

## Introduction to Quantitative Methods, 7.5 credits

### *Introduktion till kvantitativa forskningsmetoder, 7,5 hp*

<b>Course Code/Codes</b>	35PS080
<b>Subject Area</b>	Psychology
<b>School/equivalent</b>	School of Law, Psychology and Social Work
<b>Valid from</b>	2022-06-01
<b>Approved</b>	2022-04-13
<b>Revised</b>	--
<b>Approved by</b>	Head of School
<b>Translation to English, date and signature</b>	2022-04-05 hhr

## 1 Course content

The course introduces basic concepts and fundamental principles guiding the use of quantitative methods in social and behavioral sciences. The content aims to enable the integration of knowledge from philosophy of science, quantitative methods, and statistics to be able to critically examine research.

The course is aimed both at doctoral students who have little prior knowledge of quantitative methods as well as at those who wish to gain a better in-depth understanding of the underlying assumptions of commonly used methods and fundamental principles guiding the use of quantitative methods. The course will focus on key concepts and fundamental principles, rather than specific technical details of statistical analysis.

The primary purpose is for participants to gain an understanding of different types of quantitative methods to be able to identify challenges, strengths and weaknesses. Particular focus is placed on evaluating and critically discussing quantitative research methods at a methodological level, with regard to validity aspects, conclusions regarding causal associations and statistical hypothesis and testing.

During the course, doctoral students will apply their skills to evaluate research on published articles. In addition to self-studies, the focus is on discussing and problematizing interpretations and conclusions drawn from quantitative research in seminar form.

The course is divided into four themes that are dealt with in chronological order.

The first theme deals with the role of statistics in research. In addition to introducing some key concepts, different types of quantitative research questions are discussed and commonly used methods are introduced.

The second theme deals with causation. It covers data collection, design aspects and methods related to causation as well as the philosophical foundation of such thinking in quantitative research.

The third theme deals with covariation and differences. Methods for measuring central tendency, variance, as well as methods for evaluating associations and differences are discussed in this theme.

The fourth theme deals with hypothesis testing. In addition to basic probability theory, key concepts such as p-value, confidence interval and statistical power are introduced. This theme deals with methodological aspects and concerns related to hypothesis testing as well as the link with test of theory in quantitative research.

## **2 Outcomes**

### **2.1 The course in relation to the doctoral programme**

The course shall primarily refer to the following intended learning outcomes for third-cycle courses and study programmes as described in the Higher Education Ordinance, i.e. the doctoral student shall demonstrate:

#### *Knowledge and understanding*

- familiarity with research methodology in general (part of outcome 2)
- familiarity with the methods of the specific field of research in particular (part of outcome 2)

#### *Competence and skills*

- the capacity for scholarly analysis and synthesis (part of outcome 3)
- the capacity to review and assess new and complex phenomena, issues and situations autonomously and critically (part of outcome 3)
- the ability to identify and formulate issues with scholarly precision critically, autonomously and creatively (part of outcome 4)
- the ability to plan and use appropriate methods to undertake research and other qualified tasks within predetermined time frames (part of outcome 4)
- the ability to review and evaluate research and other qualified tasks (part of outcome 4)

#### *Judgement and approach*

- specialised insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used (outcome 10)

The intended learning outcomes are listed in the same order as in the general syllabus for the programme.

### **2.2 Intended course learning outcomes**

To obtain a passing grade, the doctoral student shall demonstrate:

For a passing grade, the doctoral student must show knowledge of

1. common quantitative research questions with associated methods,
2. key concepts and underlying principles in quantitative research, including methodological and philosophical foundation.
3. procedures for hypothesis testing with both statistical tests and confidence intervals.

For a passing grade, the doctoral student must show the ability to

4. problematize causal explanations from a philosophy of science and methodological perspective and be able to evaluate methods used to test causal associations,
5. evaluate and critically discuss quantitative methods in scientific articles,
6. problematize central principles for hypothesis testing and knowledge generation in quantitative research.

### **3 Reading list and other teaching material**

The following course readings and teaching material will be used on the course:

Cumming, G., & Calin-Jageman, R. J. (2017). *Introduction to the new statistics: estimation, open science, and beyond*. New York: Routledge. Selected parts, about 200 pages.

Aneshensel, C. S. (2013) *Theory-based data analysis for the social sciences*. (2nd ed.). London: SAGE. Selected parts, about 250 pages.

Articles and course material of max. 250 pages will be added, which is stated in the study guide no later than 1 week before the start of the course. Recorded lectures will also be used.

### **4 Teaching formats**

Teaching on the course takes the following format:

Lectures, seminars and exercises. In addition, self-studies based on study material before each seminar.

### **5 Examination**

The course is assessed through an examination consisting of the components listed below. The individual components are not graded separately but together they provide the basis for assessment and grading.

1. Written assignment, corresponding 5 credits. The examination refers to course learning outcomes 4-6
2. Oral and written participation in seminars, corresponding 2.5 credits. Examination refers to course learning outcomes 1-3

### **6 Grades**

Examinations on third-cycle courses and study programmes are to be assessed according to a two-grade scale with either of the grades 'fail' or 'pass' (local regulations).

The grade shall be determined by a teacher specifically nominated by the higher education institution (the examiner) (Higher Education Ordinance).

To obtain a passing grade on examinations included in the course, the doctoral student is required to demonstrate that he/she attains the intended course learning outcomes as described in section 2.2. Alternatively, if the course consists of multiple examinations generating credit, the doctoral student is required to demonstrate that he/she attains the outcomes that the examination in question refers to in accordance with section 5.

A student who has failed an examination is entitled to a retake.

If an examination consists of several examination components, and a student fails an examination component, the examiner may, as an alternative to a retake, set a make-up assignment with regard to the examination component in question.

A doctoral student who has failed an examination twice for a specific course or course element is entitled, upon his/her request, to have another examiner appointed to determine the grade.

## **7 Admission to the course**

### **7.1 Admission requirements**

To gain access to the course and complete the examinations included in the course, the applicant must be admitted to a doctoral programme at Örebro University.

### **7.2 Selection**

Selection between applicants who have been admitted to doctoral programmes at Örebro University and who otherwise meet the admission requirements as listed above is made according to the following order of precedence:

Priority will be given to doctoral students admitted to research subjects within the HS faculty.

If no other selection criteria are specified in this section, priority shall be given to applicants with a lower number of course credits left before the award of their degree over applicants with a higher number of remaining course credits. Should two or more students have equal number of credits, selection will be done through the drawing of lots. This also applies within any selection groups listed unless otherwise stated.

### **7.3 Other applicants than doctoral students admitted at Örebro University**

Other applicants than doctoral students admitted at Örebro University may be given access to the course on the grounds of provisions for and/or agreements regarding contracted courses, joint degrees, national graduate schools or cooperation in other respects with other universities.

Any decisions on what such other applicants may be given access to the course are made separately and on the basis of the provisions and/or agreements that occasion the student to apply for the course.

For participation in the course in other respects, the same provisions shall apply as for doctoral students admitted to Örebro University.

## **8 Transfer of credits for courses, study programmes and other experience**

Provisions on the transfer of credits can be found in the Higher Education Ordinance and on the university's webpage.

## **9 Other information**

Teaching is given in English.

The course is given at quarter speed.

The course will be offered if at least 3 participants are admitted to the course.

## **Transitional provisions**

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