

Anth 4334/6334: Population Issues in Anthropology **3 credits (QBQI)**

Fall 2017

Instructor: Renee Pennington

Office: ST 213E

Hours: M, W after class till 11:15 and by appt.

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Anth 4334 and Anth 6334 meet together MWF 9:40 AM–10:30 AM in ST 104. Anth 6334 students should meet with me to discuss additional requirements.

If you need help with course material please see me during office hours, but you may drop by at other times to see if I am free.

I will use Canvas to post course information, including lecture notes, reading and homework assignments, and grades. Email is the best way to reach me regarding questions about the course. Please contact the campus help desk for assistance using electronic resources (801-581-4000).

Prerequisites

Anth 4334: Math 1030 or higher.

Anth 6334: Graduate standing.

Course description

This class is about the history and dynamics of the human population. Topics include changes in numbers of people and their age distributions; land use, residence patterns and density; epidemiology of pre- and post-industrial cultures; history of the human diet; the Industrial Revolution and its social and evolutionary consequences.

Course overview

A goal of the course is for students to understand that human population dynamics grow from deeply rooted instincts about competition among individuals. Traditional presentations of population issues are typically from the social point of view in which each individual is part of a coherent whole, like a cog in the wheel, and the focus is on the success of the wheel rather than the individual. A population view based on Darwinian principles suggests instead that individuals are motivated to behave in ways that benefit them rather than the group, and it is the success of the individual (or his genes) that directs changes of population. People reproduce at high rates, and contribute to overpopulation, because this is the formula for success that has worked from the beginning. I believe that successful solutions to today's population problems will come from solutions that benefit both the individual and the group, much like vaccines.

Any class about population issues requires some understanding of methods of population measurement. Toward that end students will manipulate and graph real demographic data using methods that I teach in class; students will use their findings to make inferences about broader population issues. While often the math isn't so fun and may even be frustrating, it can reveal fascinating interactions among people and resources.

Course objectives and learning outcomes

By the end of the class students will be able to

- apply anthropological research methods to answer a question or solve a problem, and
- explain aspects of human variation using evolutionary and social theory.

Over the course of a typical semester, students will learn to

- infer birth rates, historical events and family organization from graphical representations of population;
- tabulate expectation of life;
- identify basic energy and nutritional requirements of children and adults and compute macronutrient contents of foods critical to the human diet;
- predict threshold population size for spread of certain diseases; and
- identify relationships between population dynamics of the past and human variation in the present.

Teaching and learning methods

Includes lecture, homework exercises and exams. Students should bring questions about course content, readings and homework to class for discussion.

Evaluation methods and criteria

Anth 4334 students Your grade will be based on six homework assignments (time permitting) worth 60 percent of the course grade and two midterms, each worth 20 percent of the course grade. Each homework assignment will count equally toward the course grade—i.e., each will be worth 10 percent of the course grade if we fit in all 6 of the planned assignments.

The homework assignments will involve some computations about population and two or three pages of prose in which you explain the significance of the computations to a population issue in anthropology. You should approach each as you would a take home exam or a professional report for an employer.

The exams will be short answer (definitions and concepts) and multiple choice; they may include some computations that you learned from the homework.

Assume the following percentages for grades: >93 A, 90-93 A-, 87-89 B+, 83-86 B, 80-82 B-, 77-79 C+, 73-76 C, 70-72 C-, 67-69 D+, 63-66 D, 60-62 D-, and <60 Fail. I may curve the grades at the end of the semester.

Anth 6334 students In addition to Anth 4334 requirements, graduate students enrolled in Anth 6334 complete a project. The project may be a component of a student's thesis. Graduate students may enroll in an additional hour of independent study.

Due dates

The first midterm exam will be Wednesday, October 18, 2017, during class. It covers material from the first half of the semester.

The second midterm will be during the final exam period scheduled for this course, which is Tuesday, December 12, 2017, from 8–10 am in ST 104. It covers material since the second midterm.

