GUÍA DOCENTE

ECONOMETRICS

**Degree at Economics and International Business
University of Alcalá**

Academic Year 2025/2026

Compulsory - 2nd Year - 1er Four-month period

TEACHING GUIDE

Name of the subject:	**ECONOMETRICS**
Code:	**363001**
Degree in which it is taught:	**DEGREE IN ECONOMICS AND INTERNATIONAL BUSINESS**
Department and Area of Knowledge:	**ECONOMY** **APPLIED ECONOMICS**
Character:	**MANDATORY**
ECTS credits:	**6 ECTS**
Year and term:	**Compulsory of 2º. COURSE, 1er QUATTER**
Faculty:	JOSÉ MARÍA ARRANZ MUÑOZ ADOLFO CRISTOBAL CAMPOAMOR PABLO DEL RÍO GONZÁLEZ ESTHER GALINDO FRUTOS Mª JOSÉ LECETA REY JENS PETERS CRISTINA SUÁREZ GÁLVEZ Mª DEL MAR ZAMORA SANZ
Teacher in charge:	JENS PETERS
Tutoring Schedule:	**Tutorials can be arranged, upon request in class or by e-mail, for the times established at the beginning of the course.** **[jens.peters@uah.es]**
Language of instruction:	English

1st PRESENTATION

Econometrics can be understood as the part of economics that combines economic theory, statistics, and mathematics to understand the quantitative relationships of economic analysis. In this sense, it is a discipline that deals with the empirical analysis of economic relationships, helping to validate or reject the contributions of economic theory, offering appropriate statistical tools for the testing of theoretical hypotheses and specifying models with good predictive properties.

To this end, Econometrics links theory and data to quantify and explain economic relationships using the tools provided by statistics and mathematics. Thus, econometric modelling has four simultaneous objectives: simplifying economic relationships, interpreting data, choosing between alternative theories and, finally, increasing and consolidating empirical knowledge about how the economy works.

Furthermore, the subject of Econometrics must provide the necessary tools to contrast the empirical validity of the different economic-business theories. For this purpose, the subject is designed with a fundamentally practical focus, but without ignoring the theoretical content on which it is based. In this sense, the subject Econometrics has an introductory character, centred on linear regression models, but aims to offer the student, in a clear and precise way, the fundamentals of Econometrics as a basic tool in the analysis, study and development of more complex econometric models.

With this purpose, it is intended that the knowledge acquired after the study of this subject will be useful by offering the basic notions of Econometrics that, at an introductory level, all future graduates in Economics and International Business should possess. In this sense, the study of this subject is proposed as a starting point for the understanding of other subjects that develop modelling in other environments and that are taught in subjects in higher undergraduate or postgraduate courses.

Very briefly, it can be pointed out that the subject Econometrics deals with the study of single-equation linear regression models in a static environment. In this sense, its study begins with an introduction to the so-called Classical Linear Regression Model, which includes a basic reminder of both the estimation methods and the inference procedures necessary to tackle the subject. After this introduction, modifications are made to the classical specification which will allow us to identify the so-called Generalised Linear Regression Model which establishes the basis for the study of empirical models closer to economic reality. These problems are analysed under the terms Models with homoscedastic and autocorrelated disturbances, depending on the type of specifications introduced in the model. The importance of dummy variables as exogenous and endogenous variables will also be studied through the estimation of discrete choice models (logit and probit models).

Prerequisites and Recommendations:

For students to be able to adequately follow this subject, it is necessary that they have attained knowledge of matrix algebra and optimization (Mathematics subjects), as well as of probability distributions and statistical inference (Statistics subjects).

Basic and general competences:

CG1.- Acquire skills in negotiation techniques used in international institutions and companies.

GC2.- Ability to analyze data and reports coming specifically from international sources (companies, international institutions such as IMF, WTO or Bank for International Settlements).

CG3.- Interest in updating the permanent requirements of organization and planning techniques for international business and public activities.

CG4.- Ability to assess the multiplicity of social, political, technical, etc. factors that converge in international business and institutional decisions.

GC5.- To acquire the current ethical criteria that can be permanently updated, as expressed in different countries through anti-corruption codes, international economic rights charters, etc.

CG6.- Ability to integrate in interdisciplinary teams made up of people from very different countries and backgrounds.

CG7.- Scientific and professional curiosity for the permanent use of analytical and conceptual instruments specific to international economic relations.

CG8.- Motivation for the pursuit of quality in professional practice and development

CG9.- Curiosity for learning the new techniques and instruments that are continually being introduced in the international world.

CG10.- Written and oral expression skills that can be used in different environments.

CG11.- Ability to use the English language in the search for information and use of resources in English, and in the preparation and presentation of academic activities.

CB1 - Knowledge and understanding of an area of study that builds on the foundation of general secondary education, and is usually at a level that, while relying on advanced textbooks, also includes some aspects that involve knowledge from the cutting edge of their field of study.

CB2 – Ability to apply knowledge to work or vocation in a professional manner and possession the competences usually demonstrated through the development and defense of arguments and problem solving within their field of study.

CB3 – Ability to gather and interpret relevant data (usually within the field of study) to make judgements that include reflection on relevant social, scientific or ethical issues.

CB4 - Ability to convey information, ideas, problems and solutions to both specialist and non-specialist audiences.

CB5 - Ability to developed the learning skills necessary to undertake further studies with a high degree of autonomy.

Cross-cutting competences:

CT1.- Acquire techniques and skills related to professional practice, including the application of the relevant ethical regulations.

