

Detailed course description for instructors

I. Basic data

Course code:	7VG32NBKF3M
Course title (in English):	Data Analysis for World Economics
Number of contact hours:	2+2
Number of credits:	6
Estimated student workload (in academic hours):	180
Fall/Spring:	Fall, 2021
Language of education:	English
Prerequisites:	Statistics and/or high school or College Algebra
Department:	Department of World Economy
Course leader:	Dr. Urmat Tynaliev
Time of class:	TBA

II. Aims of the course:

The main aim of the course is to develop a foundation of proficiency among students in widely used statistical and econometric methods using cross-sectional data, which are necessary for independent research works and decision-making in relevant areas.

As such, this course has three main purposes: The first purpose is to facilitate conceptual understanding of multivariate statistical methods alongside focusing on their practical applications.

The second purpose of this course is to prepare graduate students to apply multivariate statistical methods to the analysis of their own economic data.

The third purpose is to provide students with the skills necessary to interpret research articles that have employed multivariate statistical techniques. A critical component of graduate research projects is a review of research literature. It's crucial for students to be able to understand not only what multivariate statistical techniques were used in a particular research article, but also to appropriately interpret the results of that study for the purposes of synthesizing the existing research as background for their own research project or thesis.

Sustainability aspects

This course will address the following 3 goals out of 17 UN SDGs (Sustainable Development Goals):

SDG 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

The content of the class and teaching process will facilitate the inclusive and equitable quality education. The teaching content and methods can be used long after that time as they review current research as part of their future professional career activities.

SDG 5. Achieve gender equality and empower all women and girls.

The gender equality and empowerment of female students will be facilitated during the teaching process as well as in the examples and datasets used for analysis. Particularly datasets from the leading international development and financial institutions such as EuroStat, European Social Survey, World bank and UNDP will have variables reflecting the equality and empowerment of female students.

SDG 10. Reduce inequality within and among countries.

The class will have international students coming from some countries participating in the Stipendium Hungaricum scholarship. As envisioned, one of the important goals of this scholarship is to reduce the “inequality within and among countries” by sharing the available knowledge, skills and technology with developing countries that are trying to narrow the gap amongst developing and developed countries.

III. Connections with other courses:

Research methods course and Thesis Seminars would benefit from this course. Students have to complete an empirical work applying the statistical and econometric tools presented in class. This research project may serve as a foundation for these students’ own thesis papers/dissertations.

IV. Intended learning outcomes of the course

Knowledge	Skills	Attitudes
<p>By the end of the course, students will have obtained a conceptual understanding of multivariate statistical methods as well as an applied, practical skill in how to carry out statistical operations.</p> <p>Also, be able to describe various techniques for measuring the degree of relationships between variables, including bivariate correlation and regression, multivariate regression, and factor analysis.</p>	<p>At successful completion of this course, a student will be able to:</p> <ul style="list-style-type: none"> -use the data analysis tools in SPSS/Stata program to perform intermediate to advanced statistical analyses and construct econometric models; -conduct the hypothesis testing using quantitative data; -present the data analysis results effectively, whether graphically, orally, or written. 	<ul style="list-style-type: none"> -Develop a data driven decision making attitude in work settings. -Foresee the statistical and economic consequences and the implications of the empirical results and take appropriate actions to minimize their adverse effects.

V. Planned learning activities of students for supporting the achievement of intended learning outcomes.

Learning activities of students	Learning activities of students participating in dual studies (only for dual courses)
<p>1. Lecturing This part will cover the main concepts related to the class topic as listed in the course outline below.</p>	
<p>2. Practical application of the lecture material: Class topic related data analysis in SPSS and/or Stata. The datasets are retrieved from EuroStat, European Social Survey, World bank, IMF, etc.</p>	
<p>3. Individual homework assignments: Homework assignments for each topic will be made available via Moodle system and/or e-mails.</p>	

<p>4. Group Assignment or Project: Students should be able to complete an empirical work applying the statistical and econometric tools presented in class. Groups have to define an economic or business issue, find the data to test it and finally apply the statistical and econometrics tools to test/explain their hypothesis. Further information about the requirements for the paper will be provided in the class. The schedule is the following:</p> <ol style="list-style-type: none"> 1. Groups should decide on the topic of their empirical projects. Due on: Week 5 and week 6 2. Propose the hypothesis to be studied (one page containing preliminary title and brief description of the project). Due on: week 7 3. Project Report (3 pages). Students should describe the preliminary datasets, analysis and provide the sources. The groups should describe the tasks already accomplished and the pending tasks to finish the work. Due on: week 9. 4. Final Paper (Maximum 25 pages). Due on: week 11. Writing style – APA - Times New Roman, font 12, 1.5 space between lines. 	
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VI. Evaluation system of the course (in case of a dual course the system of evaluation of activities performed by of students participating in dual studies should also be discussed)

Activities/Assignments	Grade distribution
Individual/Class Participation	10%
Individual/HW Assignments	50%
Group Assignment	40%
Total	100 %

Grading break down:

%/Points Achieved	Hungarian Grading	ECTS Equivalent	Grade Definition
88-100	5	A	Excellent
76-87	4	B	Good
64-75	3	C	Satisfactory
52-63	2	D	Pass
0-51	1	F	Fail

VII. Compulsory literature

Denis, D. J. (2016). *Applied univariate, bivariate, and multivariate statistics*. United States, NJ: John Wiley & Sons.