Homework will be due approximately every two weeks. Please see list below for descriptions of the planned homework and due dates.

Late assignments and missed exams

Late homework will lose 20 percentage points. Students are required to take exams on the scheduled days. If you miss an exam, please contact me as soon as possible, preferably before the exam, about taking a makeup test so that you are not penalized. Students without a documented and compelling excuse for a missed exam will lose 20 percentage points.

Make-up work

Given the problem-based nature of the course, I don't foresee a need for makeup assignments. Please see me if you feel you need a make-up assignment.

Time commitment

A general rule of thumb is that students will need to spend about two hours outside of class for every credit hour in-class. Therefore, in addition to the time spent in class, students should plan to spend about six hours per week outside of class on readings, homework and exam preparation for this course.

Required course materials

Students can do the assignments with a hand calculator but I recommend using either a spreadsheet like Excel or a scripting language like Python to do some of the calculations.

There is no textbook to buy. All readings are either on e-Reserve at Marriott Library or retrievable from other internet sites. (See http://campusguides.lib.utah.edu/course_reserves_guide if you do not know how to access e-Reserve items). I recommend a scientific calculator.

Schedule of topics and readings

Below is a list of topics I cover in the course and readings that go with them; each topic corresponds to one of the six homework assignments. Please note that some of the readings are “how-to” sources that you will consult for information while others are items that you will want to read more carefully. I will guide you as I assign them.

We will spend about two weeks on each topic. Please keep in mind that I prefer to follow the interests and strengths of students in the class rather than a strict schedule, and I may end up shifting things around a bit and adjust the readings. Some lectures will be supplemented with extensive class notes.

1. The stable population model: What a population pyramid reveals about history. We start by going over descriptive statistics about populations. We will focus on using age-sex graphs (called population pyramids) to infer birth rates of populations and use the stable population model to test hypotheses about historical events. Topics include measures of birth and death such as the CBR (crude birth rate), the CDR (crude death rate) and age-specific death rates (ASDRs); sex ratios and the Demographic Transition.

Readings:

- (a) Clarke, L. (undated). PAPP101 - S03: How demographers think about populations: age and sex. In *Population Analysis for Policy and Programmes*. Paris: International Union for the Scientific Study of Population. Retrieve from http://papp.iussp.org/sessions/papp101_s03/PAPP101_s03_010_010.html—read and click through all 10 sections of this online module.
 - (b) Chorley, A. (undated). PAPP103 - S07: Demographic models: stable population models. 02. Introduction. In *Population Analysis for Policy and Programmes*. Paris: International Union for the Scientific Study of Population. Retrieve from http://papp.iussp.org/sessions/papp103_s07/PAPP103_s07_020_010.html—read and click through the 10 pages of the Introduction (we are not covering the entire module in class).
 - (c) Roehner, B. M. (undated). How to use population pyramids to explore the past. Retrieve from <http://www.lpthe.jussieu.fr/~roehner/pyrach1.pdf>. This is a bit esoteric but has some pretty good stuff.
2. The exponential and logistic models of population growth: The sustainability of subsistence systems. We discuss how death rates differ among technologically primitive people, peasants and farmers, pioneers, and post-industrial nations. The generic pre-industrial human experience is that roughly a

quarter of live births die in the first year of life and another quarter die between ages 1 and 15 years or so. Some insights about quality of life under varying ecologies come from models of population growth. For example, the exponential model of constant population growth rates leads rapidly to explosive population sizes while population sizes are limited by carrying capacity under the logistic model.

