Evolution & Human Health

IB/ANTH 360 Fall Semester 2019

Lecture:	Monday 1:00 – 1:50 in 101 Armory
Discussions:	Wednesday 1:00 – 1:50pm in Natural History Building 2020B or Friday 1:00 – 1:50pm in Natural History Building 2020B
Professor:	Dr. Charles C. Roseman Office: 203 Shelford Vivarium Office Hours: Monday 2:00 – 3:00pm, Wednesday 9:00 – 11:00am Email: croseman@illinois.edu
Teaching Assistant:	Angel Rivera-Colón Office: Office Hours: Email:

Course Website: We are using a Moodle page. Go to https://learn.illinois.edu and login in the upper left. You should be automatically registered.

Course Description: Our bodily makeup, immune system, and other aspects of humanity are the products of eons of evolution. IB/ANTH 360 begins with an overview of evolutionary theory and history, including human evolution, molecular evolution, life history theory, and evolutionary perspectives on development. We will then explore the applications of these principles and perspectives to problems in disease, behavior, and important events in life such as birth, growing up, aging, and death. All throughout, we will look at the ways in which evolutionary perspectives on health and disease can be used to inform the treatment of disease and to guide public health policy.

Learning objectives and course goals:

1. To build on your basic evolutionary biology skills by examining applications of evolutionary theory (e.g. population genetics and molecular evolution) to problems in human health.

2. To familiarize you with the ways in which disease interacts with people across levels of organization from pathogen-immune system interactions to epidemiology to the phylogenetic comparative study of disease over macroevolutionary time.

3. To critically analyze a health condition in an evolutionary framework by articulating and testing hypotheses in a substantial research project.

4. To develop scientific presentation skills by presenting the results of the project outlined in learning objective 3 in poster form in a mini-conference at the end of the course.

Attendance and alternate exams: Attendance of lecture and discussion are required. The large majority of the exam material is drawn from the lecture material. While you will be provided with notes, slides, and reference material, these will often be abridged. Moreover, out of context, the notes and slides may not serve you well on their own. We make exceptions for validated illness (contact the Emergency Dean for an official excuse) or absence on account of official university activities (e.g. athletic team participation or conferences), religious observance, or military or other public service. Please alert the professor and teaching assistant in the first few lectures or discussion sessions to make arrangements for absences. Do not wait until the last minute to make arrangements for absences. Without prior approval or a validated excuse for absence, you will not be allowed to make up missed exams or quizzes.

Class activities, assignments, and assessment: The class is composed of a *lecture* (Mondays at 1:00pm in 112 Gregory Hall) and a *discussion* (either Monday or Wednesday at 1:00pm in NHB 2020B). You are obligated to attend the discussion section in which you are enrolled each week. We will take attendance and participation is a major part of your grade (see *Grading* below).

Discussion sections will be held in a new interactive learning environment. We will post a guide to the discussion room during the first week. *Attendance* for the discussion section will be recorded and tallied as part of the final grade.

There are three *exams*. They are not cumulative with the exception of basic general concepts that will be emphasized throughout the course. There is no final exam. The exams are closed-note. Do not bring any exam aids or electronic devices during exams. Scheduling for exams will be on the course calendar on the Moodle site.

Each week, we will read one or a few *short pieces* on the course material and/or watch an *online lecture/documentary*. Much of the lecture and discussion will depend on familiarity with this out of class material and, as a consequence, the assessment of your participation. Moreover, the material will be accompanied by a *quiz* online, which will figure into your grade (see *Grading* below). We will drop the lowest quiz score. Quizzes will be on the Moodle site and available for a week. You must have your answers entered and submitted by 11:59pm on the Sunday before lecture.

A final *review poster* project will round out the course activities. Groups of students will select a disease, chronic, infectious, or otherwise, or some aspect of behavior, development, or anatomy with bearing on some aspect of human health. They will then assemble a critical review on the ways in which evolution has influenced this aspect of human health. We will provide a list of potential topics and each group will choose a topic. Custom topics will be allowed conditional on approval by the professor.

I-Clicker and Extra Credit: Immediate feedback is a necessary part of the lecture (on Mondays), so the use of I-Clickers is required for the class. The i-Clicker points, however, are all extra credit. There are a total of 10 in-class lectures for which we will be using i-Clickers. If you attend 6 to 7 of them and participate in the i-Clicker exercises, you will receive 1% of the total class points as extra credit. If you attend 8 to 10 of them and participate, you will receive 2% of the total class points as extra credit. No other extra credit opportunities are available.

Course Schedule: The course schedule is on the Moodle site and gives information on the topics and the due dates for assignments.

Grading Breakdown: Following is a table of the assignments and the number of points awarded and percentage of the grade accounted for by each assignment.

Assignment	Points	% of final grade
Exam 1	100	20%
Exam 2	100	20%
Exam 3	100	20%
Discussion	100	20%
Quizzes online	25	5%
Poster project	75	15%

Final grading scale: I will use a standard percentile scale (i.e. >90% A; 90% A-; 89 B+; <89 but >80 B…) for the final grades unless very few people score well (I've never had this happen), in which case, I will adjust the grade scale downward to your benefit. I will never make the grading categories more difficult. If everyone gets above 90%, everyone gets an A.

Optional supplemental text: The book Evolutionary Medicine by Stearns and Medzhitov (2016) may be a helpful resource. An ebook is available through Course Smart (http://www.coursesmart.com/9781605354835) for $58.61 for non-expiring, or $34.48 for 180 day access.

Course policies: Read and abide by the *Code of Policies and Regulations Applying to All Students* at http://www.admin.uiuc.edu/policy/code/index.html.

