

Georg-August-Universität Göttingen Module B.WIWI-QMW.0019: Advanced Statistical Inference (Likelihood & Bayes)	6 C 4 WLH
Learning outcome, core skills: Upon completion of the module, the students have acquired the following competencies: • foundations and general properties of likelihood-based inference in statistics, • bayesian approaches to statistical learning and their properties, • implementation of both approaches in statistical software using appropriate numerical procedures.	Workload: Attendance time: 56 h Self-study time: 124 h
Course: B.WIWI-QMW.0019.Lec Advanced Statistical Inference (Likelihood & Bayes) (Lecture) <i>Contents:</i> The likelihood function and likelihood principles, maximum likelihood estimates and their properties, likelihood-based tests and confidence intervals (derived from Wald, score, and likelihood ratio statistics), expectation maximization algorithm, Bootstrap procedures (estimates for the standard deviation, the bias and confidence intervals), Bayes theorem, Bayes estimates, Bayesian credible intervals, prior choices, computational approaches for Bayesian inference, model choice, predictions	2 WLH
Course: B.WIWI-QMW.0019.Ex Advanced Statistical Inference (Likelihood & Bayes) (Exercise) <i>Contents:</i> likelihood function and likelihood principles, maximum likelihood estimates and their properties, likelihood-based tests and confidence intervals (derived from Wald, score, and likelihood ratio statistics), expectation maximization algorithm, Bootstrap procedures (estimates for the standard deviation, the bias and confidence intervals), Bayes theorem, Bayes estimates, Bayesian credible intervals, prior choices, computational approaches for Bayesian inference, model choice, predictions	2 WLH
Examination: Written examination (90 minutes) or oral examination (approx. 20 minutes) B.WIWI-QMW.0019.Mp: Advanced Statistical Inference (Likelihood & Bayes)	6 C
Examination requirements: The students demonstrate their general understanding of likelihood-based and Bayesian inference for different types of applications and research questions. They know about the advantages and disadvantages as well as general properties of both approaches, can critically assess the appropriateness for specific problems, and can implement them in statistical software. The exam covers contents of both the lecture and the exercise class.	
Admission requirements: none	Recommended previous knowledge: B.WIWI-QMW.0015 Mathematics for Economics

	B.WIWI-QMW.0016 Statistics and Data Science 1: Basics of Applied Statistics
Language: English	Person responsible for module: Prof. Dr. Thomas Kneib
Course frequency: each winter semester	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester: 4 - 5
Additional notes and regulations: The actual examination will be published at the beginning of the semester. The module cannot be taken if the module M.WIWI-QMW.0002 Advanced Statistical Inference (Likelihood & Bayes) has already been successfully completed.	