



## DEPARTMENT OF POLITICAL SCIENCE

### **SF30002 Advanced regression techniques, 7.5 credits**

Avancerade regressionstekniker, 7,5 högskolepoäng

*Third-cycle level / Forskarnivå*

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### **Confirmation**

This syllabus was confirmed by the Faculty Board of Social Sciences on 2018-09-19, and was last revised on 2019-11-18. The revised course syllabus is valid from Spring semester 2020.

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

Department of Political Science, Faculty of Social Sciences

### **Entry requirements**

Completed courses in simple regression analysis and introduction to multiple regression analysis at the equivalent of second-cycle level.

Qualifying applicants are persons admitted to postgraduate studies at the University of Gothenburg or another university.

### **Learning outcomes**

On completion of the course, the doctoral student is expected to be able to:

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

- Give an account of and understand key methodological issues concerning regression analysis techniques
- Describe the available regression analysis techniques and their advantages and disadvantages.

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

- Specify and justify models for regression analysis
- Process and manage various data structures for regression analysis

- Demonstrate applications of different types of advanced regression analysis and regression diagnostics
- In scientific writing and orally, communicate the results of analyses with the regression analysis techniques covered in the course

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

- With a high degree of independence, discuss and problematise their own and others' choices of research method (regression analysis technique)
- With a high degree of independence, discuss, problematise and exemplify the strengths and weaknesses of various regression techniques based on given data
- Critically read and review a scholarly work with regard to the research questions asked, methods and results, as well as ethical aspects.

## **Course content**

The course focuses on the application, diagnosis and interpretation of advanced regression techniques for social sciences data. Particular emphasis is placed on data processing, model specification, diagnostics and inferencing.

The course consists of five components that are examined separately.

### **Sub-courses**

#### **1. Statistical analysis, data processing and model specification** (*Statistisk analys, databearbetning och modellspecifikationer*), 1 credits

This course component begins with an introduction to syntax-based regression analysis followed by data processing and the handling of 'missing' data. This course component concludes with an introduction to model specification focusing on causal analysis and statistical inferencing as regards measurement errors, model specification, and omitted variable bias.

#### **2. Multiple regression analysis and logistic regression analysis** (*Multipel regressionsanalys och logistisk regressionsanalys*), 1 credits

This course component includes linear regression analysis (OLS regression) with more explanatory variables (independent variables) and the handling of dichotomous dependent variables (e.g. great/small confidence in politicians). The specification of models, regression diagnostics, interaction effects and assumptions are also treated.

#### **3. Regression discontinuity design, instrumentation and two-step regression** (*Regression Discontinuity Design, instrumentering och två-stegsregression*), 1.5 credits

This course component includes regression discontinuity design, which is a regression-based quasi-experimental research design aimed at isolating causal effects. This course component also focuses on the use and implementation of instrument variables and two-stage OLS regression.

#### **4. Multi-level analysis** (*Flernivåanalys*), 2 credits

This course component includes an introduction to multi-level analysis, i.e., when data is

basic models, estimation of parameters, model comparisons and assumptions are also treated.

### 5. Panel data analysis (*Panel data analysis*), 2 credits

This course component includes techniques for analysing data that has been observed over time (i.e. to study changes and dynamic processes). The specification of models, correction of errors, causality and assumptions are also treated.

## Types of instruction

Lectures and seminars

### *Language of instruction*

The course is given in English.

## Grades

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

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The grading scale is Pass (G) and Fail (U).

For a Pass grade for each *course component*, the doctoral student must achieve a Pass grade in all the examination components for the course component.

For a Pass grade for the *whole course*, the doctoral student must achieve a Pass grade in each course component.

## Types of assessment

The course is examined by means of written exams, written assignments and active participation in compulsory seminars/exercises.

All classes can serve as the basis for examination.

The doctoral student is entitled to a replacement of examiner after failing the same exam twice, if practicable. Such a request must be submitted to the Department/Faculty and must be in writing.

If the content of and/or literature for the course changes, examinations can be based on this course syllabus within one year after such a change. The doctoral student is guaranteed a minimum of three examination sessions including the scheduled examination session. Thereafter, whether or not the examination can be completed under the older course syllabus is determined on a case-by-case basis. If the course ceases altogether, it can be examined within two years after the course was most recently offered. Thereafter, whether or not the examination may be completed is determined on a case-by-case basis.

## Course evaluation

The course leader is responsible for ensuring that the doctoral student has the opportunity to provide feedback on a regular basis during the course via Canvas and for conducting a summative course evaluation at the end of the course.

## Other information

Participation in exercises and seminars is mandatory. Absence will be made up as agreed with the course director.

The language of instruction will be English or Swedish.

Details about timetables, literature, etc. will be announced before the course starts.