- (a) Langer, W. L. (1972). Checks on population growth: 1750–1850. *Scientific American*, 226(2), 92–99. Retrieve from e-Reserve at Marriott Library.
 - (b) Pennington, Renee. (2017). Some notes on population growth. (Detailed class notes.)
 - (c) Optional: Timaeus, I. (undated). PAPP101 - S10: Population projections: concepts and methods. In *Population Analysis for Policy and Programmes*. Paris: International Union for the Scientific Study of Population. Retrieve from http://papp.iussp.org/sessions/papp101_s10/PAPP101_s10_010_010.html. This has some good stuff in it, but it uses non-standard notation and may be a bit confusing.
 - (d) Additional readings TBA.
3. Population expansion and the human diet. This section focuses on the earliest, dramatic expansion of population size associated with vast changes in the human diet. Following the advent of plant and animal domestication (which began roughly 10,000 years ago), farmers apparently displaced hunter-gathers throughout Europe. Of particular interest is the success of dairying cultures possessing lactase persistence alleles driving the sweep. Topics include human nutritional requirements, energy balance, Atwater factors, energy content of exemplar foods and food preferences.

Readings:

- (a) Fung, Ellen B., and Stallings, Virginia A. (2003). "Nutrition." *Encyclopedia of Food and Culture*. Encyclopedia.com. Retrieve from <http://www.encyclopedia.com/science-and-technology/biochemistry/biochemistry/nutrition>.
 - (b) Gadsby, P. (Oct. 1, 2004). The Inuit Paradox. *Discover Magazine*. Retrieve from <http://discovermagazine.com/2004/oct/inuit-paradox>. Also on e-reserve at Marriott Library.
 - (c) Curry, A. (2013). The milk revolution. *Nature*, 500, 20–22. Retrieve from e-Reserve at Marriott Library.
 - (d) Optional: Cochran, G., and H. Harpending. (2009). Pp. 173–186 in *The 10,000 Year Explosion*. New York: Basic Books. Retrieve from e-Reserve at Marriott Library.
4. The Kermack McKendrick Model of disease transmission: why diseases in large populations differ from those of small. We discuss reproductive strategies of pathogens and their transmission and dynamics in humans. Basic threshold (Kermack-McKendrick) models of disease transmission predict that macroparasites (e.g. helminthes, plasmodia) were the primary sources of disease in the past and that the transition to farming communities with larger population led to more virulent microparasitic (e.g. measles, influenza, tuberculosis, polio, small pox) infections.
- (a) Aron, J. L. (2007). Mathematical modeling: The dynamics of infection. In K. E. Nelson & C. M. Williams (Eds.), *Infectious disease epidemiology: Theory and practice* (2nd ed.). (pp. 181-211). Sudbury, Mass.: Jones & Bartlett Publishers. This chapter describes the Kermack-McKendrick model and includes some examples of applications. Retrieve from e-Reserve at Marriott Library.
 - (b) Diamond, J. (1992, October). Arrow of disease. *Discover magazine*. Retrieve from <http://discovermagazine.com/1992/oct/thearrowofdiseas137>. Also on e-Reserve at Marriott Library.

5. What geographic history predicts about health: The the Black–White mortality Crossover, the Hispanic and other so-called health paradoxes. We examine group differences in survivorship and discuss theories about how the human past may be related to variation in disease risk among diverse geographic groups.

Readings:

