



### COURSE (MODULE) DESCRIPTION

| Course title                    | Code |
|---------------------------------|------|
| Econometric Theory and Practice |      |

| Staff                                                                                               | Department                                       |
|-----------------------------------------------------------------------------------------------------|--------------------------------------------------|
| <b>Coordinator:</b> Dr Povilas Lastauskas (PhD Cantab)<br><b>Other(s):</b> Dr Soroosh Soofi Siavash | Faculty of Economics and Business Administration |

| Study cycle        | Course type |
|--------------------|-------------|
| First (Bachelor's) | Compulsory  |

| Form of implementation | Period of implementation | Language of instruction |
|------------------------|--------------------------|-------------------------|
| Face-to-face           | Full year                | English                 |

| Requirements for student                                          |                                          |
|-------------------------------------------------------------------|------------------------------------------|
| <b>Prerequisites:</b> Mathematical Methods and Statistical Theory | <b>Additional requirements (if any):</b> |

| Number of ECTS credits | Student's workload | Contact hours | Individual work |
|------------------------|--------------------|---------------|-----------------|
| 10                     | 260                | 72            | 188             |

| Purpose of the course and competences developed                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| This course aims to provide a broad overview of basic and a few more advanced econometric methods, to focus on <i>understanding, interpreting and applying</i> econometric assumptions and to apply the techniques when analyzing economic behavior. |

| Learning outcomes (corresponding learning outcomes of the program)                                                | Teaching methods                                                                  | Assessment methods                                                                                                                           |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| Have acquired knowledge in a number of econometric concepts and methods, understand their limitations. (1.1, 2.1) | Lectures and lecture notes, tutorials, reading academic literature.               | Fall semester: written exam (50%), problem sets (50%)<br><br>Spring semester: written exam (50%), problem sets and econometric project (50%) |
| Able to competently apply econometric when analyzing economic behavior. (1.2)                                     | Lectures and lecture notes, tutorials, computer exercises and empirical practice. |                                                                                                                                              |
| Learn how to use R/STATA software during the practical sessions. (2.2, 3.2)                                       | Tutorials with empirical contents (R/STATA exercises).                            |                                                                                                                                              |
| Undertake applied research that uses empirical evidence to validate economic arguments, interpret findings. (3.4) | Independent econometric project.                                                  |                                                                                                                                              |
| Present empirical findings in the classroom. (4.2)                                                                | Presentations in tutorials.                                                       |                                                                                                                                              |

| Course themes | Contact / Individual work: time and assignments |
|---------------|-------------------------------------------------|
|---------------|-------------------------------------------------|

|                                                                                                                                       | Lectures  | Tutorials | Seminars | Practical classes | Laboratory work | Practice | Contact hours | Individual work | Assignments due date                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------|-----------|-----------|----------|-------------------|-----------------|----------|---------------|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>FALL semester</b>                                                                                                                  |           |           |          |                   |                 |          |               |                 |                                                                                                                                                                                |
| Review of Statistics: Probability, Sampling Distributions, Random Variables, Expectations and Moments                                 | 2         |           |          |                   |                 |          | 2             | 4               |                                                                                                                                                                                |
| Statistical Inference: CLT, Asymptotics, Confidence Intervals                                                                         | 4         | 2         |          |                   |                 |          | 6             | 12              | Problem Set: Stock and Watson (chapters 2 and 3)                                                                                                                               |
| Single Regression: Conditional Expectation Function, Classical Assumptions, Goodness of Fit. Inference.                               | 10        | 2         |          |                   |                 |          | 12            | 30              | Problem Set: Stock and Watson (chapters 4 and 5)                                                                                                                               |
| Gauss-Markov Theorem (with a proof)                                                                                                   | 2         |           |          |                   |                 |          | 2             | 4               |                                                                                                                                                                                |
| Multivariate Regression. Basics of Matrix Algebra.                                                                                    | 6         | 2         |          |                   |                 |          | 8             | 18              | Problem Set: Stock and Watson (chapter 6, 17, 18.1)                                                                                                                            |
| Hypothesis tests in multivariate regression                                                                                           | 4         | 2         |          |                   |                 |          | 6             | 18              | Problem Set: Stock and Watson (chapters 7)                                                                                                                                     |
| <b>SPRING semester</b>                                                                                                                |           |           |          |                   |                 |          |               |                 |                                                                                                                                                                                |
| Causality: Experiments and Observational Data, Program Evaluation. Omitted Variables, Short and long regressions                      | 6         |           |          |                   |                 |          | 6             | 18              | Reading research articles and presenting results in group presentations. Stock and Watson (chapters 9 and 13). Replication of published results with omitted variable problem. |
| Instrumental Variables and Two-stage Least Squares. Measurement Errors                                                                | 4         | 2         |          |                   |                 |          | 6             | 18              | Problem Set: Angrist and Pischke (chapters 3, 6) and Stock and Watson (chapter 12). STATA exercises, two research articles.                                                    |
| Introduction to Time Series. Testing and Dynamic Causal Effects (exogeneity, restrictions, heteroscedasticity and serial correlation) | 6         | 4         |          |                   |                 |          | 10            | 26              | Stock and Watson (chapters 14 and 15). Research articles.                                                                                                                      |
| Coming Together: Cross sections over time, Introduction to Panel Data Econometrics                                                    | 12        | 2         |          |                   |                 |          | 14            | 40              | Problem Set: Stock and Watson (chapter 10). STATA exercises, one research article.                                                                                             |
| The Theory of Multiple Regression (time permitting)                                                                                   |           |           |          |                   |                 |          |               |                 | Special Problem Set (time permitting). Stock and Watson (chapter 18).                                                                                                          |
| <b>Total</b>                                                                                                                          | <b>56</b> | <b>16</b> |          |                   |                 |          | <b>72</b>     | <b>188</b>      |                                                                                                                                                                                |

