

COURSE SYLLABUS, Fall 2019**First Year Seminar, BIOL:1000*****Who are You? Revelations from The Personal Genome***

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Office Hours: 2:30am-3:30pm Mondays and 10:00am-noon Thursdays

This course is offered through the Department of Biology

Department Chair (DEO): Diane Slusarski, 143 Biology Building, 319-335-1054

COURSE DESCRIPTION: This course will evaluate the science underlying genetic analysis of human variation and ancestry, compare the tests available from the varied companies that dominate the direct-to-consumer genetic marketplace (e.g., AncestryDNA, MyHeritageDNA, Family Tree DNA, The Genographic Project, and 23andMe), and build the knowledge to navigate the results obtained from the analysis of your own DNA sample. To gain the most from this course, a student should be willing to provide a DNA sample that will be sent for analysis by 23andMe. The DNA test is available to you at no cost; however, your results will be available only to you through 23andMe's website (www.23andme.com). The content and activities of the course will facilitate your being able to fully utilize the genome data produced and reported by 23andMe.

COURSE OBJECTIVES: In this course you will:

- Contrast different types of genetic information indicative of ancestral relationships
- Evaluate research findings on genetic structure among human populations across the globe
- Build proficiency in the conceptual foundation for the methods that underlie tests of human ancestry
- Navigate the 23andMe web platform to view the various interpretations of genome data
- Investigate the relationship between genotype and phenotypic characteristics with known genetic basis
- Evaluate the personal and the potential societal impacts from commercialization of genetic tests
- Develop skills for contributing to a productive group discussion about science and humanity

COURSE ORGANIZATION AND POLICIES

1. Course wiki (direct access): <https://wiki.uiowa.edu/display/2360159/Course+Schedule>

The course content will be organized and delivered through the wiki, which is linked from the course homepage in ICON and can also be accessed directly. Readings for classes will be available either on this site or linked from the site. You will be expected to contribute content to the wiki throughout the semester. Contributions will consist of blog posts on course-related topics and comments on other students' posts.

2. Class meetings: *Wednesdays* 10:30-11:20. Room 214 Blank Honors Center (BHC)

Attendance and participation during all class meetings is required. One absence during the semester will be allowed without penalty. Otherwise, each missed class will result in a ½ point reduction for the 4-pt attendance score. *An extra blog post for each missed class can be used to recover points.*

3. Class participation: *required*

All students are expected to read the assigned materials prior to each class and **participate** in the discussion. A participation score will be assigned on a 4-pt scale at the end of the semester.

4. Blog Posts: *2 blog posts per student covering news story or other interest item or resource*

During the semester you are expected to submit two posts on the course blog. Highlight in your own words a recently published news article (or TV show, movie or seminar) on a subject relevant to the course, or a resource relevant to the course. Be certain not to plagiarize source material. Use quotation when necessary

and link to any sources of information. The blog can also link to other similar summaries in news coverage or blog entries. Comment on blog posts of other students.

5. Review paper: *Who are you, and how has the analysis of your DNA influenced your perspective?*

Near the end of the semester a reflective paper will be due (approximately 4 single spaced pages of text in 11/12 pt font, extra pages allowed for figures, figure legends, or references). Papers submitted with sufficient lead time prior to the deadline will be returned with comments to allow for revision.

6. Assessment: Each assignment will be graded on a 4-point scale (i.e., A=4, B=3,..., F=0). A blog post or final paper evaluated as 'good' or 'okay' will be assigned a 3, consistent with a B grade. Assignments that demonstrate 'great' or 'excellent' effort will be assigned a 4. Poor quality work that demonstrates little thought or effort and/or borders on plagiarism of source material will be assigned a 2 or no credit. Essentially, if a student attends all classes and writes two good blog posts and a final paper, the student will receive a B in the course. Students that actively participate in discussions and produce written work that demonstrates effort to explore the topic will receive an A. Weighting of each assignment for its contribution toward the final grade is provided below.

Grading/Expectations Breakdown

30% blog entries (each student will be expected to contribute 2 blog posts)

20% reflective paper (4 pages)

50% attendance and participation (includes in-class discussion, presentation and commenting on wiki)

Course Grade assignments: >3.5 = A, 3.5-2.5 = B, 2.5-1.5 = C, 1.5-0.5 = D, <0.5 = F

7. Other Concerns: I would like to hear from anyone who has a disability that may require accommodation. Please see me during office hours.

