Econometrics

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| Course code | ECO105 |
| Compulsory in the programmes | *Economics and Data Analytics, Economics and Politics* |
| Level of studies | *Undergraduate* |
| Number of credits | *6 ECTS (48 in-class hours + 6 consultation hours + 2 exam hours, 104 individual work hours)* |
| Course coordinator (title and name) | *Paulius Rauba, Aleksandr Christenko* |
| Prerequisites | *Statistical Data Analysis* |
| Language of instruction | *English* |

**THE AIM OF THE COURSE:**

This is an introductory course on econometrics with an emphasis on its applications. The aim of the course is to introduce the main empirical methods of economic data analysis. Students learn how to conduct empirical studies as well as how to analyse and interpret results from other empirical work. The emphasis is on gaining an intuitive understanding of the principles of econometric analysis and applying them to actual data. Students are taught how to build a suitable econometric model, understand the strengths and limitations of empirical methods, correctly interpret results, and draw valid conclusions. The main topics covered include: regression analysis with a focus on Ordinary Least Squares, dummy dependent variable models, time series, and panel data regression

**MAPPING OF COURSE LEVEL LEARNING OUTCOMES (OBJECTIVES) WITH DEGREE LEVEL LEARNING OBJECTIVES (See Annex), ASSESSMENT AND TEACHING METHODS**

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| Course level learning outcomes (objectives) | Degree level learning objectives BSC | Assessment methods | Teaching methods |
| CLO1. Understand and apply basic concepts of data analysis into econometrics: descriptive statistics, sampling, estimation and hypothesis testing. | ELO 1.1  ELO 1.2  ELO 3.2 | Midterm test, laboratory assignments, final exam | Lectures, laboratory work assignments, independent work |
| CLO2. Analyse and evaluate linear regression models: build econometric models and understand the main assumptions of the model. | ELO 1.1  ELO 1.2  ELO 3.2 | Midterm test, laboratory assignments, final exam | Lectures, laboratory work assignments, independent work |
| CLO3. Use linear regression models for economic analysis: use suitable software, interpret regression results, conduct hypothesis testing, and evaluate the model. | ELO 1.1  ELO 1.2  ELO 3.2 | Midterm test, laboratory assignments, final exam | Lectures, laboratory work assignments, independent work |
| CLO4. Understand and apply probit/logit models for economic analysis. | ELO 1.1  ELO 1.2  ELO 3.2 | Final exam | Lectures, laboratory work assignments, independent work |
| CLO5. Understand and apply time series regression for economic analysis | ELO 1.1  ELO 1.2  ELO 3.2 | Laboratory assignments, final exam | Lectures, laboratory work assignments, independent work |
| CLO6. Understand and apply panel data for economic analysis. | ELO 1.1  ELO 1.2  ELO 3.2 | Laboratory assignments, final exam | Lectures, laboratory work assignments, independent work |
| CLO7. Understand and apply simultaneous equations for economic analysis. | ELO 1.1  ELO 1.2  ELO 3.2 | Final exam | Lectures, laboratory work assignments, independent work |

**ACADEMIC HONESTY AND INTEGRITY**

The ISM University of Management and Economics Code of Ethics, including cheating and plagiarism, is fully applicable and will be strictly enforced in the course. Academic dishonesty and cheating can and will lead to a report to the ISM Committee of Ethics. With regard to remote learning, ISM reminds students that they are expected to adhere to and maintain the same academic honesty and integrity that they would in a classroom setting.

**COURSE OUTLINE**

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| **Week** | **Topic** | **In-class hours** | **Readings** |
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|  | 1. Review of statistical principles and an overview of regression analysis | 4 | Studenmund, Ch1, 15  Wooldridge, Appendix C |
|  | 2. Ordinary Least Squares | 4 | Studenmund, Ch2 |
|  | 3. The classical assumptions | 4 | Studenmund, Ch4 |
|  | 4. Hypothesis testing | 4 | Studenmund, Ch5 |
|  | 5. Model specification and Ramsey’s RESET test | 4 | Studenmund, Ch6-7 |
|  | 6. Classical assumptions: violations and treatments | 4 | Studenmund, Ch8-9 |
|  | *Midterm exam* | 2 |  |
|  | 7. Dummy dependent variables – logit and probit regression | 4 | Studenmund, Ch12 |
|  | 8. Introduction to time series regressions | 4 | Studenmund, Ch11 |
|  | 9. Time series regression continued: stationarity and the Granger-causality test | 4 | Studenmund, Ch11,14 |
|  | 10. Regression with panel data – fixed and random effects models | 4 | Wooldridge, Ch13-14 |
|  | 11. Simultaneous Equations | 4 | Studenmund, Ch13 |
|  | *Course review* | 2 |  |
|  | **Total hours** | **48** |  |
|  | CONSULTATIONS | 6 |  |
|  | FINAL EXAM | 2 |  |