| Assessment strategy  | Share in % | Time of assessment | Assessment criteria |
|----------------------|------------|--------------------|---------------------|
| <b>Fall semester</b> |            |                    |                     |

|                        |    |                                  |                                                                                                                                                                                                                                                                                                |
|------------------------|----|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Midterm exam           | 50 | Roughly after half of the course | The midterm and final exams consist of essays and mathematical questions in which students have to show their knowledge and analytical capabilities, and shorter questions testing knowledge of students for computer analysis in R.                                                           |
| Final exam             | 50 | End of fall semester             |                                                                                                                                                                                                                                                                                                |
| <b>Spring semester</b> |    |                                  |                                                                                                                                                                                                                                                                                                |
| Written exam           | 50 | End of spring semester           | The final exam will consist of both longer open questions in which students have to show their analytical capabilities and of shorter questions simply testing students' knowledge. The final exam will test the material from the whole course with a focus on the second part of the course. |
| Econometric project    | 50 | Before Easter holidays           | Econometric project is evaluated in terms of:<br>How carefully the statement of the research question is considered;<br>How well the variable descriptions, summary statistics and econometric results tables are produced, and<br>How the results are interpreted.                            |

| Author                                                                                                                                                                                                                                                                                                                          | Published in | Title                                                                                                   | Issue No. or Volume                          | Publishing house or Internet site |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------|
| <b>Required reading</b>                                                                                                                                                                                                                                                                                                         |              |                                                                                                         |                                              |                                   |
| Lecture notes and slides as well as online resources will be made available to all students.<br>Compulsory readings constitute chapters from the following books: Angrist and Pischke (2014), Dougherty (2016) and Stock and Watson (2014). Other texts are supplementary; some research articles will be assigned as homework. |              |                                                                                                         |                                              |                                   |
| Angrist, J. D. and J.-S. Pischke                                                                                                                                                                                                                                                                                                | 2014         | Mastering 'Metrics: The Path from Cause to Effect                                                       | First Edition                                | Princeton University Press        |
| Dougherty, C.                                                                                                                                                                                                                                                                                                                   | 2016         | Introduction to Econometrics                                                                            | Fifth Edition                                | Oxford University Press           |
| Murray, P. Michael                                                                                                                                                                                                                                                                                                              | 2006         | Econometrics: A Modern Introduction                                                                     | First Edition                                | Pearson                           |
| Stock, J. H. and M. W. Watson                                                                                                                                                                                                                                                                                                   | 2014         | Introduction to Econometrics                                                                            | Third Edition                                | Pearson Education                 |
| <b>Supplementary reading (text books)</b>                                                                                                                                                                                                                                                                                       |              |                                                                                                         |                                              |                                   |
| Wooldridge, Jeffrey M.                                                                                                                                                                                                                                                                                                          | 2013         | Introductory Econometrics: A Modern Approach                                                            | Fifth Edition                                | Cengage Learning                  |
| <b>Articles</b>                                                                                                                                                                                                                                                                                                                 |              |                                                                                                         |                                              |                                   |
| Acemoglu, Daron, Simon Johnson and James A. Robinson                                                                                                                                                                                                                                                                            | 2001         | The Colonial Origins of Comparative Development: An Empirical Investigation                             | <i>American Economic Review</i>              |                                   |
| Angrist, Joshua D. and Alan B. Krueger.                                                                                                                                                                                                                                                                                         | 2001         | Instrumental variables and the search for identification: From supply and demand to natural experiments | <i>The Journal of Economic Perspectives</i>  |                                   |
| Card, David                                                                                                                                                                                                                                                                                                                     | 1990         | The Impact of the Mariel Boatlift on the Miami Labor Market                                             | <i>Industrial and Labor Relations Review</i> |                                   |
| DiNardo, John.                                                                                                                                                                                                                                                                                                                  | 2007         | Interesting Questions in 'Freakonomics                                                                  | <i>Journal of Economic Literature</i>        |                                   |
| Dynarski, Susan                                                                                                                                                                                                                                                                                                                 | 2003         | Does Aid Matter? Measuring the Effect of Student Aid on College Attendance and Completion               | <i>American Economic Review</i>              |                                   |

