

Evolutionary Medicine (ANT4930 Section 4C44)

Course Info: Tuesdays 4 (10:40-11:30am) and Thursdays 4&5 (10:40am-12:35pm)

T: MAT 0009, R: TUR 1208H

Instructor: Stephanie Bogart, Ph.D.

Office: B137 Turlington Hall

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Office Hours: T 1-2:30pm, W 10:30am-12pm

Course Content: This is an interdisciplinary course discovering the evolutionary, cultural, and environmental factors in the emergence and existence of human diseases with a focus on the Darwinian (evolutionary medicine) examination of illness.

Course Objectives:

- To develop a deeper comprehension of the central and cross-disciplinary concepts of human biology, which include, but are not limited to genetics, metabolic adaptations, origins of human and pathogen diversity, as well as social behaviors; and how these factors shape human medicine.
- To foster the students' process of identifying, exploring, assessing and solving real world problems through independent study and self-directed group projects that solidify their understanding of the scientific method, and basic scientific principles.
- To demonstrate understanding of ecological and evolutionary processes including the role of genetic variation, heredity, and natural selection as well as the implications these processes have for the origins and evolution of modern humans and their biology.
- To place biological knowledge into a socio-cultural context, especially how biology can contribute to the resolution of social, medical, and environmental issues.

Student Learning Outcomes:

- Identify, describe, explain, and apply factual, conceptual, and procedural knowledge in human evolution relating to medicine and disease.
- To understand and apply the scientific method and develop critical thinking skills from an evolutionary framework to investigate human variation in its biological, social, and cultural dimensions.
- Integrate different sources and types of knowledge into holistic perspectives about diseases and medicine.
- Develop skills in reading and facilitating discussions over recent primary scientific literature, as well as public speaking skills.

Required Materials:

Principles of Evolutionary Medicine

by Gluckman, Beedle, Buklijas, Low, and Hanson (2016) Second Edition

Oxford University Press, ISBN: 978-0199663934

Grading: *grades will not be rounded*****

Midterm I (Week 5)	20%
Midterm II (Week 9)	20%
Midterm III (Finals week)	20%
Articles and Discussion	
Article analysis	10%
Participation	10%
Project (Due Week 14)	20%

Letter grades assigned based on total percent of points according to normal grade scale system. A = 93.0 or above; A- = 90-92.9; B+ = 87-89.9; B = 83-86.9; B- = 80-82.9; C+ = 77-79.9; C = 73-76.9; C- = 70-72.9; D+ = 67-69.9; D = 63-66.9; D- = 60-62.9; E = <59.9

UF grading policy: <https://catalog.ufl.edu/UGRD/academic-regulations/grades-grading-policies/>

Midterms: Midterms will be **non-cumulative**, covering the material since the last exam (or from the start of term for midterm I). The exam will consist of several types of questions: fill-in-the-blank, multiple choice, and critical thinking essays. **Make-up exams can be scheduled only with proper documentation for an appropriate excuse.**

Articles and Discussions: Articles will be assigned over the term. Students will write a guided analysis (1 page max, Single-spaced) of EACH article and participate in student-led discussions, which will generally be during Thursday's long period unless otherwise noted. **Article Analyses are to be uploaded to Canvas and are due by 10:30am the day they will be discussed.** The following elements should be in your analysis (each article analysis is worth 10pts):

- What is the research question(s) and hypothesis?
- Consider the methodology & design: Which type of research design was used? What are the advantages and disadvantages of using this design? How could you have used other designs? What limitations can you recognize about the particular methodology used in this article?
- Conclusions: Are the authors' conclusions warranted based on the findings? Do you agree with the conclusions of the paper? What are the strengths and limitations of this study?
- Future: Think about how you would choose to follow up this research. What would be the best next study to test this phenomenon?
- How do you cite and reference this article using APA style?

ALL students must read the articles and be prepared to discuss. Participation in discussions of EVERY article is graded using the following guidelines:

0 – Unexcused absence or you fell asleep

1 – Made little to no effort to contribute (spoke once or not at all)

2 – Made few contributions (at least twice).

3 – Made many contributions (at least three times): asked questions, responded to professor or other students, gave opinion, etc.

****If there are two articles discussed in one class period you will be graded for EACH article, thus the total participation points for that particular day would be 6pts.****

Project: Students will work in small groups of two or three individuals. Each group will choose a disease from a guided list to thoroughly investigate in terms of evolution, previous and current treatments, genetic impacts/coevolution, and possible future implications. **Groups will present their findings during week 14.** A handout with further instructions will be presented in class. This project includes a **mandatory approval** (5pts) for your topic at Week 6 (through Canvas) and a mandatory check-in (10pts) with the professor at Week 13. During the **check-in**, your group should bring the primary references you have found and a basic outline of your presentation. During the meeting, you can address concerns about organization, citations, references, etc. This is an opportunity to get input on finalizing your presentation (you should have half of it done).

Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at:

<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>

Absences and late assignments: Every effort should be made to attend class, however, attendance is not a grade component. Should a student miss an assignment or discussion participation a University approved absence must be met in order to make up the points. These include: Military Service, death or serious illness in your immediate family, serious personal injury or illness, official school related function (i.e. school sporting event) or attending to academic conferences. You will be permitted to make up any missed points, should the appropriate documentation be provided. It is the student's responsibility to contact the instructor and inform them of the emergency **either before the class or within a 24-hour period following the missed class**. E-mails are strongly encouraged.

SCHEDULE: (*Subject to revision*)

Week & Dates	Lecture Topic	Textbook Chapter
WK 1: Aug 20 & 22	Intro & Evolution Medicine	1
WK 2: Aug 27 & 29	Evolution Basics	2
WK 3: Sept 3 & 5	Genetics & Development	3 & 4
WK 4: Sep 10 & 12	Life Histories & Human diversity <i>Article analysis & discussions</i>	5 & 6
WK 5: Sep 17 & 19	T: Midterm I, R: EM Principles and Pathways	7
WK 6: Sep 24 & 26	Disease – Reproduction <i>Article analysis & discussions</i> Group Project topic approval	8
WK 7: Oct 1 & 3	Disease – Reproduction & Nutrition <i>Article analysis & discussions</i>	8 & 9
WK 8: Oct 8 & 10	Disease – Nutrition <i>Article analysis & discussions</i>	9
WK 9: Oct 15 & 17	T: Midterm II, Disease – Coevolution	10
WK 10: Oct 22 & 24	Disease – Coevolution, infection, immunity <i>Article analysis & discussions</i>	10
WK 11: Oct 29 & 31	Disease – Psychology & Behavior <i>Article analysis & discussions</i>	11
WK 12: Nov 5 & 7	Disease – Psychology & Behavior, Cancer <i>Article analysis & discussions</i>	11 & 12
WK 13: Nov 12 & 14	Disease – Cancer, Check in	12
WK 14: Nov 19 & 21	Student Presentations	
WK 15: Nov 26 & 28	Medical Practice Thanksgiving	13
WK 16: Dec 3	Society and Future	14
Midterm III: Thursday, December 12th 7:30-9:30am		

Article Schedule:

Sept 12: Life History & Diversity

- Pontzer, H., Brown, M. H., Raichlen, D. A., Dunsworth, H., Hare, B., Walker, K., ... & Plange-Rhule, J. (2016). Metabolic acceleration and the evolution of human brain size and life history. *Nature*, 533(7603), 390-393. doi:10.1038/nature17654
- Gluckman PD, Hanson MA, Low FM. 2019 Evolutionary and developmental mismatches are consequences of adaptive developmental plasticity in humans and have implications

for later disease risk. *Phil. Trans. R. Soc. B* 374: 20180109.
<http://dx.doi.org/10.1098/rstb.2018.0109>

Sept 26: Reproduction

- Williams TC, Drake AJ. 2019 Preterm birth in evolutionary context: a predictive adaptive response? *Phil. Trans. R. Soc. B* 374: 20180121.
<http://dx.doi.org/10.1098/rstb.2018.0121>
- Hu, H., Xiao, H., Zheng, Y., & Yu, B. B. (2019). A Bayesian spatio-temporal analysis on racial disparities in hypertensive disorders of pregnancy in Florida, 2005–2014. *Spatial and spatio-temporal epidemiology*, 29, 43-50. <https://doi.org/10.1016/j.sste.2019.03.002>

Oct 3 Reproduction and/or nutrition

- Adynski, H., Zimmer, C., Thorp Jr, J., & Santos Jr, H. P. (2019). Predictors of psychological distress in low-income mothers over the first postpartum year. *Research in nursing & health*, 42(3), 205-216. DOI: 10.1002/nur.21943
- West-Eberhard, M. J. (2019). Nutrition, the visceral immune system, and the evolutionary origins of pathogenic obesity. *Proceedings of the National Academy of Sciences*, 116(3), 723-731.

