SYLLABUS
Human Evolutionary Genetics
01:070:329

Spring 2018
Tuesdays
12:35-3:35 pm, BIO 201-A

Instructor: Mareike Janiak
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Office hours: Tuesdays 4-5 pm and by appointment
Office: BIO 310

Required Texts
Jobling et al. (2013). *Human Evolutionary Genetics*. **2nd Edition.** New York: Garland Science.

- This book is available as an eRental on amazon.com, which may be a more affordable option than purchasing a physical copy.

Additional readings will be made available as PDFs on Sakai.

Course description
This course covers how genetic research is informing our understanding of human evolution, including human migrations, Neandertal admixture, and recent adaptations to diverse diets and environments. Students will be introduced to basic computational methods used in population genetics and read the current primary scientific literature.

Learning goals
During the course of this class students will
- Become familiar with the principles of population genetics through the lens of human evolution.
- Examine how data from genetic studies can inform theories of human origins or migration patterns, and modern medicine.
- Discuss and critique current research published in the field of human evolutionary genetics.
- Debate the ethical questions involved in the use of CRISPR, GMOs, and similar issues.
- Utilize computational methods to explore population dynamics of a human sample population.

Academic Integrity
You are responsible for understanding what constitutes plagiarism and academic dishonesty. Take the time to familiarize yourself with the Rutgers Academic Integrity policy found here: http://academicintegrity.rutgers.edu/academic-integrity-policy/. Plagiarism and other forms of academic dishonesty will not be tolerated and will be reported to the Office of Academic Integrity.

Attendance
Attendance is mandatory and necessary for earning a passing grade in this course. A large percentage of your grade is made up of attendance, active participation, daily in-class quizzes, and leading paper discussions. If you are not physically present, it will be impossible to earn points in these areas. Each unexcused absence will result

in a 2-point reduction in your attendance grade. Two unexcused late arrivals will count as one unexcused absence.

Grading and Assessment

Assessment	Weight
Attendance	10%
Active participation	10%
Lead scientific paper discussion	15%
Daily quizzes on readings	10%
Midterm (short answer, essay)	25%
Research Paper (8-10 pages)	30%

Participation: Active participation in class discussions and projects is mandatory. Your participation grade will be based on *active* and *informed* contributions to our discussions.

Leading paper discussions: Each student will be required to lead at least one of our scientific paper discussions. Discussion leaders are expected to have a thorough understanding of the article, as demonstrated by their ability to respond to student questions effectively. They should also keep the discussion on topic and be able to provide information on the broader implications of the article. The latter may require additional background research to be conducted in preparation for leading the discussion.

Research paper: For the final paper each student will choose a topic related to human (or primate) evolutionary genetics. Topics need to be approved by the instructor. The paper should review the primary scientific literature related to the student's topic. Writing assignments should be formatted as follows: 8-10 pages, double-spaced, 12 pt Times New Roman font, 1 inch margins. Additional details and instructions will be available on Sakai.

Course Schedule

Dates and readings may be subject to change.

Date	**Topic**	**Readings**	**Notes & Activities**
UNIT 1 – Genomics: Organization, Variation, Diversity			
1/16	Evolutionary Theory	David Attenborough: Darwin and the Tree of Life (Film) How to Read a Scientific Article	no in-class meeting, film can be watched here: http://www.dailymotion.com/video/xsxubk
1/23	History of science: genetics	Scitable by Nature Education: Units 1-3.	
1/30	Intro to Genetics (transcription, translation, mutations, etc)	Ch. 2	In-class project: Sequence translation
2/6	Variation in the genome (SNPs, insertions, recombination, etc)	Ch. 3	
2/13	Methods for assessing genome variation	Ch. 4	In-class project: finding variation in sample set

UNIT 2 – Population Genetics			
2/20	Effects of natural selection on genomic variation	Ch. 5	In-class project: finding areas under selection in sample set
2/27	Phylogenetics	Ch. 6.1-6.4	Project: create phylogeny with sample set
3/6	Dating & Population History Take-home midterm distributed	Ch. 6.5-6.8	Project: divergence dates and pop. history with sample set
UNIT 3 – Human (& Other Primate) Origins & Migrations			
3/18	MIDTERM DUE ON SAKAI AT 11:59 PM!		
3/20	Primate migrations (lemurs, platyrrhines, hybridization zones)	Perelman et al., 2011 Horvath et al., 2008 Tung et al., 2008	Paper Discussion
4/3	What makes us human?	Ch. 7 & 8 Consortium CSaA, 2005	Paper Discussion
4/10	Human Origins & Ancient DNA (methods, issues)	Ch. 9 Ermini et al., 2015 Slatkin et al., 2016	Paper Discussion
4/17	Human migrations and Admixture	Ch. 11, 13, 14 (TBD) TBD	Paper Discussion
4/24	Agriculture & recent adaptations (high altitude, lactase persistence, salivary amylase, malaria, etc) Ethics	Ch. 12 & 15 Perry et al., 2007 Tishkoff et al., 2007 TBD Ledford, 2015a; 2015b	Paper Discussion Discussion

Final Paper due Tuesday May 8th at 5 pm.