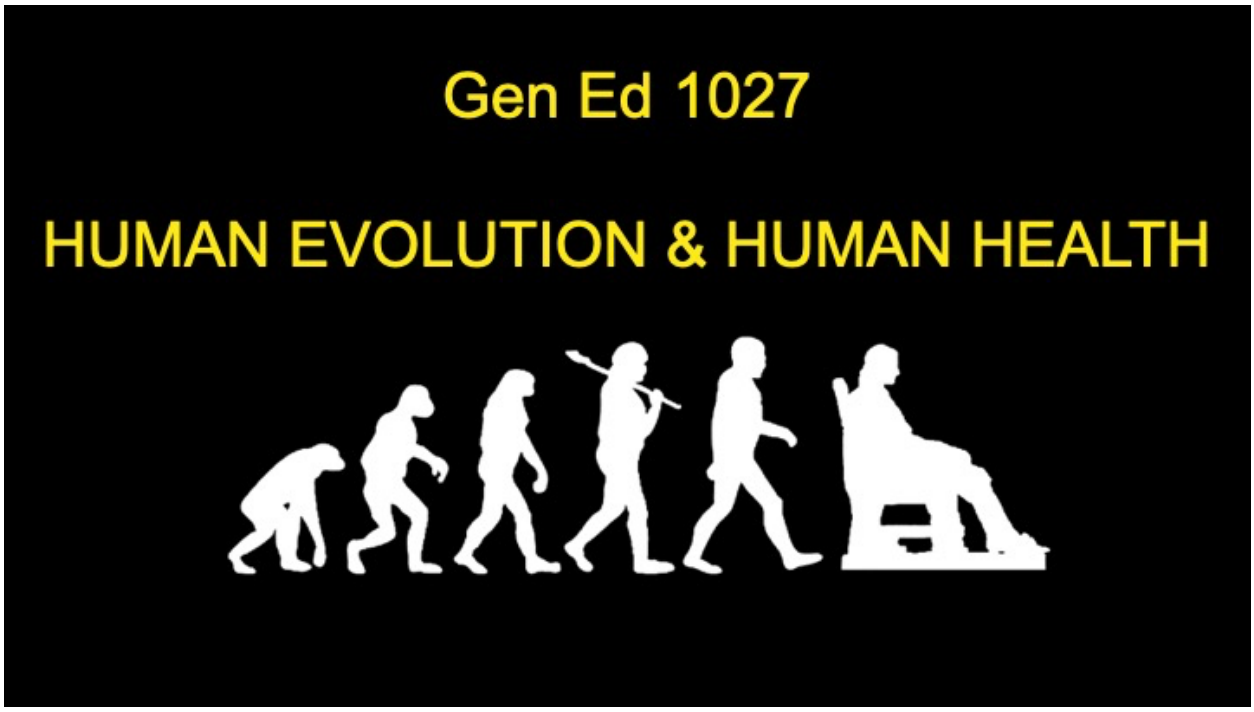
General Education 1027: Human Evolution and Human Health

Spring 2024 Syllabus

Harvard College
Program in General Education
Explore. Expand. Engage.

SCIENCE & TECHNOLOGY IN SOCIETY



How did the human body evolve to be the way it is, and how does that evolutionary history influence how we can promote health and prevent disease?

1. Course Information

Lectures:
Tuesdays & Thursdays 1:30 PM – 2:45 PM EST in MCZ 529

Lab Sections:
Wednesdays 4:30 PM – 5:45 PM EST in MCZ 541
Thursdays 9:00 AM – 10:15 AM EST in MCZ 541

Course Instructors:
Dr. Daniel Lieberman Edwin M. Lerner Professor of Biological Sciences (danlieb@fas.harvard.edu)
Office Hours: Wednesday 2-3 pm Peabody 51F and by appointment

Dr. Bridget Alex Lecturer in Human Evolutionary Biology (HEB)
(balex@fas.harvard.edu)
Office Hours: Thursdays 3-4 pm MCZ 543 and by appointment

Teaching Fellow:
Joel Ramírez
(joelramirez@fas.harvard.edu)
Office Hours: Thursdays 3:30 - 4:30 pm Peabody 53E and by appointment

If you cannot make office hours for any reason, please reach out to any of the teaching staff to schedule an appointment either in-person or on Zoom!

Course Website:
https://canvas.harvard.edu/courses/114462

2. Course Description

How and why did humans evolve to be the way we are? Why do we get sick, age, and die? And how can we use principles of evolution to improve health and wellbeing in a post-industrial world?
To address these questions, this course reviews the story of how humans evolved through a series of major transitions starting with our divergence from the other apes continuing to the present day. At the same time, we will explore the many effects of these transitions —especially recent cultural and technological shifts such as agriculture and industrialization— on human health.

