Human Population Biology BIO A 382

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Scope: This course is an introduction to human population biology including human population dynamics, the interplay between biology and ecology, and genetic variation of human populations. The emphasis is on developing a qualitative understanding of human population processes using quantitative models of biocultural processes. The focus of the course is on the population biology of small-scale societies.

Classes: Tuesday and Thursday, 4:30 to 5:50 p.m. in 411 Balmer Hall.

Office hours: Tuesday and Thursday after class. Other times can be arranged. You can also use email (at the address listed above) to contact me with questions and comments, or to set up appointments.

Readings: There is no text book for this course, *per se*. Instead there are a number of papers and book chapters that you must read. The readings are listed on the course schedule below, and are on electronic reserve. Please complete readings by the begining of the week to which they pertain. This will help you understand the lecture material and will allow us to discuss the material intelligently.

Grading: Your course grade will be based on four problem sets worth 15% each (60% total) and a final exam (40%).

Problem sets: The problem sets will include some analytical problems as well as short written answers. I encourage you to work in groups on the problems, and you are free to use any books, readings, or notes to work on the problems. If you work in a group, use the opportunity to ensure a complete understand the problems— you will see similar problems on the final exam. In part, the problem sets test your ability to do the work in a limited amount of time. Therefore, grades for **late problem sets will depreciate by 10% per day**, including any fraction of a day late. For example, if you would have gotten a 95% on the problem set, it depreciates to 85.5% for being one day late, 77% by for 2 days late, and so on. Problem sets are due by the beginning of the class period, one week after being handed out.

Exam: A final exam will cover the entire course. The exam will be worth 40% of your grade, and will be made up of two parts. The first part will be short essay questions covering concepts and ideas that we discussed throughout the quarter, and the second part will be numeric problems. The format will be much like the problem sets. The exam will be held in the classroom on Friday, 16 Mar 2001 from 4:30 to 6:20 p.m.

Readings

Coale AJ (1974) The history of the human population. *Scientific American* September.

Gage TB (1988) Bio-mathematical approaches to the study of human variation in mortality. *Yearbook of Physical Anthropology* **32**:185-214.

Ginzburg LR and Golenberg EM (1985) *Lectures in theoretical population biology*. Englewood Cliffs, New Jersey: Prentice-Hall.

Keyfitz N (1985) How do we know the facts of demography? Applied Mathematical Demography. Second edition. New York: Springer-Verlag. pp 400-418.

Mosley WH and Chen LC (1984) An analytical framework for the study of child survival in developing countries. In Mosley W and Chen LC eds., *Child Survival Strategies*. London: Cambridge University Press. pp. 25-45.

Wood JW (1990) Fertility in Anthropological Populations. *Annual Reviews of Anthropology* **19**:211-42.

Wood JW (1998) A theory of preindustrial population dynamics. *Current Anthropology* **39**:99-134.

Wood JW, Weeks SC, Bentley GR, and Weiss KM (1994) Human population biology and the evolution of aging. In Crews DE and Garruto RM eds., *Biological Anthropology and Aging: Perspectives on Human Variation over the Life Span*

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Topics and schedule

Week 1 (Jan 2, 4): Introduction to human population biology

Variation within and among populations. The lifecourse view. Populations vs. medical views of human biology. Views on an evolutionary time scale. Mathematical models of biocultural processes.

Readings: Keyfitz (1985)

Week 2 (Jan 9, 11): The structure of human populations

Vital statistics. Past and present human population sizes. The age structure of populations.

Readings: Coale (1974)

Problem set 1 distributed.

Week 3 (Jan 16, 18): Population genetics I

The genetic basis of evolution. Hardy-Weinberg. Natural Selection

Readings: Ginzburg and Golenberg (1985) pp 7-43.

Problem set 1 due.

Week 4 (Jan 23, 25): Population genetics II

Mutation. Migration. Inbreeding.

Readings: Ginzburg and Golenberg (1985) pp 47-77.

Problem set 2 distributed.

Week 5 (Jan 30, Feb 1): Population genetics III

Genetic drift. Neutral evolution.

Readings: Ginzburg and Golenberg (1985) pp 81-115.

Problem set 2 due.

Week 6 (Feb 6, Feb 8): Population growth and regulation

Models of population growth and regulation. Density dependent population regulation.

Readings: Ginzburg and Golenberg (1985) pp 117-139, Wood (1998)

Problem set 3 distributed.

Week 7 (Feb 13, 15): Human fertility

Birthspacing and the reproductive span. Natural fertility. The proximate determinants of fertility. Reproductive aging and post-reproductive life.

Readings: Wood (1990)

Problem set 3 due.

Week 8 (Feb 20, 22): Human aging and mortality

Models of human senescence. The biology of human longevity. Models of mortality (Guest Lecture by Dr. O'Connor).

Readings: Wood et al. (1994), Gage (1988)

Problem set 4 (20%) distributed.

Week 9 (Feb 27, Mar 1): Disease ecology

Infectious disease. Effects of population clustering and size on disease transmission and maintenance. Immune function and disease (Guest lecture by Dr. Shell-Duncan).

Readings: Mosley and Chen (1984)

Problem set 4 due.

Week 10 (Mar 6, 8): Extentions and elaborations