This course builds on students’ previous demographic research training in three ways. We derive and develop the continuous-time extension of lifetable quantities. We grow the state-space in which we work and the types of possible transitions we consider. We cover a series of additional demographic models that reveal (1) how populations change as a function of the interaction of multiple demographic processes, (2) how aggregate population change and individual lifecourse experiences are connected, and (3) how demographic phenomena can be modeled in the absence of perfect information. Throughout the semester, we will consider how knowledge in the social sciences can be advanced with the tools of formal demography. As a secondary goal, the course is designed to augment students’ data acquisition, management, and visualization skills through application of these methods in real-world inquiry.

Prerequisite: Sociology 674 or discussion with instructor.

Required Texts:


Additional readings can be found through jstor.org, Google Scholar, and the UW-Madison MadCat system. Note: students should not need to pay for these.

CDE:

Soc 756 students are encouraged to attend the weekly Center for Demography and Ecology Seminars, held Tuesdays: 12:15-1:30 in 4308 Sewell Social Sciences. [http://www.ssc.wisc.edu/cde/demsem/home.htm](http://www.ssc.wisc.edu/cde/demsem/home.htm). On occasion, we will allocate a portion of Thursday seminars to a discussion of methods used in the presentations.

Computing:

All of the problem sets for this class should be completed in R. R is more powerful than Excel for dynamic modeling. It is also the dominant programming language used by demographers; you will
find a great deal of shared code that facilitates more complex demographic analysis. Knowledge of R will augment your ability to efficiently answer a wide range of research questions and effectively communicate your research findings. This has value for securing research jobs within and beyond the academy. Please submit programs with problem sets. If you have not yet used R, do not fear! You are not alone in this class. We will start slowly and build each week. Download R here: https://cran.r-project.org and R Studio here: https://www.rstudio.com. Please plan to attend the Intro to R session taught by the SSC staff. Then work through the short chapters 5, 3, 4, and 10-12, in that order, of Wickham and Grolemund 2017.

Evaluation:

Grades will be based on 12 problem sets (35%) and two exams (exam 1: 30%, exam 2: 35%). Problem sets will be posted to our canvas page Wednesdays at 5pm. They should take between 4 and 8 hours (including learning new R code) and are due the following Tuesday at the beginning of class. It is acceptable, even advisable, to work in groups on problem sets. You are responsible for turning in your own work. You are strongly encouraged to make sure you understand anything produced in partnership with classmates.

Extra credit (up to 5%): Adapting Demographic Methods to the Study of Complexity in Human Populations. We will discuss this critical-thinking, writing assignment in class on February 7. 2,000-3,000 words. Due May 3rd, uploaded to the Canvas page.

Anticipated Course Schedule:

**January 22: Why Demographic Methods?**
Healy. Chapter 1.

**January 24: Age-Specific Rates and Probabilities, Standardization, Decomposition**
Preston et al. Chapter 2
Ottolinger, P. LexisPlotR.

**January 29, 31: Single Decrement Processes**
Preston et al. Chapter 3
Healy. Chapter 2 & 3

**February 5, 7: Modeling Mortality & Variance**

Healey. Chapter 4.


Pages 78-85, 103-109, 153-167.


**February 12, 14: Multiple Decrement Processes**

Preston et al. Chapter 4


**February 19, 21: Increment Decrement Processes**

Preston et al. Chapter 12


**February 26, 28: Measuring and Modeling Fertility, Demographic Translation**

Preston et al. Chapter 5


March 5, 7, 9: Population Projection and Models of Renewal

March 14: Midterm exam

March 19-26: No class. Spring Recess.

March 28, April 2, 4: The Stable Population Model, Population Momentum

April 10: Introduction to Variable-r
Preston et al. Chapter 8

April 12. No class. Population Association of America meetings
Attend sessions or read about new research [here](#)
Post on the Canvas discussion board.

April 16, 18: Estimating Demographic Quantities from Multiple Sources
Preston at al. Chapter 9
Healy Chapter 8


**April 23, 25: Population Selection and Lagged Selection Bias**

*Wickham and Grolemund Chapter 28.*


**April 30, May 2: Population Dynamics and Kinship Structure**


**Final Exam** (cumulative): To take place between 5/6-5/9. Date to be discussed in class.