COURSE SYLLABUS

Academic Year: 2023-2024

Identification and characteristics of the course				
Code	500420	ECTS Credits		6
Course title (English)	ECONOMETRICS I			
Course title (Spanish)	ECONOMETRÍA I			
Degree programs	• Bachelor's Degree in Economics (GECO) • Bachelor's Double Degree in Business Administration and Management and Economics (PCEO ADE-ECO)			
Faculty/School	Faculty of Economics and Business Administration			
Semester	4 (ECO) / 6 (ADE-ECO)	Course type (compulsory/optional)		Compulsory
Module	Quantitative Methods for Economics			
Subject matter	Statistics-Econometrics			
Lecturer/s				
Name	Room	E-mail		Web page
RAMAJO HERNÁNDEZ, JULIÁN	50 (Departments Building)	ramajo@unex.es		https://sites.google.com/site/julianramajo
Subject Area	Quantitative Methods for Economics and Business			
Department	Economics			
Coordinator (Only if there is more than one lecturer)				

Competencies*

Basic Skills and General Competences: CB1, CB2, CB3, CB4, CB5; CG1, CG2, CG3, CG4.

CB1 – Students should have demonstrated and understood a basic level of the knowledge field showing a progress of knowledge from a secondary school level to a higher advanced level using vanguard studies of the field.

CB2 – Students should be able to apply their knowledge to their work or vocation in a professional way. Students should possess the skills that are usually demonstrated through argument elaboration and defense and problem solving within their area of study.

CB3 – Students should have the ability to collect and interpret relevant data (usually within their area of study) to make judgments that include a reflection on relevant social, scientific, or ethical issues.

CB4 – Students should be able to transmit information, ideas, problems, and solutions to specialized and non-specialized audiences.

CB5 – Students should have developed those learning skills necessary to undertake further studies with a high degree of autonomy.

CG1 – Ability to identify and anticipate relevant economic problems in the private and/or public domains, to discuss the alternative solutions, and to select the most appropriate ones.

CG2 – Ability to provide rationality for the analysis and description of any aspect of economic reality.

CG3 – Ability to apply professional criteria based on the management of technical instruments to the analysis of economic problems.

CG4 – Ability to design, manage and write economic projects and to issue advice reports on specific situations of the (international, national, or regional) economy.

Transversal Skills: CT1, CT2, CT4, CT5, CT8, CT9, CT10, CT11.

CT1 – Computer literacy and ICT skills.

CT2 – Oral and written communication skills in Spanish.

CT4 – Ability to manage, analyze, and synthesize information.

CT5 – Ability to work in a team.

CT8 – Independent learning ability.

CT9 – Critical thinking and self-criticism.

CT10 – Ability to solve problems.

CT11 – Ability to make decisions.

Specific Skills: CE5, CE6.

CE5 – Ability to know, understand, and use the principles of statistics.

CE6 – Ability to know, understand, and use the principles of econometrics.

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*   The sections concerning competencies, course outline, teaching activities, teaching methodology, learning outcomes and assessment methods must conform to those included in the ANECA verified document of the degree program.

Contents

Course outline*

INTRODUCTION TO ECONOMETRICS. THE LINEAR REGRESSION MODEL: THE LEAST SQUARES ESTIMATOR AND ITS SAMPLING PROPERTIES; INTERVAL ESTIMATION AND HYPOTHESIS TESTING; PREDICTION, GOODNESS-OF-FIT, AND MODELING ISSUES; AND DIAGNOSTIC TOOLS. VIOLATION OF THE BASIC ASSUMPTIONS OF THE MODEL.

I. The main objectives of Unit 1 (which serves as a course introduction) are to discuss the purpose and scope of Econometrics and to develop its conceptual framework.

II. The main and secondary objectives of Unit 2 and Unit 3 (which constitute the course core) are the following:

a) The main objectives are to perform a regression analysis, to examine the validity of an econometric model, and to interpret the econometric results from statistical and economic perspectives.

b) The secondary objectives are to collect and manage economic data, to use the econometric software *gretl*, and to evaluate the econometric analyses conducted in different economic studies.

