



## DEPARTMENT OF EDUCATION AND SPECIAL EDUCATION

### **QRM1810 Introduction to quantitative methods in educational research, 7.5 credits**

Introduktion till kvantitativa metoder 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 2019-04-16, and is valid from Spring semester 2019.

#### *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 QRM1800 course "Basic statistics for educational research, 7.5 credits", or similar.

### **Learning outcomes**

The course is intended to provide an introduction to and overview of fundamental methodological concepts and issues in quantitative educational research, with a focus on designs for causal inference, measurement and analysis. It aims to develop participants' general research methodological competence and critical thinking to a level commensurate with what is required by a researcher within the field of education. After successful completion of the course the student should be able to:

#### *Knowledge and understanding*

- Account for fundamental concepts in research ethics and good research practice in accordance with Swedish and European standards
- Describe key characteristics of experimental, quasi-experimental and non-experimental

designs

- Describe and explain methods of analysis suited for different designs.
- Explain the notion of validity of causal inference, including its most common sub-categories and threats to valid causal inference.
- Explain the notions of validity and reliability of educational measurement, including threats to valid and reliable measurement

### *Competence and skills*

- Orally and in writing discuss possibilities and limitations of quantitative methods within educational contexts.
- Critically discuss scientific projects and articles with respect to their:
  - research design, using appropriate terminology and conceptual tools.
  - measurement procedures and methods, using appropriate terminology and conceptual tools.
  - statistical analysis procedures, using appropriate terminology and conceptual tools.

### *Judgement and approach*

- Evaluate the relevance of different design, measurement and analytical approaches in relation to research questions, data and scientific claims.
- Reflect on questions of research ethics and related decisions.

## **Course content**

The course introduces the basic principles how quantitative methods may be used in studying educational science questions. Points of departure in the course are designs, measures, and analyses as applied in educational research. Validity, reliability, and generalizability are central quality criteria that should be observed in all phases of the research process, as are considerations pertaining to research ethics. The focus lies partly on the internal logic of quantitative methods in relation to educational and social scientific research questions, and partly on key scientific concepts and quantitative research terminology. During the course, students discuss methodological issues, such as choice of design and required sample sizes, and steps that can or should be taken for analyses and conclusions to be valid. Throughout the course, participants acquire an overview and conceptual understanding of basic quantitative research methodology. This understanding is elaborated on and discussed in relation to concrete examples of research.

## **Types of instruction**

During the first week of the course, participants familiarize themselves with the course content through reading introductory material on their own. During the second week participants meet during two and half days on-campus, for lectures, hands-on-activities and network activities. Thereafter the course continues as an online course with seminars, exercises, group-work and supervision.

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

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

The course is given in English.

Language of instruction is English, unless all participants agree on Swedish

## **Grades**

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

The grading scale includes the Fail (U) and Pass (G) degrees. Pass means that the learning outcomes have been achieved.

## **Types of assessment**

To pass the course requires both active participation in the course seminars and successful fulfillment of three examination tasks. The latter consist of written essays where the validity of measurement and inferences in published research articles is scrutinized.

## **Course evaluation**

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

## **Other information**

This is a third-cycle course within the school of Quantitative Research Methods in Education (QRM).

### *Collaborating Departments*

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

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).

The number of participants is limited to 15. Priority will be given to doctoral students with an educational sciences focus, secondly supervisors for doctoral students with a focus on educational science research and thirdly researchers with a doctoral degree and an interest in

quantitative designs and analyses.

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The course book list is available in the form of an appendix

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This course, QRM1810, replaces the course QRM1801 *Design, measurement and analysis in educational research*, 7,5 credits, with start from Fall 2019.