What is the format of the course?
GEN ED 1027 consists of both lecture and lab components.

What can I expect from GEN ED 1027 lectures?

Yes, your instructors will present information on slides. But to make our meetings interactive, we will include polls and plenty of opportunities to pose questions or comments. Lecture recordings will be posted on Canvas (go to "Panopto" tab) along with PDFs of the lecture slides.

What can I expect from GEN ED 1027 labs?
GEN ED 1027 labs build upon the material presented in lecture and will expose you to the major themes of the class through examinations of pertinent skeletal material and collaborative activities simulating key points in human evolution. All students must participate in **eight 1.25 hour (75 minute) lab sessions**. Attendance in lab section is an important part of the course and thus mandatory. During lab, you will work through activities in a small group setting.

Examinations:
There will be two in-person examinations: a *Midterm* and a *Final Exam*. Both exams will consist of short answers and essay questions. To help you prepare, we will post practice exam questions and answers.

Getting to know each other:
We will do our best to facilitate discussions and build community. To encourage participation, 5% of your grade will be assessed from in-class attendance as assessed by polls. If you cannot make a class(es) please let the Head TF know in advance and we will give you equivalent credit.

How can I interact with course faculty and teaching staff outside of class and lab?
All members of the teaching staff will hold weekly office hours in person. Please use these office hours as an opportunity to say hello or ask questions. DO NOT feel as if you need to have a "good question" to drop by office hours. If you have other commitments during office hours, no problem! Please **email us directly** to arrange another time to meet, either in-person or over Zoom. We are happy to meet with you!

3. Course Objectives

Following the successful completion of this class you will understand:

- The major events in the course of human evolution
- How these events have shaped the unique aspects our life history, anatomy, and physiology
- How postindustrial lifestyles affect our health and increase our susceptibility to developing certain diseases, illnesses, and conditions

4. Course Policies and Expectations

Attendance and lecture participation credit:
We ask that you attend all lectures sessions so we can create a community, have discussions, and learn from each other. To encourage in-class participation, 5% of your grade will be assessed from in-class attendance as assessed by polls. If you cannot make a class(es) please let the Head TF know in advance and we will give you equivalent credit.

Lab Section Changes/Absences:

Lab sections will be assigned at the beginning of the semester with the expectation that you will continue in the same section for the duration of the course. If you need to switch or miss a lab section due to illness or other extenuating circumstance, please email the Head TF before the lab you need to miss.

*****PLEASE NOTE*****: Students are **prohibited** from recording any class activity including lecture, lab, office hours *or posting any class materials to any website.* Following Harvard College rules, students that violate this policy will be referred to the Harvard College Administrative board.

Collaboration Policy:

Collaboration between students plays an integral role in the learning and processing of information presented in this course. Students in GEN ED 1027 are therefore encouraged to discuss course material with course instructors and classmates to better understand the material. However, any work that you submit for evaluation after such a discussion **must** be the result of your own effort and **must** be submitted in your own words. To ensure the proper use of sources while at the same time recognizing and preserving the importance of the discussion and collaboration, the Faculty of Arts and Sciences adopted the following policy:

"It is expected that all homework assignments, projects, lab reports, papers, theses, and examinations and any other work submitted for academic credit will be the student's own. Students should always take great care to distinguish their own ideas and knowledge from information derived from sources. The term 'sources" includes not only primary and secondary material published in print or online, but also information and opinions gained directly from other people. Quotations must be placed properly within quotation marks and must be cited fully. In addition, all paraphrased material must be acknowledged completely. Whenever ideas or facts are derived from a student's reading and research or from a student's own writings, the sources must be indicated." (from Student Handbook)

Late assignments and missed tests:

If you require an extension on an assignment because of an emergency or Harvard-related reason (e.g., for seniors with thesis deadlines) **you must ask for the extension in advance of the deadline**; otherwise, late assignments will be downgraded by 5%/day late.

Missed tests cannot be made up unless you (a) arrange an alternative with Professors Lieberman or Alex in advance, or (b) are ill and obtain proper University Health Services documentation.

Academic Integrity:

Discussion and the exchange of ideas are essential to developing a good understanding of the material in GEN ED 1027. For **post-lab assignments** you are encouraged to use lecture material and outside sources, and to consult with your classmates and TFs when formulating answers. However, after discussions with peers or TFs, ensure that any answers you submit for evaluation are **the result of your own research efforts and are written in your own words**. In addition, you must cite any books, articles, websites, lectures, etc. that have helped you with your work using appropriate citation practices (Harvard Guide to Using Sources). Similarly, you must list the names of students with whom you have collaborated on post-lab assignments.

