

## QUANTITATIVE METHODS

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Autumn 2016  
Tuesdays, 16:00 - 18:00, Room: U81

Responsible for the course & lecturer:  
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### **Purpose:**

The course offers an introduction to quantitative methods for social scientists required to carry out and interpret analyses of quantitative datasets. This methodological course is designed to introduce the core concepts in applied statistics for social scientists and enable students to use statistical software. The sessions are set up to build a core understanding of the concepts and tool-set that can be used (and further extended) in applied statistical analysis. Hence, students working with data and adopting a quantitative analysis for their Master's thesis or larger research projects will gain training in working on such projects. Furthermore, the course also equips students to interpret and critically assess empirical research that applies quantitative estimation methods. Accordingly, the aim of the course is to make students acquainted with: the possibilities and limitations of quantitative statistical analysis, the quantities of interest in basic statistical analyses, the interpretation of the estimated quantities, and the links between substantive theory and transposition into statistical analysis.

### **Connection with other courses:**

By providing students with the basic instruments of statistical analysis, the course is fulfilling a dual aim: on the one hand, students will be able to perform their own analyses for tasks required in other courses or for their own Master thesis. On the other hand, students will be able to understand the arguments, empirical methods and evidence in research papers used for other courses.

### **Labour market relevance:**

This course aims at students that would like to work in governmental and non-governmental positions in which they need to form an opinion about and decide on the implementation and modification of specific instruments on the grounds of statistical information and quantitative analyses provided by experts. Furthermore, the course provides an academic base for students that want to pursue a scientific career by providing them with the skills to conduct quantitative research for academic audiences and decision-makers.

### **Content - Key areas:**

The central subject-related topics discussed:

- Statistical inference: core goals and working with data
- Descriptive statistics
- Analysis of association

- Hypothesis testing and uncertainty
- Bivariate regression analysis
- Multivariate regression analysis
- Assumptions of OLS and violations of assumptions
- Conditional relationships: using interactions
- Models for categorical outcomes – logistic regressions
- Future avenues for advanced topics, such as multilevel & panel data analysis

This course offers a combination of theory of quantitative methods and its practical application. Thus, topics will be discussed initially in a lecture format with applied examples and then implemented by students using statistical software (i.e. STATA), so extended focus will be designated to working with data individually and in groups.

**Goals description (SOLO taxonomy):**

To meet the goal of the course, students at the end of the course should have:

*Knowledge that enables the student to:*

- understand the principles of statistical analysis
- discuss and understand core quantities and concepts in statistical analysis
- interpret results from statistical analysis

*Skills that enables students to:*

- analyze and critically assess scientific articles using the statistical methods taught in the course
- find and select suitable data for their own research projects
- select the appropriate methods and statistical models for their research questions assessed in a quantitative manner

*Competences that enables students to:*

- to comfortably use statistical software for their analyses

**Form of instruction:**

The course consists of a mix of lectures and sessions in which students apply the presented analytical concepts to datasets, using the statistical software STATA. There will be a mid-term paper which is mandatory. Mid-term papers may be resubmitted once. There are 15 sessions of 2 hours each, thus a total of 30 hours. Besides these ordinary lectures students are expected to participate in additional activities arranged in connection to the course for a total of 6-7 hours. A description of these activities will be provided in the course plan by the beginning of the semester.

**Time of examination:**

Ordinary examination in January and re-exam in February.  
Evaluation at the re-exam can be changed.

Midterm assignment in November. See syllabus for exact breakdown.

Registration for the course is automatically a registration for the ordinary examination in the course. Cancellation is not possible. If the student does not participate in the examination, the student will use an examination attempt. If the student does not pass the ordinary examination, the student will automatically be registered for the re-exam in the same examination period. Cancellation of registration for the re-exam is not possible.

**Examination conditions:**

Midterm take-home assignment carried out by the students individually (1 week), pass/fail (97012612).

The take-home assignment is a practical one using all concepts covered until the assignment is published in an applied setting. Students are required to use the data supplied with the assignment to answer and interpret the questions. Students are expected to send along the computer code used to carry out the analysis. The assignment must be maximum 7 pages (each 2,400 key strokes) including spaces, notes and appendixes but excluding table of content, reference list and computer code.

After the deadline, the midterm take-home assignment will be discussed and solved in class in order to prepare for the final examination. Failed papers can be resubmitted once in a revised version. If the student does not meet the Examination conditions the student cannot participate in the regular exam and first attempt is used.

**Form of examination for the certificate:**

Take-home written assignment with analysis carried out by the students individually (1 week). The final take-home written assignment takes on the same format as the midterm take-home assignment, but covers material from the whole course.

Supplemental information for the form of examination:

**Duration:** 1 week

**Internet Access:** Necessary

**Hand out:** Via SDU-assignment in the course in Blackboard.

**Hand in:** Via SDU-assignment in the course in Blackboard.

**Extent:** The following limitations are required: The paper must be maximum 7 pages (each with 2400 strokes) including spaces, notes and appendixes but excluding table of content, reference list and computer code. The paper has to be written in English. The computer code on which the analysis is based (do-file) has to be included.

**Exam Aids:** All exam aids allowed.

**Please note:**

Home assignments are not allowed to exceed the length mentioned in course descriptions.

Therefore, students must indicate the total number of units (including spaces) of the assignment on the front page of the home assignment. If the number of units and spaces are not indicated on the front page of an assignment, the assignment will be rejected – i.e. remain unassessed. If it in some other way appears that the number of units exceeds the number allowed - the assignment will be rejected – i.e. remain unassessed.