8. Special Considerations: Your DNA is unique to you, and by submitting a sample for testing at 23andMe the test results obtained will be completely unique and potentially identifiable to you. Privacy settings are available to protect your identity, but due to the fact that your results are completely unique to you, there is always the potential that your anonymity will be compromised. Some potential outcomes of DNA testing are clear, and we will discuss these in the first class meeting; however, other outcomes not currently envisioned are likely to arise in the future. Test results can be deleted by you from the 23andMe website at any time. By submitting a sample for testing, consider the following potential outcomes:

- You may reveal that your ancestry includes different geographic regions than you expect
- You may discover a biological relative that was previously unknown to you and your family
- You may determine that your parents are related
- You may receive emails from others wanting to connect due to a biological relationship
- You may learn that you or your children are at risk of developing an incurable genetic disease
- You may expose your relatives to all of these findings, and furthermore, expose a relative as a suspect in a criminal investigation.

The first class meeting will be dedicated to considering the potential outcomes of genetic testing for this class. Authorization forms and samples for the DNA test will be prepared during the 2nd class meeting. You must be at least 18 years old to submit a DNA test without parental consent; however, all students are encouraged to discuss with their parents (and other family members) the potential outcomes of participation. *Submission of a test is optional!* Students that do choose to participate in DNA testing should be comfortable with discovering results that may be unsettling to you and/or your family members.

Class topics and conceptual timeline below (Subject to change or rearrangement)

Date	Topic
	<i>Class objectives</i>
Week 1	Consequences of DNA Testing <i>Consider the possible outcomes of DNA testing</i> <i>Evaluate the value of the results versus potential foreseen and unforeseen consequences</i> <i>Identify the potential impacts of DNA testing on you and your relatives</i>

Date	Topic <i>Class objectives</i>
Week 2	DNA and the Human Genome <i>Relate the molecular structure of DNA to genome sequence</i> <i>Recognize the presence of a shared genome among cells of your body</i> <i>Prepare authorization forms and samples for DNA testing</i>
Week 3	Genealogy to Trees: Inheritance and Tracing Ancestry Near and Far <i>Integrate parent-offspring relationships into the broader Tree of Life</i> <i>Apply a 'tree thinking' framework to individuals, populations and species</i> <i>Recognize the utility of shared features, such as SNPs, as indicators of common ancestry</i>
Week 4	Mitochondrial Eve & Y-Chromosome Adam <i>Trace the uni-parental history of the mitochondrial genome and Y chromosome</i> <i>Contrast between unique mutations and common SNPs in ancestry analysis</i> <i>Interpret geographic patterns and prevalence of haplogroups</i>
Week 5	Your Ancestry Composition <i>Identify your placement within the Y chromosome and/or mtDNA tree of humanity</i> <i>Interpret the different analyses of ancestry composition</i> <i>Recognize the presence of ancient genetic variants revealed by Neanderthal ancestry</i>
Week 6	Geographic Variation Among Humans <i>Evaluate the importance of reference populations in ancestry analysis</i> <i>Contrast geographic patterns of shared and private variation in humans</i> <i>Relate patterns of genetic variation in modern human populations to global colonization</i>
Week 7	Autosomal Inheritance <i>Contrast different patterns of inheritance; mtDNA, Y, X, and autosomes</i> <i>Consider the role of recombination in shuffling autosomes and X chromosomes</i> <i>Calculate degrees of relatedness and expected similarity in autosomal DNA</i>
Week 8	Genetic Genealogy: It's All Relative(s)! <i>Evaluate the relationships revealed with other users indicated by shared genome segments</i> <i>Recognize the value of testing known relatives to partition branches of your family tree</i> <i>Predict the percent similarity expected based on degree of family relationship</i>
Week 9	Genetic Variation and Phenotypic Diversity <i>Recognize the influence of the genotype on the appearance of a phenotype</i> <i>Contrast between traits with simple versus complex genetic causation</i> <i>Evaluate the association between genetic variants and complex phenotypes</i>
Week 10	Navigating Your Genome <i>Compare regions of your genome shared with relatives</i> <i>Use SNPedia to identify variants of interest and explore your genotype</i>
Week 11	Test Results and Health Risk <i>Interpret the meaning of increased health risks associated with genetic variants</i> <i>Recognize the impact of genetic variants on the effectiveness of pharmaceuticals</i>
Week 12	FDA Regulation of Commercial Genetic Tests <i>Evaluate potential outcomes of learning about disease risks</i> <i>Recognize the current level of imprecision in risk assessment from genetic data</i>
Week 13	Downloading and Using Your Genome Data <i>Download your DNA test results and identify fields of the text file</i> <i>Identify tools available for further analysis and interpretation of genome data</i>
Week 14	Direct-to-Consumer Genetic Tests; What are the Options? <i>Consider the different uses of direct-to-consumer genetic tests</i> <i>Compare the results and platforms provided by different companies</i> <i>Identify relatives that can be tested to enhance studies of ancestral relationships</i>
Week 15	The Future of Genetic Testing <i>Evaluate the value of personal genetic information relative to its costs</i> <i>Identify societal impacts of widespread genetic testing</i>

