



## DEPARTMENT OF EDUCATION AND SPECIAL EDUCATION

### **QRM1802 Regression analysis in educational research, 7.5 credits**

Regressionsanalys i utbildningsvetenskaplig forskning , 7,5 högskolepoäng

*Third-cycle level / Forskarnivå*

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#### **Confirmation**

This syllabus was confirmed by the Department of Education and Special Education on 2018-06-20, and was last revised on 2023-09-27. The revised course syllabus is valid from Spring semester 2024.

#### ***Responsible Department***

Department of Education and Special Education, Faculty of Education

#### **Entry requirements**

For admission to the course, the applicant has to be registered as a doctoral student in the third cycle or have a doctoral degree. The applicant should also have documented prior knowledge corresponding to the learning goals in the basic course QRM1800 "Basic statistics for educational research, 7,5 credits", or similar.

#### **Learning outcomes**

The main purpose of the course is to provide an introduction to regression analysis and how different regression techniques can be applied to educational science issues. The course also aims at developing the participants' ability to critically review educational research using different regression techniques. Upon completion of the course, the participants should be able to:

#### ***Knowledge and understanding***

- Describe different applications of regression techniques and their fundamental assumptions.
- Understand the basic principle of the least squares method and the maximum likelihood method.
- Explain the basic concepts used in regression analysis, such as dependent and independent

variables, explained variance, residuals, bias, multicollinearity, probability and odds ratio.

### ***Competence and skills***

- Prepare data and conduct multiple regression and logistic regression using the statistical program SPSS.
- Specify different regression models in order to test hypotheses, and evaluate basic assumptions on which the model is based.
- Describe, discuss and interpret results orally and in writing in accordance with the publication standards.

### ***Judgement and approach***

- Reflect on the pros and cons of regression methods compared to other quantitative approaches.
- Critically review scientific publications that have applied regression methods.
- Reflect on applicable questions of research ethics and related decisions

## **Course content**

The course introduces basic principles and techniques of regression analysis. These techniques aim, on the one hand, at examining causal relationship between a set of explanatory variables and an outcome variable, and at predicting the outcome with the explanatory variables on the other hand. Theoretical foundations and practical applications of these regression analyses will be introduced with examples from the educational sciences. Depending on the measurement level of the outcome variable, the course focuses on two different types of regression models, namely, linear regression analysis in which the dependent variable is continuous, and logistic regression analysis where the dependent variable is binary. Thereafter, the different concepts, techniques and procedures in the regression analytical process, such as, theoretical motivation, model specification, data inspection and variable transformation, estimation, hypothesis and assumption testing, and model evaluation and interpretation, will be described and trained upon. Reporting of the model results according to the publication standard will also be emphasized.

## **Types of instruction**

The course starts with two and half days of on-campus lectures and hands-on training in applying statistical analyses on educational data with the statistics software SPSS. After the on-campus meeting, the course continues as an on-line course, with lectures, assignments and seminars over the internet and GU's learning platform.

Course participants are expected to take responsibility for their own learning, independently and together with peer students, by reading the course literature and actively participate in seminars and group work, and by performing the practical exercises and complete the tasks that are assigned by the course leader.

### ***Language of instruction***

The course is given in English.

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## Grades

The grade Pass (G) or Fail (U) is given in this course.

The grade Pass (G) or Fail (U) is given in this course. Pass (G) indicates that the learning goals have been achieved.

## Types of assessment

The course is examined by various theoretical and practical assignments continuously during the course, and a final written report, in which statistical analyses is applied to educational data and the results are presented, interpreted, and discussed. A pass grade requires active participation in seminars and workshops, and attendance in all mandatory tasks.

## Course evaluation

The course will be evaluated after the course. The results will be used as advice for improving of the course.

## Other information

This is a third-cycle course and a basic course within the national school of Quantitative Research Methods in education (QRM) for researchers. More information about QRM is available at [www.qrm.gu.se](http://www.qrm.gu.se).

### *Collaborating departments*

Department of Education and Special Education, University of Gothenburg in collaboration with Department of Applied Educational Science, Umeå University.

### *Technical equipment*

In order to participate in the course, access to own computer / laptop is needed together with computer accessories for online communication (camera, headphones, mic) and the required statistical software (see list of literature).

### *Participant limitation and priority*

The number of participants is limited to 15. Priority will be given to doctoral students within the Educational sciences if the number of applicants for the course is exceeding the number of places.