Plagiarism will not be tolerated. All written assignments are exposed through SafeAssign and Exam Monitor. Rules on good academic practices are specified on the homepage of the study programme under the 'Exam' key and the key of 'Regulations and advises' (where there is a link at the right hand side on exam cheating where you can download a leaflet on 'Proper Academic Practices'). See also More information about plagiarism on this webpage:

[http://sdunet.dk/Vaerktoejer/love\\_regler\\_aftaler/Uddannelse/Eksamen-og-karakterer/Eksamenssnyd.aspx?contentlang=en](http://sdunet.dk/Vaerktoejer/love_regler_aftaler/Uddannelse/Eksamen-og-karakterer/Eksamenssnyd.aspx?contentlang=en)

**Main literature:**

Agresti, Alan, and Barbara Finlay. latest edition. *Statistical Methods for the Social Sciences*. Upper Saddle River, NJ: Pearson Prentice Hall. → Chapters and page numbers refer to the edition from 2014.

Longest, Kyle C. latest edition. *Using Stata for Quantitative Analysis*. Thousand Oaks, CA: SAGE Publications, Inc. → Available as e-book in the SDU library. Chapters and page numbers refer to the edition from 2012.

See further literature in the schedule below

## I. INTRODUCTION: BASICS OF QUANTITATIVE METHODS

**S1 Introductory Meeting** 06-09-2016

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**S2 Descriptive Statistics** 13-09-2016

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Agresti/Finlay: Ch. 1-3  
(72)

**S3 Distribution & Statistical Inference I** 20-09-2016

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Agresti/Finlay: Ch. 4-5  
(70)

**S4 Stata1: Introduction to the program** 21-09-2016

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Longest: Ch. 1-3, until p. 69

Blended Lesson: 12-14 AM in U66

Supplementary: Pfaff, Tobias. 2009. "A Brief Introduction to Stata with 50+ Basic Commands." Münster: Institute for Economic Education, University of Münster.

URL: [https://www.wiwi.uni-muenster.de/ioeb/Downloads/Forschen/Pfaff/Introduction to Stata with 50+ Basic Commands.pdf](https://www.wiwi.uni-muenster.de/ioeb/Downloads/Forschen/Pfaff/Introduction%20to%20Stata%20with%2050%20Basic%20Commands.pdf)  
(101)

**S5 Stata2: Descriptive Statistics, logical operators & graphs** 27-09-2016

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Longest: Ch. 4  
(24)

**S6 Statistical Inference II: Significance Tests** 04-10-2016

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4-6 pm  
Agresti/Finlay: Ch. 6-7  
(79)

**S7 Correlation and Bivariate Regression** 11-10-2016

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Agresti/Finlay: Ch. 9  
(33)

**S8 Stata3: Data management & bivariate statistics** 12-10-2016

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Longest: Ch. 3 (from p. 69) + Chapter 5-6 (excl. p. 122-125 & 144-146)  
(55)

Blended Lesson: 12-14 AM in U24

**II. MULTIVARIATE REGRESSIONS****S9 Multivariate Regression** 25-10-2016

Agresti/Finlay: Ch. 10+11

Supplementary:

Wooldridge, Jeffrey M. latest edition. Introductory Econometrics: a Modern Approach. 4th ed. Mason, OH: South-Western. Ch. 2+3

(142)

**S10 Stata 4: Regressions I** 1-11-2016

Longest: Ch. 7

(19)

**S11 Correlation vs. Causality & Regression Assumptions** 8-11-2016

Agresti/Finlay: Ch. 10 + 14.1-14.3

(39)

**S12 Stata5: Regressions II – Testing assumptions** 9-11-2016

Blended Lesson: 12-14 AM in U24

Pevalin, David, and Karen Robson. Latest version. Stata Survival Manual. Berkshire, GBR: Open University Press. Ch. 8, especially p. 288-303. → available as e-book in the SDU library.

(39)

**Take-home midterm exam** 9-11-2016Hand-out: 9<sup>th</sup> of NovemberHand-in: 16<sup>th</sup> of November**III. ADVANCED TOPICS****S13 Interaction terms & other functional forms** 15-11-2016

4-6 pm

Agresti/Finlay: Ch. 14.5-14.7

Brambor, Thomas, William Roberts Clark, and Matt Golder. 2006. "Understanding Interaction Models: Improving Empirical Analyses." Political Analysis 14 (1):63-82.

(40)

**S14 Logistic regression** 22-11-2016

Agresti/Finlay: Ch. 15.1-15.5

(22)

**S15 Multilevel analysis**

29-11-2016

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Hox, Joop 2010. Multilevel Analysis. Techniques and Applications. 2 ed. New York and Hove: Routledge. Ch. 1-2.2

Supplementary:

Rabe-Hesketh, Sophia, and Anders Skrondal. 2012. Multilevel and Longitudinal Modeling Using Stata. Volume 2: Categorical Responses, Counts, and Survival. College Station: Stata Press. Ch. 2+3.  
(133)

**S16 Discussion of take-home exam**

06-12-2016

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**S17 Understanding academic articles: multilevel analysis & interaction terms** 13-12-2016

Wulfgramm, Melike. 2014. "Life Satisfaction Effects of Unemployment in Europe: The Moderating Influence of Labour Market Policy." Journal of European Social Policy 24 (3):258-72.

Supplementary:

Wooldridge, Jeffrey M. latest edition. Introductory Econometrics: a Modern Approach. 4th ed. Mason, OH: South-Western. Ch. 13+14.  
(63)

**S18 Wrap-up and Q & A**

20-12-2016

Online Meeting