

Course description

Bayesian Statistics

1. Course name, ECTS, quarter/semester, contact hours

Bayesian Statistics, 5 ECTS, 3rd quarter (Spring Semester), 48 contact hours

2. Author of the course

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3. Outline

Bayesian Statistics is a rapidly developing field of statistics, which has many useful applications in various areas of comparative social research. The goal of this course is to provide a brief introduction to the theory and application of Bayesian statistical methods. The course begins with basic concepts of Bayesian statistics. Then we consider the general approach to the estimation and assessment of Bayesian models. Because of the focus of the master program on comparative studies, we then will discuss applications of Bayesian modelling to specific tasks arising in cross-cultural research, including such topics as multilevel/hierarchical analysis, Bayesian structural equation modelling (BSEM), multilevel BSEM, and Bayesian approximate measurement invariance. In the end of the course, several advanced applications of Bayesian analysis are highlighted, such as informative hypothesis testing, multiple imputation and simulation-based approach to model interpretation.

4. Structure and content

No	Theme
1	Introduction. Basic Concepts of Bayesian analysis
2	General Principles of Bayesian Inference. Priors and Likelihood
3	Estimating Bayesian Model: choice of sampling algorithm, assessment of model fit, model comparisons
4	Bayesian Hierarchical Analysis
5	Bayesian Structural Equation Modelling
6	Bayesian Approximate Measurement Invariance
7	Informative hypothesis testing
8	Multiple Imputation. Simulation
	Total

5. Prerequisites

Students are assumed to have basic knowledge of statistics and be familiar with several conventional statistical methods, including regression analysis and factor analysis. Knowledge of advanced topics, such as multilevel analysis, structural equation modelling (SEM), or maximum-likelihood estimation, is helpful, but not critical.

6. Assessment

- ✓ home assignments (cumulative grade - 60%)
- ✓ final project presentation (40%)
- ✓ participation/attendance: If unexcused absences are greater than two, then final grade =
(final project grade) + (cumulative grade) x (attended weeks / total weeks)
- ✓ Late assignments will be graded down.
- ✓ If you plagiarize, you will fail. You may not recycle papers used in other classes.