**FINAL GRADE COMPOSITION**

**Assessment methods**

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| --- | --- | --- | --- |
| **Assignment** | **Topics** | **Total hours** | **Final grade, %** |
| Midterm exam | 1-6 | 30 | 30 |
| Final exam | 7-11 | 30 | 30 |
| Laboratory assignments 1 |  | 17 | 20 |
| Laboratory assignments 2 |  | 17 | 20 |
| Consultations |  | 6 |  |
| Total |  | 100 | 100% |

**Midterm exam.** It will be held in week 7 of the term during a lecture. It counts towards 30% of the final grade. The midterm will be based on topics 1-6. Calculators may be used, provided they cannot store text. The midterm will consist of theoretical questions and practical problems.

**Final exam.** The exam counts towards 30% of the final grade. It is a closed book and includes multiple-choice questions and open questions. It tests conceptual, analytical, and numerical skills. The exam will be based on topics 7-12. Calculators may be used, provided they cannot store text. The final written examination will take place during the examination session. It consists of theoretical questions and practical problems.

**Laboratory assignments.** In the assignments, students will have to prepare reports of performed analysis following a framework provided by the instructor. Assignments can be completed alone or in a group of two. The content of each assignment will be similar to computer exercises performed during the seminars. There will be two assignments each worth 20% of your final grade.

**The retake exam.** After receiving a failing final cumulative grade, a student can retake the exams. A retake exam will consist of all course material including the midterm and final exam and will constitute 60% of the final grade. Laboratory assignments cannot be retaken at a later time, but their grades will be incorporated into the final grade.

**Readings:**

1. Studenmund, A. H., *Using Econometrics: a Practical Guide, 6th ed*., Addison Wesley, Longman 2014

Additional Readings:

Wooldridge Jeffrey, M., *Introductory Econometrics: A Modern Approach, 4th ed*., Thompson/ South-Western, 2009. Stock, James H. and Mark W. Watson, Introduction to Econometrics, Addison Wesley, Pearson, 2014.

**ANNEX**

**DEGREE LEVEL LEARNING OBJECTIVES**

**Learning objectives for the Bachelor of Business Management**

*Programmes:*

*International Business and Communication,*

*Business Management and Marketing, Finance,*

*Industrial Technology Management*

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| --- | --- |
| **Learning Goals** | **Learning Objectives** |
| Students will be critical thinkers | BLO1.1. Students will be able to understand core concepts and methods in the business disciplines |
| BLO1.2. Students will be able to conduct a contextual analysis to identify a problem associated with their discipline, to generate managerial options and propose viable solutions |
| Students will be socially responsible in their related discipline | BLO2.1. Students will be knowledgeable about ethics and social responsibility |
| Students will be technology agile | BLO3.1. Students will demonstrate proficiency in common business software packages |
| BLO3.2. Students will be able to make decisions using appropriate IT tools |
| Students will be effective communicators | BLO4.1. Students will be able to communicate reasonably in different settings according to target audience tasks and situations |
| BLO4.2. Students will be able to convey their ideas effectively through an oral presentation |
| BLO4.3. Students will be able to convey their ideas effectively in a written paper |

**Learning objectives for the Bachelor of Social Science**

*Programmes:*

*Economics and Data Analytics,*

*Economics and Politics*

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| --- | --- |
| **Learning Goals** | **Learning Objectives** |
| Students will be critical thinkers | ELO1.1. Students will be able to understand core concepts and methods in the key economics disciplines |
| ELO1.2. Students will be able to identify underlying assumptions and logical consistency of causal statements |
| Students will have skills to employ economic thought for the common good | ELO2.1.Students will have a keen sense of ethical criteria for practical problem-solving |
| Students will be technology agile | ELO3.1. Students will demonstrate proficiency in common business software packages |
| ELO3.2. Students will be able to make decisions using appropriate IT tools |
| Students will be effective communicators | ELO4.1.Students will be able to communicate reasonably in different settings according to target audience tasks and situations |
| ELO4.2.Students will be able to convey their ideas effectively through an oral presentation |
| ELO4.3. Students will be able to convey their ideas effectively in a written paper |