and the Review Quiz. These quizzes may contain multiple choice, true/false, or short answer questions. The results of the Self-Quiz will not count towards your final grade. However, it is highly recommended that you complete the Self-Quiz to ensure that you have adequately understood the course materials. Along with the Reading Assignments, the results of the Self-Quiz should be used as part of an iterative learning process, to thoroughly cover and test your understanding of course material. You should use the results of your Self-Quiz as a guide to go back and review relevant sections of the Reading Assignments. Likewise, the Review Quiz will not count towards your final grade, but should also be used to assist you in a comprehensive review and full understanding of all course material, in preparation for your Final Exam. Lastly, the results of the Graded Quiz will count towards your final grade.

Final Exam

The Final Exam will take place during the Thursday and Sunday of Week/Unit 9, following the completion



of eight units of work. The format of the Final Exam is similar to that of the quizzes and may contain a combination of different question types. You will have one attempt to take the exam, and it will be graded electronically. Specific instructions on how to prepare for and take the exam will be provided during Week/Unit 8.

The Final Exam for this course must be done under the supervision of a proctor. Since you already secured your proctor before registering for this course, this is a reminder that you should coordinate with him/her before you take the exam. As a reminder, students are required to successfully complete proctored exams spaced throughout their program of study at UoPeople, in order to verify the student's identity in confirming a degree and diploma upon graduation.

No use of course materials is allowed, including the internet and non-electronic sources.

Course Forum

The Course Forum is the place to raise issues and questions relating to the course. It is regularly monitored by the instructors and is a good place to meet fellow students taking the same course. While it is not required to participate in the Course Forum, it is highly recommended.

Course Policies:

Grading Components and Weights

Each graded component of the course will contribute some percentage to the final grading scale, as indicated here:

Discussion Assignments	10%
Written Assignments	20%
Learning Journals	15%
Two Graded Quizzes	30%
Final Exam	25%
TOTAL	100%

Grading Scale

This course will follow the standard 100-point grading scale defined by the University of the People, as indicated here:

Letter Grade	Grade Scale	Grade Points
A+	98-100	4.00
A	93-97	4.00
A-	90-92	3.67
B+	88-89	3.33
B	83-87	3.00
B-	80-82	2.67
C+	78-79	2.33
C	73-77	2.00
C-	70-72	1.67
D+	68-69	1.33
D	63-67	1.00



D-	60-62	0.67
F	Under 60	0.00

Grade Appeal

If you believe that the final grade you received for a course is erroneous, unjust, or unfair, please contact your course instructor. This must be done within seven days of the posted final grade. For more information on this topic, please review the Grade Appeal Procedure in the University Catalog.

Participation

Non-participation is characterized by lack of any assignment submissions, inadequate contributions to the Discussion Forums, and/or lack of peer feedback to Discussion/Written Assignments. Also, please note the following important points about course participation:

- Assignments must be submitted on or before the specified deadline. A course timeline is provided in the course schedule, and the instructor will specify deadlines for each assignment.
- Any student showing non-participation for two weeks (consecutive or non-consecutive) is likely to automatically fail the course.
- Occasionally there may be a legitimate reason for submitting an assignment late. Most of the time, late assignments will not be accepted and there will be no make-up assignments.
- All students are obligated to inform their instructor in advance of any known absences which may result in their non-participation.

Academic Honesty and Integrity

When you submit any work that requires research and writing, it is essential to cite and reference all source material. Failure to properly acknowledge your sources is known as “plagiarism” – which is effectively passing off an individual’s words or ideas as your own. University of the People adheres to a strict policy of academic honesty and integrity. Failure to comply with these guidelines may result in sanctions by the University, including dismissal from the University or course failure. For more information on this topic, please review the Academic Integrity Policy in the University Catalog.

Any materials cited in this course should be referenced using the style guidelines established by the American Psychological Association (APA). The APA format is widely used in colleges and universities across the world and is one of several style and citation formats required for publication in professional and academic journals. Purdue University’s Online Writing Lab (OWL) is a free website that provides excellent information and resources for understanding and using the APA format and style. The OWL website can be accessed

here: https://owl.purdue.edu/owl/research_and_citation/apa_style/apa_style_introduction.html

Code of Conduct

University of the People expects that students conduct themselves in a respectful, collaborative, and honest manner at all times. Harassment, threatening behavior, or deliberate embarrassment of others will not be permitted. Any conduct that interferes with the quality of the educational experience is not allowed and may result in disciplinary action, such as course failure, probation, suspension, or dismissal. For more information on this topic, please review the Code of Conduct Policy in the University Catalog.