Hill, R. C., Griffiths, E. W., & Lim, C. G. (2018). *Principles of econometrics* (5th ed). United States, NJ: John Wiley & Sons.

Baddeley M.C., & Barrowclough D.V. (2009). *Running regressions: A practical guide to quantitative research in economics, finance and development studies*. UK, Cambridge: Cambridge University Press.

Older editions of these texts can also be used. The lecturer might still be using some chapters or parts from other texts, articles, etc.

VIII. Recommended literature

Beins, C. B., & McCarthy, A. M. (2012). *Research methods and statistics*. Boston, MA: Pearson.

IX. Time of class:

Week/ Venue/ Time	Topics	Main Concepts	Class activities/assignments
	Professor & Student Introductions. Data sources and software.	Course introduction and syllabus review. Review of necessary Math and Software discussions. Role of the Statistics in economics and business. Data sources. Software programs. Sampling and sampling distributions.	Lecturing, data sets and discussions.
	Fundamentals of Hypothesis Testing	Developing null and alternative hypotheses. Population mean, σ known. Population mean, σ unknown. Type I and Type II Errors. One-Tailed and Two-Tailed Tests.	Lecturing, discussions, topic related economic data analysis in SPSS and/or Stata.
	One and Two-Sample Tests. T-test vs Z-test.	One-sample tests. Comparing the means of two independent populations. Related research questions and hypotheses. Comparing the means of two related populations. Comparing the variances of two independent populations.	Lecturing, discussions, topic related economic data analysis in SPSS and/or Stata. HW 1 Due.
	Confidence Interval Estimations.	Confidence interval estimate for the mean (σ Known). Confidence interval estimate for the mean (σ unknown). Determining the sample size.	Lecturing, discussions, topic related economic data analysis in SPSS and/or Stata. HW 2 Due. Group project members assigned.
	Analysis of Variance, ANOVA/ANCOVA.	Assumptions and conceptual overview of ANOVA/ANCOVA. Related research questions and hypotheses. Comparing the variance estimates: The <i>F</i> Test. Post hoc analysis. Chi-Square Test of Independence.	Lecturing, discussions, topic related economic data analysis in SPSS and/or Stata. Topic of the group projects Due.
	MANOVA/MAN-COVA	Assumptions and conceptual overview of MANOVA. Related research questions and hypotheses. Box's M test. Levene's test. Wilks lambda and other tests. MANCOVA. Comparing	Lecturing, discussions, topic related economic data analysis in SPSS and/or Stata. HW 3

		the variance estimates: The F Test. Post hoc analysis.	Due.
	Factor Analysis. Principal components analysis.	Factor loadings. Communalities. Principal components analysis. Related research questions and hypotheses. Eigenvalue and its relationship to a scree plot. Assessment of model fit and parsimony. Distinguish between orthogonal and oblique rotations.	Lecturing, discussions, topic related economic data analysis in SPSS and/or Stata. HW 4 Due.
	Multiple Regression.	CLRM assumptions. Least squares method. Related research questions and hypotheses. Multiple coefficient of determination. Testing for significance. Categorical independent variables. Multicollinearity. Interaction between independent variables.	Lecturing, discussions, topic related economic data analysis in SPSS and/or Stata. HW 5 Due.
	Further Inference in the Multiple Regression Model.	Restricted and unrestricted models. The F -test to test single null hypotheses or joint null hypotheses. Heteroskedasticity. Stepwise regression. Akaike information or Schwartz criteria to select variables for a predictive model.	Lecturing, discussions, topic related economic data analysis in SPSS and/or Stata. The preliminary datasets, analysis and their sources are Due.
	Qualitative and Limited Dependent Variable Models.	Categorical data analysis. Related research questions and hypotheses. Limited dependent variables. Linear probability model. Logistic random variable.	Lecturing, discussions, topic related economic data analysis in SPSS and/or Stata. Group project draft papers Due.
	Logit vs. Probit.	Binary choice models. Logit vs Probit. Probabilities, odds, and odds ratios. Feasible generalized least squares. Latent variables.	Lecturing, discussions, topic related economic data analysis in SPSS and/or Stata.
	Group Project Presentations.	Student small groups' project presentations, and Q/A session.	