

COURSE SYLLABUS, Fall 2014
First Year Seminar, BIOL:1000:0001 (002:029:001)

Who are You? Genetic Insights on Human Ancestry

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Office Hours: 2:30-3:30 M, 10-noon Th

This course is offered through the Department of Biology

Department Chair (DEO): Bernd Fritsch, 143 Biology Building, 319-335-1054

COURSE DESCRIPTION: This course will evaluate the science underlying genetic analysis of human ancestry, compare the tests available from the varied companies that dominate the direct-to-consumer genetic marketplace (e.g., Ancestry DNA, 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
- Recognize the existence of 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/pages/viewpage.action?pageId=119088675>

The course content will be organized and delivered through the wiki, which is embedded as the course homepage in ICON and can also be accessed directly. Readings for each class will be either available 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:** *Tuesdays* 3:30-4:20. Room 214 Blank Honors Center (BHC)

Attendance and participation during all class meetings is required. *If you need to miss class due to a conflict or illness, you will be expected to contribute an extra blog post for each missed class.*

3. **Class participation:** *required*

All students are expected to read the assigned materials prior to each class and **participate** in the discussion.

4. **Bloggers:** *2 blog posts per student covering news story or other resource*

Bloggers will be assigned for each of the course meetings. The job of a blogger is to find a recently published news article on a subject relevant to the course, or a resource relevant to the course, and post a 200-400 word summary for the class. The blogger can also link to other similar summaries in news coverage or blog entries.

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

At 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 early 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). 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 due by Dec 12)

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

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; 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
- 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

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 on September 2nd. 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)

Relevant Papers and reviews will be posted on the course web site 1 week prior to class meeting

Date	Topic <i>Class objectives</i>
Week 1 Aug. 26	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>
Week 2 Sept. 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 Sept. 9	Genealogy: 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>

Date	Topic <i>Class objectives</i>
Week 4 Sept. 16	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>Evaluate the phylogenetic patterns observed among human mtDNA and Y chromosomes</i>
Week 5 Sept. 23	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 6 Sept. 30	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 Oct. 7	Direct-to-Consumer Genetic Tests; Which Test To Do? <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 8 Oct. 14	mtDNA and Y Haplogroups – What Does It Mean <i>Recognize the geographic patterns and the prevalence of haplogroups</i> <i>Identify your placement within the Y chromosome and/or mtDNA tree of humanity</i> <i>Contrast haplogroup identity with detailed analysis of the Y chromosome or mtDNA</i>
Week 9 Oct. 21	Your Ancestry Composition <i>Interpret the meaning of primary and minor contributions to ancestry composition</i> <i>Contrast the different analyses of ancestry composition</i> <i>Recognize the presence of ancient genetic variants revealed by Neanderthal ancestry</i>
Week 10 Oct. 28	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 11 Nov. 4	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 12 Nov. 11	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 13 Nov. 18	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 Dec. 2	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 15 Dec. 9	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>

Statement Regarding Student Collaboration:

Your creative products for this course should be your own. Use the instructor and other students to gain insight, and to organize and prepare, but the products should be from your own efforts.

Academic Misconduct:

The College of Liberal Arts and Sciences considers academic fraud, dishonesty, and cheating serious academic misconduct. All students suffer when academic misconduct takes place. Academic fraud, dishonesty, and cheating disturb the mutual respect that should exist between instructors and students and among students, and can poison the atmosphere of a classroom. Perhaps most seriously, those who commit academic fraud, dishonesty, or cheating are robbed of the educational experiences that are the primary purpose of course work in the College of Liberal Arts and Sciences. We expect instructors to help students understand and avoid all academic fraud.

If you are unclear about the proper use and citation of sources, or the details and guidelines for any assignment, you should discuss the assignment and your questions with the instructor. All forms of plagiarism and any other activities that result in a student presenting work that is not really his or her own are considered academic fraud. Academic fraud includes these and other misrepresentations:

- presentation of ideas from any sources you do not credit;
- the use of direct quotations without quotation marks and without credit to the source;
- paraphrasing information and ideas from sources without credit to the source;
- failure to provide adequate citations for material obtained through electronic research
- downloading and submitting work from electronic databases without citation;
- participation in a group project which presents plagiarized materials;
- taking credit as part of a group without participating as required in the work of the group;
- submitting material created/written by someone else as one's own, including purchased term/research papers;

Cheating on examinations and other work also interferes with your own education as well as the education of others in your classes. If you are unclear about the guidelines for any testing situation or assignment, you should discuss your questions with the instructor. Academic cheating includes all of the following, and any other activities that give a student an unfair advantage in course work.