COLLEGE OF LIBERAL ARTS AND SCIENCES: IMPORTANT POLICIES AND PROCEDURES

Absences and Attendance

Students are responsible for attending class and for contributing to the learning environment of a course. Students are also responsible for knowing the absence policies for their courses, which will vary by instructor. All absence policies, however, must uphold the UI policy related to student illness, mandatory religious obligations, unavoidable circumstances, or University authorized activities (<https://clas.uiowa.edu/students/handbook/attendance-absences>). Students may use this absence form to communicate with instructors:

<https://clas.uiowa.edu/sites/default/files/ABSENCE%20EXPLANATION%20FORM2019.pdf>

Academic Integrity

All undergraduates enrolled in courses offered by CLAS have, in essence, agreed to the College's [Code of Academic Honesty](#). Misconduct is reported to the College, resulting in suspension or other sanctions, with sanctions communicated with the student through the UI email address (<https://clas.uiowa.edu/students/handbook/academic-fraud-honor-code>).

Accommodations for Disabilities

UI is committed to an educational experience that is accessible to all students. A student may request academic accommodations for a disability (such as mental health, attention, learning, vision, and physical or health-related condition) by registering with Student Disability Services (SDS). The student is then responsible for discussing specific accommodations with the instructor. More information is at <https://sds.studentlife.uiowa.edu/>.

Administrative Home of the Course

The College of Liberal Arts and Sciences (CLAS) is the administrative home of this course and governs its add/drop deadlines, the second-grade-only option, and related policies. Other colleges may have different policies. CLAS policies may be found here: <https://clas.uiowa.edu/students/handbook>.

Communication and the Required Use of UI Email

Students are responsible for official correspondences sent to the UI email address (uiowa.edu) and must use this address for all communication within UI ([Operations Manual, III.15.2](#)).

Complaints

Students with a complaint about a course should first visit with the instructor or course supervisor and then with the Chair of the department or program offering the course; students may next bring the issue to CLAS in 120 Schaeffer Hall. For more information, see <https://clas.uiowa.edu/students/handbook/student-rights-responsibilities>.

Final Examination Policies

The final exam schedule is announced around the fifth week of classes; students are responsible for knowing the date, time, and place of a final exam. Students should not make travel plans until knowing this information. No exams of any kind are allowed the week before finals. Visit <https://registrar.uiowa.edu/final-examination-scheduling-policies>.

Nondiscrimination in the Classroom

UI is committed to making the classroom a respectful and inclusive space for all people irrespective of their gender, sexual, racial, religious or other identities. Toward this goal, students are invited to optionally share their preferred names and pronouns with their instructors and classmates. The University of Iowa prohibits discrimination and harassment against individuals on the basis of race, class, gender, sexual orientation, national origin, and other identity categories set forth in the University's Human Rights policy. For more information, contact the Office of Equal Opportunity and Diversity (diversity.uiowa.edu).

Sexual Harassment

Sexual harassment subverts the mission of the University and threatens the well-being of students, faculty, and staff. All members of the UI community must uphold the UI mission and contribute to a safe environment that enhances learning. Incidents of sexual harassment must be reported immediately. For assistance, please see <https://osmrc.uiowa.edu/>.