

The Hebrew University of Jerusalem

Syllabus

Demographic Models - 53925

Last update 28-02-2022

HU Credits: 4

Degree/Cycle: 2nd degree (Master)

Responsible Department: Sociology & Anthropology

Academic year: 0

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: Mt. Scopus

Course/Module Coordinator: Barbara Okun

Coordinator Email: barbara.okun@mail.huji.ac.il

Coordinator Office Hours: by appointment

Teaching Staff:

Prof Barbara Okun

Course/Module description:

The purpose of this course is to introduce students to mathematical tools for understanding population processes and to present models for the analysis of demographic data. We will discuss the application of demographic models to areas such as fertility, marriage, divorce and mortality.

The course assumes basic understanding of probability and statistics

Course/Module aims:

The purpose of this course is to introduce students to mathematical tools for understanding population processes and to present models for the analysis of demographic data.

Learning outcomes - On successful completion of this module, students should be able to:

- Compute and interpret demographic rates
- Construct and analyze forms of life tables
- Apply the concepts of weak and strong ergodicity to population processes
- Analyze the structure and characteristics of stable populations and their change
- Construct and analyze alternative measures and models of fertility
- Apply statistical models (such as survival models) to demographic data

Attendance requirements(%):

Teaching arrangement and method of instruction: Lectures, discussions

Course/Module Content:

Sources of Demographic Data
The Balancing Equation for Populations
Exponential Population Growth
Cohorts and Periods
Rates and Probabilities

Life Tables
Cohort Life Tables
Period Life Tables

Stable Population Theory

Weak ergodicity

Strong ergodicity

Stable Age Distributions

Sources of Error in Demographic Data; Age Misreporting

Model Life Tables and Model Stable Populations

More on Life Tables

Multiple Decrement Life Tables

Mathematics and the Life Table

Heterogeneity and the survival curve

Measures of Fertility

Review of Basic Measures

Bongaarts' Decomposition of Fertility into Proximate Determinants

Timing Effects on Measures of Period Fertility

Selected Topics in Statistics for Demographers

Hazard Models

Logistic Regression Models

Required Reading:

Sources of Demographic Data:

Carmichael, G. A. 2016. Fundamentals of Demographic Analysis: Concepts, Measures, and Methods Springer. Chapter 1, pp. 4-19.

Population Growth:

Wachter, K. 2014. Essential Demographic Methods. Harvard University Press Chapter 1, pp. 5-26.

Preston, S. and Y.C. Vierboom. 2021. "The Changing Age Distribution of the United States" Population and Development Review, 47(2):527-539.

Periods and Cohorts as Concepts: Wachter, K. 2014. Essential Demographic Methods. Harvard University Press Chapter 2, pp. 30-46.

Life Tables:

Weinstein, J. and V.K. Pillai. 2000. Demography: The Science of Population. Boston: Allyn and Bacon. Chapter 9, "The Life Table: An Introduction" pp. 261-293.

Stable Population Theory:

Wachter, K. 2014. *Essential Demographic Methods* Cambridge, MA: Harvard University Press . Chapter 10, pp. 218-249.

Model Life Tables and Model Stable Populations:

Hinde, A. 1998. *Demographic Methods* London: Arnold. Chapter 14, "Applications of Stable Population Theory" pp. 176-189.

Measures of Fertility:

Wachter, K. 2014. *Essential Demographic Methods*. Cambridge, MA: Harvard University Press. Chapter 7, pp. 125-150

Bongaarts, John and Griffith Feeney, 1998, "On the Quantum and Tempo of Fertility", *Population and Development Review* 24(2):271-291.

van Imhoff, Evert and Nico Keilman, 2000, "On the Quantum and Tempo of Fertility: Comment", *Population and Development Review* 26(3):549-553.

Bongaarts, John and Griffith Feeney, 2000, "On the Quantum and Tempo of Fertility: Reply", *Population and Development Review* 26(3):560-564.

Goldstein, J. et al 2009. "The End of Lowest-low Fertility?". *Population and Development Review* 35(4):663-699.

Bongaarts, J. and Sobotka, T. 2012. "Demographic Explanations for the Recent Rise in European Fertility". *Population and Development Review* 38(1):83-120.

****Exact reading list is subject to change. In general, feel free to read chapters from the Carmichael and Wachter textbooks. Both are excellent references for these materials, and are available as e-books via the University library system.**

Additional Reading Material:

Course/Module evaluation:

End of year written/oral examination 70 %

Presentation 0 %

Participation in Tutorials 0 %

Project work 0 %

Assignments 30 %

Reports 0 %

Research project 0 %

Quizzes 0 %

Other 0 %

Additional information:

If it will not be possible to administer the exam in class, there will be a take-home exam.