Module P.GRK2300.D5:
Statistical Modeling and Advanced Regression Analyses
(2024)

Module content (according to the module catalogue)

Learning outcome core skills
The PhD students are familiar with various types of advanced regression models and possibilities to identify the most appropriate model for a given research question. They can apply the chosen model in the statistical software R, check the adequacy and validity of the model, and interpret the results they have achieved.

Course: *Statistical modelling and advanced regression analyses*
Contents: Generalized linear models, mixed models, spatial regression models, generalized additive models, quantile regression, Bayesian and likelihood-based inference, structured additive regression
Literature: Fahrmeir, Kneib, Lang, Marx (2013): Regression – Models, Methods and Applications, Springer.

Examination: Oral Presentation (approx. 20 minutes)
Examination requirements: The students demonstrate their ability to choose, apply, check and interpret advanced regression modelling techniques in a scientific project. The results of their statistical analyses are presented in a final colloquium where the students also demonstrate their ability to discuss their results with their fellow students.

Lecturers:	Prof. Thomas Kneib (Chairs of Statistics and Econometrics), Dr. Holger Sennhenn-Reulen (NW-FVA) Alejandro Pereira Jens Lichter
Dates:	October 18, 2024 (Pre-Meeting) November 21 & 22, 2024 (Generalized Linear Models) December 5 & 6, 2024 (Mixed Models) January 23 & 24, 2025 (Spatial Statistics and Flexible Regression) February 21, 2025 (Project Presentations)
Place	Seminar room 0.104, Humboldtallee 3
Credits:	2 ECTS (attendance of at least 80 % and project presentation on February 21, 2025)

Language of instruction is English

Teaching concept of the course

- Mix of short lecture and discussion components with project-based work on your own data
- Participants can work either alone or in pairs on their respective projects.
- For the pre-meeting on October 18th, each (group of) participant(s) should prepare a project idea which they would like to work on during the course. Each project comprises a data set/collection and

the planned analyses. For example, projects could be based on the data and analyses of the first/second cohort, an own data collection, a published paper that includes data for reproducibility, or other data sources. The corresponding data and first plans for analyses should be presented at the pre-meeting (10 minutes presentation plus 5 minutes discussion for each project).

- There will be three thematic blocks, each consisting of a short introductory lecture, work on the projects (with the possibility of having discussions and feedbacks with the supervisor(s) of the course), and intermediate group discussions and additional background information.
- The final part of the course will consist of project presentations (20 minutes plus 10 minutes discussion for each project) on the achievements from the course.

Registration: Please send an email to serena.mueller@forst.uni-goettingen.de by July 15, 2024. As seats are limited, please register as soon as possible.
If you get a seat in the course, please submit a short description of your planned project (and whether you will work on the project on your own or together with one of your peers) by Friday, September 27. This will help us to make a schedule for the pre-meeting.