Course contents

Unit 1: Introduction to Econometrics

Contents of unit 1:
1.1. Definition of Econometrics
1.2. Economic models
1.3. Econometric models
1.4. Elements of an econometric model
1.5. Basic principles for the user of Econometrics

Description of practical activities for unit 1:
• Introduction to the econometric software *gretl*
• Data management with *gretl*
• Making graphic representations and calculating basic statistics with *gretl*
• Statistical sources for econometric analysis: data search and manipulation

Unit 2: The Linear Regression Model and its Assumptions

Contents of unit 2:
2.1. The linear regression model. Assumptions of the linear regression model
2.2. Goodness of fit
2.3. Inference in linear regression (I): interval estimation and hypothesis testing for the model parameters
2.4. Inference in linear regression (II): joint hypothesis testing and the restricted least squares estimator
2.5. Prediction in the linear regression model
2.6. Functional form

Description of practical activities for unit 2:
• Estimating linear regression models with the econometric software *gretl*
• Analyzing econometric results from statistical and economic perspectives
• Developing hypothesis tests and confidence intervals from the estimated models
• Simulation, prediction, and modeling issues

Contents (cont.)

Unit 3: Validation of the Linear Regression Model

Contents of unit 3:
3.1. General criteria for evaluating and validating econometric models
3.2. Analysis of the basic assumptions related to the model specification: omitted variables, irrelevant variables, functional form, and parameter stability
3.3. Analysis of the basic assumptions related to the error term: non-normality of the residuals, heteroskedasticity, and autocorrelation
3.4. Analysis of the basic assumptions related to the sample data: multicollinearity and measurement errors in the model variables

Description of practical activities for unit 3:
• Validating the assumptions of the linear regression model: performing the appropriate statistical tests with *gretl*

Educational activities*								
Student workload (hours per lesson)		**Lectures**	**Practical sessions**				**Monitoring activity**	**Homework**
Lesson	**Total**	**L**	**HI**	**LAB**	**COM**	**SEM**	**SGT**	**PS**
1. Theory	2	1	—	—	—	—	—	1
1. Practice	6	1.5	—	—	—	2	0.5	2
2. Theory	30	10	—	—	—	—	—	20
2. Practice	36	11	—	—	—	4	1	20
3. Theory	30	10	—	—	—	—	—	20
3. Practice	36	11	—	—	—	4	1	20
Assessment**	10	3	—	—	—	—	—	7
TOTAL ECTS	**150**	**47.5**	**—**	**—**	**—**	**10**	**2.5**	**90**

L: Lectures (100 students)
HI: Hospital internships (7 students)
LAB: Lab sessions or field practice (15 students)
COM: Computer room or language laboratory practice (30 students)
SEM: Problem-solving classes, seminars, or case studies (40 students)
SGT: Scheduled group tutorials (educational monitoring, ECTS type tutorials)
PS: Personal study, individual or group work and reading of bibliography

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** Insert as many rows as necessary. For instance, you can include one row for a partial exam and another for the final exam.

Teaching methodology*

1. Lecture method (I). The professor explains some particular topics of the course.
2. Lecture method (II). The professor delivers some examples or solves some problems with emphasis on procedures/techniques.
3. Problem-solving method. The professor sets out a problem and students try to find a solution by applying problem-solving techniques.
4. Case studies. Students analyze real or simulated cases in order to interpret, solve, ponder, and complete their knowledge.
5. Collaborative activities. Students work in groups to broaden and deepen theoretical knowledge by searching relevant sources of information and data and applying them.
6. Learning assessment. Students take some tests in order to assess their progress and reinforce their learning process.

Learning outcomes*

a) Students will be able to recall information, concepts and theories that can be used later for the quantitative analysis of economic situations.
b) Students will be able to understand the information, concepts or theories learned in order to reformulate and structure them by means of statistical-mathematical models.
c) Students will be able to apply the information, concepts or theories learned to face new situations, solve economic problems with appropriate techniques and instruments, and collect, manipulate and interpret current relevant data on the Spanish, European and world economies.
d) Students will be able to analyze economic phenomena to reach cause-effect conclusions, make inferences and interpret data by identifying patterns and trends, and relate them to the theoretical concepts acquired.
e) Students will be able to evaluate the relevance, adequacy or operability of certain situations and measures adopted in the Spanish, European and international economies.