The Harvard College Honor Code:

Members of the Harvard College community commit themselves to producing academic work of integrity – that is, work that adheres to the scholarly and intellectual standards of accurate attribution of sources, appropriate collection and use of data, and transparent acknowledgement of the contribution of

others to their ideas, discoveries, interpretations, and conclusions. Cheating on exams or assignments, plagiarizing or misrepresenting the ideas or language of someone else as one's own, falsifying data, or any other instance of academic dishonesty violates the standards of our community, as well as the standards of the wider world of learning and affairs.

Accommodations for students with disabilities:
Students needing academic adjustments or accommodations because of a documented disability must present their Faculty Letter from the Accessible Education Office (AEO) and speak with Head TF Ben Sibson by the end of the second week of the term. All discussions will remain confidential, although we may need to contact the AEO to discuss appropriate implementation.

5. Materials and Access

Course Website:
The canvas website (https://canvas.harvard.edu/courses/114462) contains the syllabus and links to weekly readings and assignments. Class-related announcements will also be disseminated through this page.

Textbook:
The Story of the Human Body, Daniel Lieberman. Available online or at The COOP. (NB: Professor Lieberman does not receive royalties from these book purchases)
Assigned weekly readings: These are listed at the end of the syllabus and will be posted online on Canvas throughout the semester.

6. Assignments and Grading

Category	% of course letter grade
Midterm	20%
Final Exam	45%
Lab Assignments	30%
In class participation	5%

We will not curve this class. Following FAS guidelines, we will grade as follows: A range = excellent quality, full mastery of subject; B range = good comprehension of course material, and good commandment of skills; C range = adequate and satisfactory, basic requirements met; D range = unsatisfactory with minimal commandment of material. **This course may be taken pass/fail**. In order to receive a passing grade, a student must receive the equivalent of a C grade or higher. If you would like to take the course pass/fail, please contact the Head TF.

7. Equity, Diversity, Inclusion, and Belonging

The study of human evolution and its relationship to health and disease as well as other aspects of the human condition raise numerous issues relevant to equity, diversity, inclusion, and belonging. Like many academic fields, these areas of inquiry were established when only certain groups of people were able or permitted to engage in and publish formal scientific research. In some cases, this research was informed by implicit or explicit bias and discrimination.

GEN ED 1027 aims to teach what happened in human evolution and how that evolutionary history is relevant to people today, while maintaining an awareness of the harm that can be and has been inflicted by consciously or unconsciously misusing scientific findings. We will inevitably touch on sensitive issues such as health, race, ability status, gender and sex. We hope that we can respectfully discuss issues of bias and representation should they arise, but please know that you can contact any of the course staff (who will keep your identity confidential) if you have any suggestions to improve the quality of the course materials, or if you feel something was said in class (by anyone) that you felt was disrespectful or discriminatory. If there is any way we can help your performance in this class, please know that we and others in the University are here to help. Additional resources include your Allston Burr Resident Dean, the Harvard Office for Equity, Diversity, Inclusion, and Belonging, and if you are experiencing emotional distress Harvard CAMHS has a Cares Line (617-495-2042) with mental health counselors available 24/7 along with many other mental health resources.

8. Lecture, Weekly Readings, and Lab Schedule

Readings subject to change between course registration and spring semester. The syllabus will be updated prior to the first day of class.

Week 1:	**Jan 23** Introduction: health today, and why is evolution relevant? Bridget Alex (BA) and Daniel Lieberman (DL) **Jan 25** How evolution works. BA and DL Lieberman (2012). *The Story of the Human Body, Ch. 1* *Alex (2018). Hopeful Monsters: How do we define a species?* Discover.
Week 2:	**Jan 30** Evolutionary Medicine. DL **Feb 1** What does it mean to be an ape? BA Lieberman *Ch. 7* Nesse & Williams (1994). *Why We Get Sick, Ch. 1: The Mystery of Disease* Gurven & Lieberman (2020). *WEIRD bodies: mismatch, medicine and missing diversity.* Evolution and Human Behavior.
Week 3:	**Feb 6** Transition #1: The first hominins. BA **Feb 8** The most fundamental physical activity: walking (then and now). DL Lieberman *Ch. 2* Pontzer (2012). *Overview of Hominin Evolution.* Nature Education

