Georg-August-Universität Göttingen **Module M.WIWI-QMW.0037: Advanced Bayesian Inference**	6 C 4 WLH

Learning outcome, core skills: The students: • learn about the computational challenges of and approaches to Bayesian inference, • get familiar with both simulation-based and approximate solutions to perform Bayesian inference, • learn how to utilize Bayesian inference for complex types of statistical models.	**Workload:** Attendance time: 56 h Self-study time: 124 h

Course: M.WIWI-QMW.0037.Lec **Advanced Bayesian Inference** (Lecture) *Contents*: • Principles of Bayesian inference, • Markov chain Monte Carlo (MCMC) simulation techniques, • constructing sensible proposal distributions for MCMC, • constructing prior distributions, • model diagnostics and model criticism, • approximate forms of Bayesian inference, • variational Bayes inference, • Reversible jump MCMC, • Bayesian inference for semiparametric regression models.	2 WLH
Course: M.WIWI-QMW.0037.Ex **Advanced Bayesian Inference** (Exercise) *Contents*: In the context of the supporting exercise, the students deepen and expand the knowledge and skills acquired in the lecture.	2 WLH
Examination: Written examination (90 minutes) or oral examination (approx. 20 minutes) or software project including term paper (max. 10 pages) M.WIWI-QMW.0037.Mp: Advanced Bayesian Inference	6 C

Examination requirements: The students demonstrate their advanced understanding of Bayesian inference for different types of statistical models. They know about the advantages and disadvantages as well as general properties of Bayesian inference, can critically assess the appropriateness for specific problems, and can implement them in statistical software.	

Admission requirements: none	**Recommended previous knowledge:** M.WIWI-QMW.0001 Generalized Regression M.WIWI-QMW.0002 Advanced Statistical Inference (Likelihood & Bayes) M.WIWI-QMW.0011 Advanced Statistical Programming with R M.MED.0001 Linear Models and their Mathematical Foundations

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:** 3