

IB 169, EVOLUTIONARY MEDICINE, Spring 2024

Department of Integrative Biology, University of California, Berkeley

Instructor: Irina Krylova, PhD @ ikrylova@Tberkeley.edu**Lectures:** 3:30-4:50pm Tuesdays and Thursdays, Hearst Field Annex A1**Office Hours:** Tuesdays, Thursdays 2:30-3:20PM, location TBA.**Graduate Student Instructors:**Aleksey Maro @ alekseymaros@Tberkeley.edu Sections DIS101/102/106Diler Haji @ diler@Tberkeley.edu Sections DIS103/104/105

Class Information	Schedule/Location
LEC 001 • Class # 22006	TuTh 3:30P-4:59P - A1 - Hearst Field Annex
DIS 101 • Class # 17871	M 2:00P-2:59P - 80 - Social Sciences Building
DIS 102 • Class # 17872	M 3:00P-3:59P - 581 - Social Sciences Building
DIS 103 • Class # 17873	W 12:00P-12:59P - 47 - Evans
DIS 104 • Class # 17874	W 2:00P-2:59P - 80 - Social Sciences Building
DIS 105 • Class # 17875	W 3:00P-3:59P - 2066 - Valley Life Sciences
DIS 106 • Class # 17876	F 1:00P-1:59P - 581 - Social Sciences Building
DIS 107 • Class # 17877	F 2:00P-2:59P potential section, TBA

Texts for class (Optional, available from UCB Library online or as a paper book):Evolutionary Medicine, 1st Edition, 2016, Stephen C. Stearns & Ruslan Medzhitov, Sinauer Publishers, ISBN 978-1-60535-260-2

Principles of Evolutionary Medicine, 1st Edition, Peter Gluckman, Alan Beedle, & Mark Hanson, Oxford University Press, ISBN: 9780199236398

Course Description:

This course explores the ways that evolutionary theory can illuminate our understanding of human health and disease. The integration of evolutionary concepts into health sciences can deepen our understanding of the origins of diseases and how human populations evolve in response to these ailments. The course begins with an introduction to evolutionary medicine followed by an overview of human genetic variation and natural selection. With this foundation, we evaluate the fields of reproductive biology, gynecology, and infant/child health through an evolutionary lens. We will also study the evolution of human diet, metabolic adaptation, and the evolution of human ecological relationships with the environment. Next, we explore evolutionary concepts in chronic metabolic disorders, degenerative diseases, and psychiatric conditions associated with aging, lifestyle, behavior, and social/cultural organization. Finally, we examine infectious disease ecology from the perspective of both human and microbial evolutionary responses.

Lecture Topics are listed on the Canvas Schedule dashboard. This is a tentative schedule that will be adjusted as needed.

Exam Schedule

- **Midterm #1** on 2/20/24 at 3:30 PM
- **Midterm #2** on 4/2/24 at 3:30 PM
- **Final Exam:** 5/10/21 at 7:00 PM-10:00PM Location TBD

NOTE: Each exam has 50 multiple choice questions and a 10 point essay question for a total of 60 points

TOTAL POINTS FOR COURSE

Exam material will be based only on material presented in the lectures and the provided reads.

Lecture section 75%	Pts
Exam 1 Lec 1-10	60
Exam 2 Lec 11-20	60
Exam 3 Lec 21-26	60
PollEv/Socrative quizzes	20
Canvas quizzes	60
Paper (individual)	40
Discussion section 25%	
Presentation (teams of 2)	60
Discussion participation	40
	400

Exam are scheduled on the Canvas class dashboard. Make sure to provide an advanced notice (at least 1 week before the exam) if you have a schedule conflict.)

Lettr	Grading Scale	Equal or larger than ____ points
A+	97-100%	388
A	93-96%	372
A-	90-92%	360
B+	87-89%	348
B	83-86%	332
B-	80-82%	320
C+	77-79%	308
C	73-76%	292
C-	70-72%	280
D+	67-69%	268
D	63-66%	252
D-	60-62%	240
F	0-59%	<240

Note: Canvas grades are accurate only if all assignments were submitted and graded.

TERM PROJECT:

Term project worth 100 points will consist of a presentation done and submitted for the discussion section (60 points), and of a 1500 words paper (on the topic of presentation or another relevant topic (40 points), submitted for the lecture section. Instructions for the papers will be made available through the submission assignment. If presenting in teams of two, please submit your (identical) presentations separately to get graded, but your papers should be original. Papers will be processed through the TurnItIn to assure the originality (<20% plagiarism score is acceptable). In discussion section, each student will give a five-minute presentation (if individually), or 10-minute presentation (if presenting in teams of two students), on a topic related to evolutionary medicine. Ideally, you come up with your own topic on a subject that really makes you tick, but a list of potential topics/papers will be posted on Canvas. **Once you have presented**, your presentation slides will need to be uploaded on Canvas to receive a grade (max 60 points.) That same assignment page (for both presentation, and paper) will have a *rubric for your presentation* – make sure to review.