- copying from someone else's exam, homework, or laboratory work;
- allowing someone to copy or submit your work as his/her own;
- accepting credit for a group project without doing your share;
- submitting the same paper in more than one course without the knowledge and approval of the instructors involved;
- using notes, text messaging, cell phone calls, pre-programmed formulae in calculators, or other materials during a test or exam without authorization;
- not following the guidelines specified by the instructor for a "take home" test or exam.

When an instructor in the College of Liberal Arts and Sciences suspects a student of academic fraud or cheating these procedures will be followed:

- The instructor (or supervisor, if the instructor is a teaching assistant) must inform the student--in a printed letter--as soon as possible after the incident has been observed or discovered.
- If the instructor comes to the conclusion that the student academic fraud or cheating has occurred, he or she (in consultation with the supervisor if the instructor is a teaching assistant) will determine what action to take. The instructor may decide to reduce the student's grade on the assignment or activity, or in the course, or even to assign an F for the assignment or activity or for the course
- The instructor will send a written report of the case to the Associate Dean for Academic Programs and send copies of the report to the DEO and to the student(s) involved
- The associate dean for academic programs will impose the following or other penalties: disciplinary warning until graduation (usually for a first offense); suspension from the college for a calendar year or longer (usually for a second offense); or recommendation of expulsion from the University by the president (usually for a third offense).

If a student believes that the finding of academic fraud or cheating is in error or the penalty unjust, he or she may request information on appeal procedures from CLAS Academic Programs & Services, 120 Schaeffer Hall.

IMPORTANT POLICIES OF THE COLLEGE OF LIBERAL ARTS AND SCIENCES

Academic Fraud

Plagiarism and any other activities when students present work that is not their own are academic fraud. Academic fraud is a serious matter and is reported to the departmental DEO and to the Associate Dean for Undergraduate Programs and Curriculum. Instructors and DEOs decide on appropriate consequences at the departmental level while the Associate Dean enforces additional consequences at the collegiate level. See the CLAS Academic Fraud section of the [Student Academic Handbook](#).

CLAS Final Examination Policies

Final exams may be offered only during finals week. No exams of any kind are allowed during the last week of classes. Students should not ask their instructor to reschedule a final exam since the College does not permit rescheduling of a final exam once the semester has begun. Questions should be addressed to the Associate Dean for Undergraduate Programs and Curriculum.

Electronic Communication

University policy specifies that students are responsible for all official correspondences sent to their University of Iowa e-mail address (@uiowa.edu). Faculty and students should use this account for correspondences. Link for additional information on the CLAS website can be found [here](#).

Making a Suggestion or a Complaint

Students with a suggestion or complaint should first visit the instructor, then the course supervisor, and then the departmental DEO. Complaints must be made within six months of the incident. See the CLAS [Student Academic Handbook](#).

Accommodations for Disabilities

A student seeking academic accommodations should first register with Student Disability Services and then meet privately with the course instructor to make particular arrangements. See www.uiowa.edu/~sds/ for more information.

Understanding 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 have a responsibility to uphold this mission and to contribute to a safe environment that enhances learning. Incidents of sexual harassment should be reported immediately. See the UI [Comprehensive Guide on Sexual Harassment](#) for assistance, definitions, and the full University policy.

Administrative Home

The College of Liberal Arts and Sciences is the administrative home of this course and governs matters such as the add/drop deadlines, the second-grade-only option, and other related issues. Different colleges may have different policies. Questions may be addressed to 120 Schaeffer Hall, or see the CLAS [Student Academic Handbook](#).

Reacting Safely to Severe Weather

In severe weather, class members should seek appropriate shelter immediately, leaving the classroom if necessary. The class will continue if possible when the event is over. For more information on Hawk Alert and the siren warning system, visit the Public Safety [web site](#).