

## COURSE PROGRAM

Academic Year: 2023/2024

Identification and characteristics of the course			
Code	500425	ECTS Credits	6
Course name (English)	ECONOMETRICS II		
Course name (Spanish)	ECONOMETRÍA II		
Degree programs	-Bachelor's Degree in Economics (GECO) -Bachelor's Double Degree in Business Administration and Management, and Economics (PCEO GADE-GECO)		
Faculty/School	Faculty of Economics and Business Administration		
Semester	5 <sup>th</sup> (GECO) / 7 <sup>th</sup> (PCEO GADE-GECO)	Type of course	Compulsory
Module	Quantitative Methods for Economics		
Matter	Statistics-Econometrics		
Lecturer/s			
Name	Office	E-mail	Web page
MÁRQUEZ PANIAGUA, MIGUEL ÁNGEL	70(Department Building)	mmarquez@unex.es	<a href="https://sites.google.com/view/mamarquez/home">https://sites.google.com/view/mamarquez/home</a>
Subject Area	Quantitative Methods for Economics and Business		
Department	Economics		
Coordinating Lecturer (If more than one)			
Competencies*			
<p><b>Basic competences:</b> CB1, CB2, CB3, CB4, CB5</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>CB4 – Students should be able to transmit information, ideas, problems, and solutions to specialized and non-specialized audiences.</p> <p>CB5 – Students should have developed those learning skills necessary to undertake further studies with a high degree of autonomy.</p>			
<b>General competences:</b> CG1, CG2, CG3, CG4			

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 competences:** CT1, CT2, CT4, CT5, CT8, CT9, CT10, CT11  
 CT1 - Computer literacy and information and communications technology (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 competences:** CE5, CE6  
 CE5 – Ability to know, understand, and use the principles of statistics.  
 CE6 – Ability to know, understand, and use the principles of econometrics.

**Contents**

**Course outline\***

**EXTENSIONS OF THE LINEAR REGRESSION MODEL: INDICATOR (DUMMY) VARIABLES; HETEROSKEDASTICITY; DYNAMIC ECONOMETRIC MODELS; RANDOM REGRESSORS; PANEL DATA MODELS; AND QUALITATIVE AND LIMITED DEPENDENT VARIABLE MODELS.**

The main and secondary objectives of this course are the following:

a) The main objectives are to test the basic assumptions of the linear regression model, to propose alternative solutions in case of assumption violation, and to interpret the selected model results from econometric 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 syllabus**

**Title of Unit 1: Extensions of the Linear Regression Model: Advanced Topics on Functional Forms**

Contents of Unit 1:

1.1. Structural change: regressions with changing parameters  
 1.2. Non-linearity: the non-linear least squares estimator  
 1.3. Criteria for selection between alternative models

Description of practical activities for Unit 1:  
 Testing the basic hypotheses of the linear regression model related to the functional specification: carrying out the corresponding statistical tests and corrections with the *gretl* program.

**Title of Unit 2: Extensions of the Linear Regression Model: Advanced Topics on the Error Term**

Contents of Unit 2:

2.1. Non-normality of errors: robust estimation  
 2.2. Heteroscedastic regressions  
 2.3. Autocorrelation regressions and dynamic econometric models  
Description of the practical activities of Unit 2:  
 Testing the basic hypotheses of the linear regression model related to the error term: carrying out the corresponding statistical tests and corrections with the gretl program. Specification and estimation of dynamic models.

**Title of Unit 3: Extensions of the Linear Regression Model: Advanced Topics on Sample Information**

Contents of Unit 3:  
 3.1. Colinearity between explanatory variables: the ridge estimator and the principal components method  
 3.2. Missing data  
 3.3. Aggregation of data  
 3.4. Measurement errors, simultaneous equations and stochastic regressors: the estimator of instrumental variables and the Sargan test of instruments validity  
 3.5. Outliers  
 3.6. Data panels  
 3.7. Discrete or limited dependent variable

Description of the practical activities of Unit 3:  
 Testing the basic hypotheses of the linear regression model related to the available sample information: carrying out the corresponding tests and statistical corrections with the gretl program.

