ÖREBRO UNIVERSITET

Introduction to Structural Equation Modeling, 7.5 credits

Introduktion till strukturell ekvationsmodellering, 7,5 hp

Course Code/Codes	35PS084
Subject Area	Psychology
School/equivalent	School of Behavioural, Social and Legal Sciences
Valid from	2024-01-15
Approved	2023-11-28
Revised	-
Approved by	Head of School
Translation to English, date and signature	ltr, 2023-11-28

1 Course content

The course aims to provide specific and in-depth skills in the application of structural equation modeling (SEM) using the statistical program MPlus. The course is aimed at postgraduate students with prior knowledge of classical inferential statistics and linear analysis methods, especially regression.

The focus will be on identifying, estimating and evaluating the most common types of models within the SEM framework for both cross-sectional and longitudinal data. The course includes, among other things, confirmatory factor analysis, path analyses, growth analyzes and mixture models. Formulation and identification of models, estimation and interpretation of parameters, statistical assumptions, and model comparisons are further intended to be covered in the course. Application takes place in the form of computer exercises, with a particular focus on training practical skills in using the statistics program Mplus. Opportunities for students to apply analysis to their own data will also be provided.

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 scientific methodology in general (part of objective 2)
- familiarity with the specific research area's methods in particular (part of objective 2)

Skills and abilities
- ability for scientific analysis and synthesis (part of objective 3)
- ability to independently critically review and assess new and complex phenomena, issues and situations (part of objective 3)
- ability to critically, independently, creatively and with scientific accuracy identify and formulate questions (part of objective 4)
- ability to plan and with adequate methods conduct research and others qualified tasks within given time frames (part of objective 4)
- ability to review and evaluate research and other qualified data (part of objective 4)

Evaluation ability and approach
- intellectual independence and scientific honesty (part of goal 9)

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 demonstrate in-depth knowledge of
1. common SEM models
2. statistical assumptions, fit measures and model building in SEM
3. strengths, limitations and controversies associated with SEM

For a passing grade, the doctoral student must demonstrate the ability to
4. to be able to formulate, identify, estimate and evaluate different types of statistical models within the framework of SEM
5. justify the choice of data analysis model in SEM in relation to the research question and design
6. interpret SEM models based on equations and figures
7. to estimate common forms of SEM models with observed and latent variables using the statistical program Mplus
8. compile, report and draw adequate conclusions from SEM analyses

3   Reading list and other teaching material

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

Wang, J., & Wang, X. (2019). *Structural Equation Modeling: Applications Using Mplus*. Chichester: John Wiley & Sons, 350 pages
Klein, R. (2023). *Principles and Practice of Structural Equation Modeling*. (5th ed.) Guilford Press: New York, 100 pages

Articles, book chapters and course material about max. 200 pages are added, which is specified 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:

The format for the course will include lectures, seminars, and exercises with the statistical software. In addition to this, the doctoral student must work engage in self-study based on predetermined study material before each teaching session. Course participants are encouraged to bring their own data for the exercises and have access to a version of the statistics program Mplus.

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 to 6 credits. The test concerns knowledge objectives 4, 5, 7-8
2. Participation in an examining seminar, corresponding to 1 credit. Test refers to knowledge objective 1-3, 6

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:

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

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Transitional provisions

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