Oct 10: Nutrition

- Chan, E. Y., & Zlatevska, N. (2019). Is meat sexy? Meat preference as a function of the sexual motivation system. *Food quality and preference*, 74, 78-87.
<https://doi.org/10.1016/j.foodqual.2019.01.008>
- Skodje, G. I., Minelle, I. H., Rolfsen, K. L., Iacovou, M., Lundin, K. E., Veierød, M. B., & Henriksen, C. (2019). Dietary and symptom assessment in adults with self-reported non-coeliac gluten sensitivity. *Clinical nutrition ESPEN*, 31, 88-94.

Oct 24: Coevolution

- Kim, K. H., Kabir, E., & Jahan, S. A. (2018). Airborne bioaerosols and their impact on human health. *Journal of Environmental Sciences*, 67, 23-35.
- Abi-Rached, L., Jobin, M. J., Kulkarni, S., McWhinnie, A., Dalva, K., Gragert, L., ... & Kimani, J. (2011). The shaping of modern human immune systems by multiregional admixture with archaic humans. *Science*, 334(6052), 89-94

Oct 31: Psychology and behavior

- Wu, X., Lu, Y., Zhou, S., Chen, L., & Xu, B. (2016). Impact of climate change on human infectious diseases: Empirical evidence and human adaptation. *Environment international*, 86, 14-23.
- Thompson, R. N., Thompson, C. P., Pelerman, O., Gupta, S., & Obolski, U. (2019). Increased frequency of travel in the presence of cross-immunity may act to decrease the chance of a global pandemic. *Philosophical Transactions of the Royal Society B*, 374(1775), 20180274.

Nov 7: Cancer

- Rosenheim, J. A. (2018). Short-and long-term evolution in our arms race with cancer: Why the war on cancer is winnable. *Evolutionary applications*, 11(6), 845-852.
- Koufaris, C. (2016). Human and primate-specific microRNAs in cancer: Evolution, and significance in comparison with more distantly-related research models: The great potential of evolutionary young microRNA in cancer research. *BioEssays*, 38(3), 286-294.

Accommodation

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodations. Students with disabilities should

follow this procedure as early as possible in the semester. **Ideally, student accommodation should be communicated to the Instructor before the end of AUGUST.**

Course Evaluations – GatorEvals

Students in this class are participating in the new course evaluation system called GatorEvals. The new evaluation system is designed to be more informative to instructors so that teaching effectiveness is enhanced and to be more seamlessly linked to UF's CANVAS learning management system. Students can complete their evaluations through the email they receive from GatorEvals, in Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Please note your other classes this semester may be evaluated in the current GatorRater online evaluation system at <https://evaluations.ufl.edu>. Thank you for serving as a partner in this important effort.

Student Conduct and Academic Honesty and Integrity

UF students are bound by The Honor Pledge which states:
<https://sccr.dso.ufl.edu/students/student-conduct-code/>

We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment."

Cheating, copying other's work, plagiarism, and other acts of academic misconduct are unethical. UF and the instructor consider these to be serious offenses. The Honor Code specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the Instructor

Harassment and Discrimination

"Harassment" is defined as conduct that (1) is of any type (written, oral, graphic, or physical), (2) is directed towards or against a person because of their personal status (i.e., race, religion, sex, sexual orientation, political affiliation, national origin, age, disability, marital status, pregnancy or others), and that (3) unreasonably interferes with the individual's work, education, or participation in activities or programs at UF or creates a working or learning environment that a reasonable person would find threatening. "Discrimination" is defined as a conduct that (1) adversely affects any aspect of an individual's employment, education, or participation in activities or programs at UF, and (2) is based on one or more personal characteristics listed above. Any student who feels that his/her rights have been violated may speak to the instructor who will direct the complaint through the proper university channels, or the student may directly file a complaint with UF Department of Human Resources.

Campus Resources

Students experiencing personal problems that are interfering with their academic performance are encouraged to contact the Counseling and Wellness Center:

<https://counseling.ufl.edu/about/location-hours-contact/>

- Health and Wellness U Matter, We Care: If you or a friend is in distress, please contact umatter@ufl.edu or (352) 392-1575 so that a team member can reach out to the student.
- Counseling and Wellness Center: <https://counseling.ufl.edu/>, 392-1575

CLASS CONDUCT

No photography or recording
allowed during lecture
(without prior permission)

Cell phones should be off or in silent mode

Use of a phone will result in point deductions

Laptops are permitted ONLY for notetaking

Use of social media, email, or non-course related work will result in point deductions

- Students experiencing personal problems that are interfering with their academic performance are encouraged to contact the Counseling and Wellness Center.

Academic Resources

- E-learning technical support, 352-392-4357 (select option 2) or e-mail to Learningsupport@ufl.edu. <https://lss.at.ufl.edu/help.shtml>
- Library Support, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.
- Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <http://writing.ufl.edu/writing-studio/>