- (a) Moultrie, T. (undated). PAPP101 - S06: Mortality statistics and standardisation. 01–04. In *Population Analysis for Policy and Programmes*. Paris: International Union for the Scientific Study of Population. Retrieve from at http://papp.iussp.org/sessions/papp101_s06/PAPP101_s06_040_010.html—read and click through the first four sections of this module (we are not covering the entire module in class).
 - (b) Sloggett, A. (undated). PAPP101 - S07: Life Tables (I). In *Population Analysis for Policy and Programmes*. Paris: International Union for the Scientific Study of Population. Retrieve from http://papp.iussp.org/sessions/papp101_s07/PAPP101_s07_010_010.html—read and click through all sections of this module.
 - (c) Lamare, J. (Dec. 2, 2012). Latino Life Expectancy: Exploring the Hispanic Paradox. Hispanic Link News Service. Retrieve from <http://newamericamedia.org/2012/12/latino-life-expectancy-exploring-the-hispanic-paradox.php#>
 - (d) Wheelwright, J. (May 1, 2005). Native America’s Alleles. *Discover Magazine*. Retrieve from <http://discovermagazine.com/2005/may/native-americas-alleles>. Also on e-reserve at Marriott Library.
 - (e) Wheelwright, J. (March 1, 2005). Human, study thyself. *Discover Magazine*. Retrieve from <http://discovermagazine.com/2005/mar/human-study-thyself>. Also on e-reserve at Marriott Library.
 - (f) Cell Press. (2016). “Europeans and Africans have different immune systems, and Neanderthals are partly to thank.” Retrieve from <https://phys.org/news/2016-10-europeans-africans-immune-neanderthals-partly.html>
 - (g) Optional: Pennington, R. *et al.*, (2009). Group differences in proneness to inflammation. *Infection, Genetics and Evolution*, 9(6), 1371–1380. Retrieve from e-reserve at Marriott Library.
6. The Industrial Revolution and health. The run-up to it in Europe was characterized by social changes and genetic changes associated with profound differences in the reproductive success of social groups. Topics include overpopulation in the countryside, the “age of seduction” in cities, and horrific urban mortality.
- (a) Sloggett, A. (undated). PAPP101 - S08: Life Tables (II). In *Population Analysis for Policy and Programmes*. Paris: International Union for the Scientific Study of Population. Retrieve from http://papp.iussp.org/sessions/papp101_s08/PAPP101_s08_010_010.html.
 - (b) Mann, Charles C. How the Potato Changed the World. *The Smithsonian Magazine*. November 2011. Retrieve from <http://www.smithsonianmag.com/history/how-the-potato-changed-the-world-108470605/>. Also on e-Reserve at Marriott Library.
 - (c) Langer, W. L. (1963). Europe’s initial population explosion. *The American Historical Review*, 69(1), 1–17.

Tentative list of homework problems

Time permitting, there will be six homework assignments. Below is a brief description of each and its expected due date. Please note that I may need to modify the assignments and the due dates if we get behind in the class.

You must upload your assignment to Canvas by the due date, or submit a paper copy at the beginning of class, to avoid the 20 percent late penalty.

1. Identify anomalies in population pyramids and investigate hypotheses about the historical or social events that caused them. (Due approx. Sept. 8, 2017.)
2. Compute statistics about population growth using logistic and exponential models of population growth; apply concepts of doubling time and carrying capacity to sustainability. (Due approx. Sept. 22, 2017.)
3. Compute energy values of foods and nutritional requirements of families; relate variation in subsistence systems to human gene variation, nutritional disease and land use. (Due approx. Oct. 6, 2017.)
4. Given a set of disease parameters, such as transmission rates, population size and recovery/death rates, predict the spread of infectious disease in a community; relate principles of disease transmission dynamics to variation in gene defenses against pathogens. (Due approx. Nov. 3, 2017.)
5. Compute survivorship from age-specific rates of death; describe the cause(s) of group differences in health. (Due approx. Nov. 17, 2017.)
6. Compute expectation of life from survival rates of historical Europeans; describe the consequences of profound differences in reproductive success to population composition. (Due approx. Dec. 6, 2017.)

Boiler Plate Items

A note about the University of Utah

“As the only institution in the state classified in the highest research category (R1), at the University of Utah you will have access to state-of-the-art research facilities and be able to be part of the knowledge creation process. You will have the opportunity to do research of your own with faculty who are leading experts in their field, engaging in programs that match your research interests. Further, you will interact with and often take classes with graduate students that provide an advanced understanding of the knowledge in your field.”

Faculty and student responsibilities

Please respect everyone’s right and expectation to learn in the classroom. This means all of us should engage in respectful discussion with each other during class time and avoid behaviors that distract others.