Item	Presentation	Paper	Notes
Section	DIS	LEC	
Points	60	40	100 points total
Format	Individual or in teams of 2	Individual, original	
Volume	Indiv: 5min; Team of 2: 10min	1200-1500 words w/o refs	~ 1min per slide
TOPIC	Same or different with paper	Same or different with pres	
Route of submission	DIS assignment	Lec assignment	
Rubric and directions	DIS assignment	Lec assignment	

Discuss your potential topic with your lecture/discussion instructor to get an approval of your topic before you commit. You will then schedule your presentation **using editable schedule linked to your DIS section**.

Contents of Discussion Sessions.

In addition to the students presenting, you will have one item, usually original research paper, but it can be some popular science piece, per a discussion section, that will be posted on Canvas. Go through this material and come up with **at least three questions** that you will write down in your IB169 DIS notebook – these will yield your participation points for the discussion section. During the discussion section, you will be asking these questions of your peers and answering their questions. Your written questions will be checked and together with your activities during discussions, will constitute your DIS section participation points (40 total).

Peer-reviewed (refereed or scholarly) journals (ack. Tom Carlson)

- In **Peer-reviewed Journals**, in order to ensure the article's quality, articles are written by experts and are reviewed by several other experts in the field (peer reviewers) before the article is published in the journal.
- In academic publishing, the goal of **peer review** is to **assess the quality** of articles submitted for publication in a scholarly journal.
- Articles published in these journals are more likely to be scientifically valid and reach reasonable conclusions.
- The peer reviewers check the manuscript for accuracy and assess the validity of the research methodology and procedures.
- If they find the article to have appropriate scholarly validity and rigor, the peer reviewers may still suggest revisions.
- If the peer reviewers find the article lacking in scholarly validity and rigor, they reject it.
- Because a peer-reviewed journal will not publish articles that fail to meet the standards established for a given discipline, peer-reviewed articles that are accepted for publication exemplify the best research practices in a field.
- Typically, the peer reviewers do not know who is the author of the article, so the article succeeds or fails on its own merit, not the reputation of the expert

Examples of Websites to Locate Peer-Reviewed Articles

- UCB Library
- Google Scholar
- Pubmed
- Web of Science

Non-Peer-reviewed articles

- **Newspapers, magazines, and websites** containing articles and news: Articles are written by people who may or may not be experts in the field of the article. Consequently, articles may contain incorrect information and have biases.
- **Non-Peer-reviewed Journals** containing articles written by academics and/or professionals. Although the articles are written by "experts," any particular "expert" may have some ideas that are not considered valid by the academic or professional community.

Lecture Schedule (Tentative and a subject to change!)

Note: on February 6th we will have a

Guest Lecture by Prof. Robert Dudley – an author of “Drunken Monkey”

Lecture #	Date	Lecture Topic
1	1/16/24	What is Evo Med and Why Evo is needed to understand Med?
2	1/18/24	The Molecular Basis of Human Variation and Inheritance.
3	1/23/24	Evolution of human diversity
4	1/25/24	Evolutionary Logic of Metabolism
5	1/30/24	What is patient?
6	2/1/24	What is disease?
7	2/6/24	How our drinking behavior today might link with millions of years of evolution within tropical ecosystems.
8	2/8/24	Human Evolution and Variability in Human genome: Cyp and Xenobiotic Receptors
9	2/13/24	Human Evolution and Variability in Human genome Glycemic responses variability
10	2/15/24	Case of retroviral integration: Placentas & Koalas. Evolutionary view on Cancers.
	2/20/24	Exam1 Lec 1-10
11	2/22/24	Evo History of an individual vs species: microchimerism.
12	2/27/24	Infections disease as major driving force of human Evolution
13	2/29/24	Co-evolution with Microbiome: We are not alone
14	3/5/24	Our co-evolution with Microbes: Female Uterine Cycle
15	3/7/24	1918 Flu, Immunity and virus resurrection
16	3/12/24	Increase in Trehalose consumption and C.dif; Syphilis, Leprosy, and Pathogen adaptation
17	3/14/24	CCR5, black plaque, HIV and engineered babies
18	3/19/24	Pathogen mimicry and evolution
19	3/21/24	Emerging diseases: COVID evolution
	3/26/24	Spring Break
	3/28/24	Spring Break
	4/2/24	Exam2 Lec 11-19
20	4/4/24	Persistence of recessive alleles: ApoE4 and reproductive success; BRCA1 and 2
21	4/9/24	Mismatches in space: sickle cell anemia
22	4/11/24	Genotype-Phenotype interactions: Epigenetics
23	4/16/24	Reproductive success advantage allows deleterious alleles to persist
24	4/18/24	Interaction of genes and early development Greedy gene phenotype
25	4/23/24	Interaction of genes and early development Aggression
26	4/25/24	Errors of Imprinting
	4/30/24	Exam review
	5/10/24	Final Exam Lec 20-26