Assessment methods*

There are two methods of assessment: (a) continuous assessment, and (b) final examination. In both assessment methods, students must achieve a minimum overall grade of 5 points on a grading scale from 0 to 10 in order to pass the course.
The student must notify the professor (via the University of Extremadura's Virtual Campus) the type of assessment that he or she has chosen in the first three weeks of each semester. If there is no notification, continuous assessment will be selected as the default method. Once the student has chosen the type of assessment, his or her preferred method cannot be changed during the semester.
For legal aspects, see «Normativa de Evaluación de las Titulaciones oficiales de Grado y Máster de la Universidad de Extremadura», DOE No. 212, November 3, 2020 (in Spanish).

Assessment methods* (cont.)

a) Continuous assessment

This system consists of the following written activities:

- Course assignments. Complementary out-of-class activities are proposed by the professors.
- Mid-semester test. Theoretical and practical contents and skills of the first thematic module are evaluated.
- End-of-semester test. Theoretical and practical contents and skills of the second thematic module are evaluated.
- Final exam (if necessary). Theoretical and practical contents and skills of the three course units are evaluated.

Any unsubmitted course assignments will be awarded zero points each. The course assignments' grades are valid for the current academic year only.

Once both written tests are completed, the overall grade of the course is obtained as follows:

Overall course grade =
10% Continuous assessment assignments' grades +
90% (50% Mid-semester test grade + 50% End-of-semester test grade)   (1)

To pass the course, students must sit both examinations, must secure no less than 4 out of 10 points in each written test, and must obtain an overall grade (eq. 1) of at least 5 out of 10 points.

The student who do not secure an overall grade (eq. 1) of 5 out of 10 points or more can sit the final exam.

Once the final exam of the continuous assessment method is completed, the overall grade of the course is obtained as follows:

Overall course grade =
10% Continuous assessment assignments' grades + 90% Final exam grade   (2)

To pass the course, students must obtain an overall grade (eq. 2) of at least 5 out of 10 points.

According to University of Extremadura (UEx) regulations, there are two opportunities per academic year to take the course final exam, the "ordinary call" in June and the "extraordinary call" in July. Students must check in advance that they are entitled to take an exam or will not be evaluated. The final exam dates and times will be published on the website of the UEx's Faculty of Economics and Business Administration [https://www.unex.es/conoce-la-uex/centros/eco] before the end of classes.

Assessment methods* (cont.)

b) Final examination

This system consists of a single written test:

- Final exam. Theoretical and practical contents and skills of all course units (i.e., from 1 to 3) are evaluated.

The final exam of the final examination method can be different from the final exam of the continuous assessment method since the former must also evaluate the contents and skills covered in the continuous assessment assignments.

Once the final exam of the final examination method is completed, the overall grade of the course is obtained as follows:

Overall course grade = 100% Final exam grade   (3)

To pass the course, students must obtain an overall grade (eq. 3) of at least 5 out of 10 points.

According to University of Extremadura (UEx) regulations, there are two opportunities per academic year to take the course final exam, the "ordinary call" in June and the "extraordinary call" in July. Students must check in advance that they are entitled to take an exam or will not be evaluated. The final exam dates and times will be published on the website of the UEx's Faculty of Economics and Business Administration [https://ecouex.es/] before the end of classes.

Bibliography (basic and complementary)

Basic bibliography
Theory and practice
- Hill, R.C., Griffiths, W.E., and Lim, G.C. (2018). Principles of Econometrics, Five Edition. Wiley.
- Adkins, L.C. (2018). Using gretl for Principles of Econometrics, 5th Edition, Version 1.0. Retrieved from http://www.learneconometrics.com/gretl/index.html

Supplementary bibliography
Theory and practice
- Brooks, C. (2019). Introductory Econometrics for Finance, Fourth Edition. Cambridge University Press.
- Stock, J.H. and Watson, M.M. (2020), Introduction to Econometrics, Fourth Edition, Pearson.
- Wooldridge, J.M. (2020). Introductory Econometrics. A Modern Approach, Seventh Edition. Cengage Learning, Inc.

Other resources and complementary materials

Throughout the course, other suitable material (theoretical and practical PDF handouts) will be provided via the University of Extremadura's Virtual Campus [https://campusvirtual.unex.es/portal/], and the professors of Econometrics' dedicated webpage [https://sites.google.com/site/rmneconometria/].