You are responsible for making sure I receive assignments before the deadline and that you can access readings and other course materials well before you need them.

The University expects regular attendance at all class meetings. If you must miss a class, be sure to find out what you missed; you should get lecture notes from another student in the class and check the class website for reading assignments, lecture notes and homework.

University and department policies

ADA Statement: The Americans with Disabilities Act. The University of Utah seeks to provide equal access to its programs, services, and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin

Union Building, (801) 581-5020. CDS will work with you and the instructor to make arrangements for accommodations. All written information in this course can be made available in an alternative format with prior notification to the Center for Disability Services.

Addressing Sexual Misconduct: Title IX makes it clear that violence and harassment based on sex and gender (which includes sexual orientation and gender identity/expression) is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, color, religion, age, status as a person with a disability, veteran's status or genetic information. If you or someone you know has been harassed or assaulted, you are encouraged to report it to the Title IX Coordinator in the Office of Equal Opportunity and Affirmative Action, 135 Park Building, 801-581-8365, or the Office of the Dean of Students, 270 Union Building, 801-581-7066. For support and confidential consultation, contact the Center for Student Wellness, 426 SSB, 801-581-7776. To report to the police, contact the Department of Public Safety, 801-585-2677(COPS).

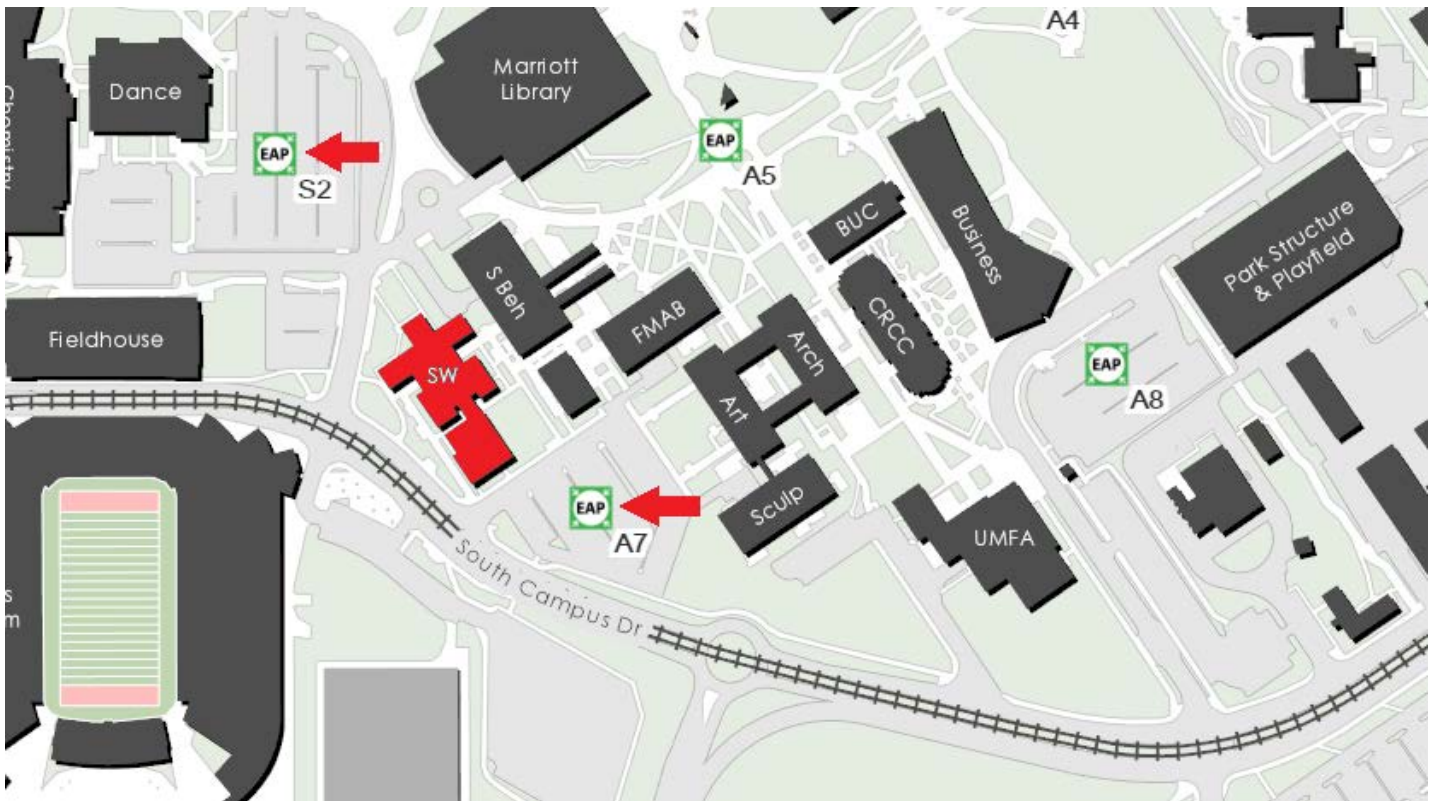
Wellness Statement: Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness (<http://www.wellness.utah.edu>; 801-581-7776).