**Educational activities**

Student workload in hours by lesson		Lectures	Practical activities				Monitoring activity	Homework
Lesson	Total	L	HI	LAB	COM	SEM	SGT	PS
1. Theory	20,5	7,5	—	—	—	—	—	13
1. Practice	25,5	7,7	—	—	—	3	0,8	14
2. Theory	20,5	7,5	—	—	—	—	—	13
2. Practice	26,5	7,7	—	—	—	3	0,8	15
3. Theory	20	7	—	—	—	—	—	13
3. Practice	27	7,1	—	—	—	4	0,9	15
<b>Assessment **</b>	10	3	—	—	—	—	—	7
<b>TOTAL</b>	150	47,5	—	—	—	10	2,5	90

L: Lectures (100 students)  
 HI: Hospital internships (7 students)  
 LAB: Laboratory or field practices (15 students)  
 COM: Computer room or language laboratory practices (30 students)  
 SEM: Problem classes or 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

**Teaching Methodologies**

1. Expository method consisting of the presentation by the teacher of the contents on the subject of study.  
 2. Expository method that consists of the presentation by the teacher of examples or problems and the way to solve them.  
 3. Method based on the presentation of problems by the teacher and their resolution by the students through the application of problem-solving procedures.

\*\* Indicate the total number of evaluation hours of this subject.

4. Method based on the intensive analysis of real or simulated cases in order to interpret, solve, reflect and complete knowledge.
5. Collaborative method for group work that allows to broaden and deepen theoretical knowledge by searching relevant sources of information and data, and applying them.
6. Method by which the students perform some test that serves to reinforce their learning and as an evaluation tool.

### Learning outcomes

Recall information, concepts and theories that can be used later in the quantitative analysis of economic situations.

Understand the information, concepts or theories learned in order to reformulate and structure them through statistical-mathematical models.

Apply the information, concepts or theories learned to face new situations, solve economic problems using appropriate techniques and instruments, and collect, manipulate and interpret relevant current data on the Spanish, European and world economy.

Analyse economic phenomena to reach cause-effect conclusions, make inferences and interpret data identifying patterns and trends, and relate them to the theoretical concepts acquired.

To evaluate the relevance, adequacy or operability of certain situations and measures adopted in the framework of the national, European or international economy.

### Assessment systems

There are two alternative methods of assessment: **(a)** continuous assessment, and **(b)** final examination (a single comprehensive final test).

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).

#### **(a) Continuous assessment**

In the continuous assessment system, 90 % of the final score will come from the overall mark obtained as a result of the completion of two partial knowledge exams (after each topic or thematic block) and/or a final exam (if applicable), while the remaining 10 % will come from the completion of complementary activities of a non-attendance nature (proposed by the teacher). This assessment could also include attendance at those transversal activities (conferences, workshops, talks, colloquiums, etc.) that take place during the semester at the center and that represent a plus for the comprehensive training of the student. These activities have a final deadline, and once handed in and assessed, any modification of the grade will not be permitted.

#### **1.-Partial exam and/or final exam (90%).**

Each partial knowledge exam will consist of theoretical and practical questions (interpreting the results economically). These exams will be evaluated with a score from 0 to 10 points.

At least four points must be obtained in the first exam in order to sit the second exam. Once the two exams have been taken, if a mark equal to or greater than 4 points has

been obtained in all of them, the overall mark will be the average of the marks obtained in the two partial knowledge exams.

A student will pass the course, without having to take the final exam, when his weighted average mark (between the global mark of the two exams partial knowledge tests and the mark of the complementary activities of the course) is at least 5 points.

A student whose weighted average mark is less than 5 points must pass a final examination (in which the theoretical and practical knowledge required to acquire the skills of the subject will be assessed). This final exam will be graded with a score from 0 to 10 points. The student will pass the course when the weighted average mark between this final exam and the mark of the complementary activities (see point 2 below) is at least 5 points.

**2.- Continuous assessment assignment and complementary activities (10%)**

The participation of the student in the activities that take place in the classroom during the period of the classes will be assessed, as well as the resolution of exercises and problems outside the classroom.

**(b) Final examination (assessment with a single overall final test).**

In the evaluation system with a single overall final exam, 100% of the final score obtained by the student will come from the grade obtained in the final exam.

The student will take the final exam after concluding the classes of the subject. In this exam the theoretical and practical knowledge that the student needs to acquire the competences of the subject will be evaluated. This final exam will be graded with a score from 0 to 10 points, to one decimal place, to which the corresponding qualitative grade can be added.

The student will pass the course when the grade of the final exam is at least 5 points.

**Bibliography (basic and complementary)**

**Basic Bibliography**

Hill, R.C., Griffiths, W.E., and Lim, G.C. (2011). Principles of Econometrics, Fourth Edition. Wiley.

Adkins, L.C. (2018). Using *gret!* for Principles of Econometrics, Fifth Edition. [<http://www.learn econometrics.com/gret/index.html>]

**Supplementary Bibliography**

Gujarati, D.N., and Porter, D.C. (2009). Basic Econometrics, Fifth Edition. McGraw-Hill.

Wooldridge, J.M. (2016). Introductory Econometrics. A Modern Approach, Sixth Edition. Cengage Learning.

**Other resources and complementary educational materials**

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