Please be aware that this syllabus may change during the semester. Changes to the syllabus will be announced in class and on

By the recommendation of the university, I am appending the following emergency recommendations to the syllabus. Please read them.

Emergency response recommendations

The Department of Homeland Security and the University of Illinois at Urbana-Champaign Office of Campus Emergency Planning recommend the following three responses to any emergency on campus: **RUN > HIDE > FIGHT**

ONLY FOLLOW THESE ACTIONS IF SAFE TO DO SO. When in doubt, follow your instincts—you are your own best advocate!

RUN

Action taken to leave an area for personal safety.

- Take the time now to learn the different ways to leave your building **BEFORE** there is an emergency.
- Evacuations are mandatory for fire alarms and when directed by authorities. **No exceptions!**
- Evacuate immediately. Pull manual fire alarm to prompt a response for others to evacuate.
- Take critical personal items only (keys, purse, and outerwear) and close doors behind you.
- Assist those who need help, but carefully consider whether you may put yourself at risk.
- Look for **EXIT** signs indicating potential egress/escape routes.
- If you are not able to evacuate, go to an Area of Rescue Assistance.
- Evacuate to Evacuation Assembly Area and remain until additional instructions are given.
- Alert authorities to those who may need assistance.
- Do not re-enter building until informed by emergency response personnel that it is safe to return.

ACTIVE THREAT:

- If it is safe to do so run out of the building. Get as far away as possible. Do not go to the Evacuation Assembly Area.

HIDE

Action taken to seek immediate shelter indoors when emergency conditions do not warrant or allow evacuation, such as for severe weather.

- Take the time now to learn the different ways to seek shelter within your building **BEFORE** there is an emergency.
- If you are outside, proceed to the nearest protective building.
- If sheltering-in-place due to severe weather, proceed to the identified Storm Refuge Area or to the lowest, most interior area of the building away from windows or hazardous equipment or materials.

ACTIVE THREAT:

- Lock or barricade your area.
- Get to a place where the threat cannot see you.
- Place cell phones on **silent**.
- Do not make any noise.
- Do not come out until you receive an Illini-Alert advising you it is safe.

FIGHT

Action taken as a last resort to increase your odds for survival.

ACTIVE THREAT:

- If you cannot run away safely or cannot hide, **be prepared to fight with anything available to increase your odds for survival.**

Week	Date	Session	Topic
1	8/26	Lecture	Why is evolution important to medicine?
	8/28 or 8/30	Discussion	**Project Day:** Class and Project Orientation
		Online	N/A
2	9/2	LABOR DAY NO CLASS	
	9/4 or 9/6	Discussion	Evolution Workshop
		Online	"Evolutionary medicine at 20" Randy Nesse (https://www.youtube.com/watch?v=5dbC7BgeO4Q)
3	9/9	Lecture	Evolutionary thinking
	9/11 or 9/13	Discussion	**Project Day:** Choosing a project topic and formulating questions and hypotheses.
		Online	"Evolution of skin pigmentation" Nina Jablonski (https://www.youtube.com/watch?v=d4KcRMTKImQ)
4	9/16	Lecture	What is a patient?
	9/18 or 9/20	Discussion	Individual differences and development
		Online	"Year of Darwin" Steven Austad
5	9/23	Lecture	What is a disease? (Part 1) **Project Topic Statement Due**
	9/25 or 9/27	Discussion	What is a disease? (Part 2)
		Online	"Methods for testing hypotheses" Randy Nesse (https://www.youtube.com/watch?v=xPylGadS9Kk).
6	9/30	**EXAM 1**	
	10/2 or 10/4	Discussion	Applying principles of evolutionary medicine
		Online	
7	10/7	Lecture	Defenses, immune and otherwise.
	10/9 or 10/11	Discussion	Making graphs (Antibiotic resistance exercise)
		Online	"Pathogen evolution in a vaccinated world" Andrew Read (https://youtu.be/TeyxhehhEuo)
8	10/14	Lecture	Growing up and ageing
	10/16 or 10/18	Discussion	**Project Day:** Figures and graphs
		Online	"Year of Darwin: Aging" Steven Austed (https://www.youtube.com/watch?v=i1cahR2GLGM)
9	10/21	Lecture	Cancer and diseases of ageing
	10/23 or 10/25	Discussion	Epidemiology and demography: Water, sewers, and vaccines.
		Online	"What Elephants and Evolution Have to Teach us About Cancer" Carlo Maley (https://vimeo.com/95891382)
10	10/28	Lecture	Mismatch
	10/30 or 11/1	Discussion	**Project Day:** Group consulting day.

Week	Date	Session	Topic
		Online	“What are humans adapted for?” Daniel Lieberman
11	11/4	**EXAM 2**	
	11/6 or 11/7	Discussion	**Project Day:** Group consulting day.
		Online	
12	11/11	Lecture	Critical evolutionary medicine: Mental health and reproduction
	11/13 or 11/15	Discussion	**Project Day:** Group consulting day.
		Online	"Reproductive ecology and reproductive health" Peter Ellison (https://www.youtube.com/watch?v=Ve6T9PgnlY8).
	11/18	Lecture	Individual health and population health **Posters Due On Moodle**
13	11/20 or 11/22	Discussion	**Project Day:** Poster presentations 1
		Online	“Calling the Shots” NOVA Special
		Thanksgiving Break.	
14	12/2	Lecture	Health in a changing world
	12/4 or 12/6	Discussion	**Project Day:** Poster presentations 2
		Online	“Labor Pains and Helpless Infants: Eve or Evolution?” Holly Dunsworth
15	12/9	**EXAM 3**	
		NO DISCUSSION	