Student Code: (Policy 6-400) All students are expected to maintain professional behavior in the classroom setting, according to the Student Code (<http://regulations.utah.edu/academics/6-400.php>). Students have specific rights in the classroom as detailed in S. II of the Code. The Code also specifies standards of behavior (S. III) and academic conduct (S. V). "Students must adhere to generally accepted standards of academic honesty, including but not limited to refraining from cheating, plagiarizing, research misconduct, misrepresenting one's work, and/or inappropriately collaborating" (S. VB). According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors. Students have the right to appeal such action to the Student Behavior Committee.

Incomplete Policy: An "I" will only be given for work not completed because of circumstances beyond the student's control, providing the student is passing the course and needs to complete 20% or less of the work. Valid reasons for an "I" grade include: (a) An illness (documented by a medical statement) that precludes the ability of the student to perform; (b) an accident or situation that prevents the student from physically being present (documentation may be required); (c) Extreme emotional or other mental circumstances that are severe enough to interfere with a student's normal academic performance. If you do receive an "I", do not register for the course again. You must complete the required work in the time agreed by you and the instructor. If the work is not completed within one year, the grade will change to an "E". Faculty will not accept additional work to change the grade after that one-year period. If a student has a problem with the course, please deal with it immediately. It is the student's responsibility to contact instructors and submit necessary forms.

Note: The syllabus is not a binding legal contract. It may be modified by the instructor when the student is given reasonable notice of the modification.

CSBS EMERGENCY ACTION PLAN



BUILDING EVACUATION

EAP (Emergency Assembly Point) – When you receive a notification to evacuate the building either by campus text alert system or by building fire alarm, please follow your instructor in an orderly fashion to the EAP marked on the map below. Once everyone is at the EAP, you will receive further instructions from Emergency Management personnel. You can also look up the EAP for any building you may be in on campus at <http://emergencymanagement.utah.edu/eap>.



CAMPUS RESOURCES

U Heads Up App: There's an app for that. Download the app on your smartphone at alert.utah.edu/headsup to access the following resources:

- **Emergency Response Guide:** Provides instructions on how to handle any type of emergency, such as earthquake, utility failure, fire, active shooter, etc. Flip charts with this information are also available around campus.
- **See Something, Say Something:** Report unsafe or hazardous conditions on campus. If you see a life threatening or emergency situation, please call 911!

Safety Escorts: For students who are on campus at night or past business hours and would like an escort to your car, please call **801-585-2677**. You can call 24/7 and a security officer will be sent to walk with you or give you a ride to your desired on-campus location.