	Knowledge. Lieberman (2022). *Standing up for the earliest bipedal hominins.* Nature. Watch: "Seven Million Years of Human Evolution" American Museum of Natural History" ****Lab 1: Natural selection and adaptation**
Week 4:	**Feb 13** Transition #2: The australopiths. BA **Feb 15** The original paleo diet. DL Lieberman *Ch. 3* Strait (2010). *The Evolutionary History of the Australopiths.* Jabr (2013). How to Really Eat Like a Hunter-Gatherer. Scientific American. ****Lab 2: Learning from bones**
Week 5:	**Feb 20** Transition #3: The human genus. BA **Feb 22** What it means to be a hunter-gatherer. DL *Lieberman Ch. 4* Leitch (2020). As the Knee Evolved, So Did Arthritis Risk. ****Lab 3: Locomotion and bipedalism**
Week 6:	**Feb 27** How we evolved for endurance. DL **Feb 29** Transition #4: Archaic humans. BA Lieberman *Ch. 5* Alex (2019). *Getting Naked.* Discover. Podcast: "We Are Family" **Lab 4: Meet the ancestors, Part I
Week 7:	**Mar 5** Human life history and energy. DL **Mar 7 In-class midterm** Lieberman *Ch. 6* Reich (2018). *Who We Are and How We Got Here, Ch. 1: How the Genome Explains Who We Are* (digital copy available on Hollis).
Spring Break:	**March 9 - 17**
Week 8:	**Mar 19** The origin and diversification of modern humans & the problem of race. BA **Mar 21** Transition #6: The agricultural revolution. BA and DL AABA Statement on Race & Racism (2019). Gravlee (2009). *How Race Becomes Biology: Embodiment of Social Inequality.*

	Chapter 6, "Race and Ancestry: How Our Genes Connect and Divide Us." In *DNA is not destiny*, Heine, S.J. (2017). Jobling, M.A., Rasteiro, R. & Wetton, J.H. (2015). *In the blood: the myth and reality of genetic markers of identity.* Ethnic and Racial Studies. Diamond. (2002). *Evolution, consequences and future of plant and animal domestication*. Nature. ****Lab 5: Meet the ancestors, Part II (Stone Tool viewing in Peabody Museum)**
Week 9:	**Mar 26** Why humans are so innovative: brains, language and culture. BA **Mar 28** Transition #7: The industrial and post-industrial revolutions. DL Lieberman *Ch. 8* *Boyd & Silk (2018). How Humans Evolved (8th). Ch. 16: Culture, Cooperation, and Human Uniqueness* Jablonski & Chaplin (2002). *Skin deep.* Scientific American. ****Lab 6: Harvard Art Museum visit**
Week 10:	**Apr 2** Mismatches of novelty: shoes, chairs, etc. DL **Apr 4** Mismatches of too much: Obesity. DL Lieberman *Ch. 9* Jones, Podolsky, & Greene (2012). *The Burden of Disease and the Changing Task of Medicine.* ****Lab 7: Energy Goes In**
Week 11:	**Apr 9** Mismatches from too little: Physical inactivity. DL **Apr 11** Old perspectives on the world's #1 killer: Heart Disease. DL Lieberman *Ch. 10 & 11* Lieberman (2020). *Exercised Ch. 2* Raichlen & Lieberman (2022). *The evolution of human step counts and its association with the risk of chronic disease.* Cell. ****Lab 8: Energy Comes Out (Last Lab!)**
Week 12:	**Apr 16** Old perspectives on the world's #2 killer: Cancer. DL **Apr 18** Rethinking rest: sleep and sitting. BA Lieberman *Ch. 12* Nesse (2019). *Good Reasons For Bad Feelings, Ch. 1: A New Question* Schroeder (2007). *We Can Do Better - Improving the Health of the American People.*
Week 13:	**Apr 23** (*last day of class*) Conclusion: The future of human health. BA and DL Lieberman *Ch. 13*

	Exercised, Ch. 3 & 4 *Alex (2018). To Sleep, Perchance to Evolve. Discover.* Raichlen et al. (2020). *Sitting, squatting, and the evolutionary biology of human inactivity.* PNAS.

GENED 1027 Summary
Harvard College/Graduate School of Arts and Sciences: 112339
Term: 2024 Spring / Full Term
Course Instructor(s): Daniel Lieberman and Bridget Alex
Location: Museum of Comp Zool 529 (FAS)
Meeting Time: Tuesday 01:30 PM - 02:45 PM; Thursday 01:30 PM - 02:45 PM
Exam Group: FAS15_C
Course Description: How and why did humans evolve to be the way we are, and what are the implications of our evolved anatomy and physiology for human health today? How can we use principles of evolution to promote health and prevent disease? To address these questions, this course reviews the major transitions that occurred in human evolution, from the divergence of the ape and human lineages some 8 million years ago to the origins of Homo sapiens about 300,000 years ago. We also consider the many health effects of the recent cultural and technological transitions from hunting and gathering to farming and then to industrialization.

Additional information will be shown if available from the Registrar.