CT2.- Know the resources available for accessing information and using them effectively.

CT3.- Acquire oral and written communication skills in modern languages, both in professional and other contexts.

CT4.- Understand the ideas and arguments expressed in a foreign language, in writing and orally, both in everyday situations and in professional and specialized contexts.

CT5.- Advanced command of the most frequently used office tools in a professional environment (word processing, databases, and spreadsheets) and advanced use of electronic communication, navigation and data search programs (electronic mail and Internet).

CT6.- Design presentations using computer programs and the ability to structure information in an appropriate manner and transmit it clearly and effectively, with a basic knowledge of the operation of data transmission networks.

CT7.- Know the main techniques of management, conflict resolution, labour selection and motivation of human teams in a work environment with the use of effective strategies in time management.

CT8.- Plan and develop research in a specific field of study, in accordance with the academic and scientific requirements that are specific to it.

CT9. – Acquire digital skills and competence in the field, as outlined in the Department's Master Plan, which is part of the University of Alcalá's Strategic Plan 2036

Specific competences:

CE9.- Reinforce and/or acquire skills in Mathematical Analysis for Economics.

CE10. Use and apply mathematical language as a globalized vehicle for the expression of complex concepts in modern economic analysis.

CE15.- To acquire the ability to analyze, synthesize and critically summarize economic-business information using quantitative tools in the different economic- business fields.

CE16.- Apply the theoretical knowledge acquired to econometric practice, drawing up medium and long-term predictions based on a model and through econometric computer programs of quantitative analysis.

Learning outcomes of the subject

In this subject, students acquire the basic concepts of econometric models that, at an introductory level in Econometrics, a graduate in Economics and International Business should possess.

Thee acquired knowledge in Econometrics links theoretical and practical concepts (with data and software) for the purpose of quantifying and explaining economic relationships using the tools provided by statistics and mathematics in econometric modelling.

The econometric modelling has five simultaneous objectives: simplification of economic and business relationships, interpretation of data, estimation of parameters in models, choice between alternative theories and models and, finally, increase and consolidation of empirical knowledge about how Economics and International Business works. In this sense, the study of this subject is proposed as a starting point for the understanding of other subjects that develop modelling in other environments and that are taught in subjects in higher undergraduate or postgraduate courses.

3. CONTENTS

Content blocks (topics can be specified if necessary)	Total classes, credits, or hours
The nature of econometrics and econometric data	• 3 hours
The multiple regression model: estimation, inference, and prediction	• 15 hours
Relaxation of classical assumptions: (autocorrelation, heteroscedasticity, misspecification, and additional issues).	• 12 hours
Binary or exogenous dummy variables	• 6 hours
Binary choice models: logit/probit	• 12 hours

Timetable (Optional)

Week / Session	Content
1	• The nature of econometrics and econometric data • Learning and use of computer software
2-4	• Estimation and inference in the classical normal linear regression model
5-8	• Generalized linear regression model • Heteroskedasticity, autocorrelation, misspecification, and additional questions
9-11	• Exogenous qualitative (dummy) variables
12-14	• Binary choice models: logit/probit
15	• Review and exam preparation

4. TEACHING-LEARNING METHODOLOGIES-TRAINING ACTIVITIES

4.1. Distribution of credits (specify in hours)

Number of classroom hours: **48**	Theoretical lectures: 22,5 (1,5h*15 weeks)
	Practical classes and seminars: 22.5 (1,5h*15 weeks) Examinations and evaluation tests: 3
Number of working hours student's own: **102**	Hours of self-study: 50 Elaboration and resolution of exercises: 22 Work and activities: 30
Total hours: **150**	

Face-to-face classes	<u>Theoretical classes</u> in which the lecturer will develop the basic concepts of each of the subjects contained in the program. These classes will also guide the study work to be carried out by the students. <u>Practical classes</u> in which the professor carries out practical cases of application of the contents exposed in the theoretical classes to the professor might also develop auxiliary concepts that he/she considers appropriate or complementary to the theoretical classes These practical classes will take place, whenever possible, in the IT classroom to learn more about the use of computer software.
Self-employment	The student's personal autonomous work is one of the fundamental elements of the learning process. This autonomous work must be oriented in such a way as to guarantee the acquisition of the contents taught in the theoretical and practical classes, and that a distinction can be made between study time and applied work time. <u>Study by the student</u>. As part of the student's autonomous work, he/she must review and understand the bibliographic materials and any other material that may be proposed in the development of the subject. <u>Applied work</u>. Students must dedicate part of their independent work time to carrying out the applied activities and exercises proposed in class. Students will be able to make use of Artificial Intelligence tools as a complement in the resolution and interpretation of econometric exercises. Its use will be oriented to facilitate the understanding and critical analysis of the results, promoting autonomous learning and reflective thinking.

Tutorials	Tutorials are optional for students and can be in groups or individually. In the tutorials, the lecturer will orient and guide the students in carrying out the directed academic activities to check how they are being carried out and thus be able to resolve any doubts and questions that may arise. In the tutorials, the teacher will try to guide the individual study of the student who needs it, clarifying the specific doubts that may arise, correcting poorly acquired concepts and guiding the student on how to successfully complete the subject and enhance his/her desire for knowledge. The tutoring or consultation hours of each teacher will be communicated at the beginning of the course and published in the Virtual Classroom of the subject.

5. EVALUATION: Procedures, evaluation and grading criteria[1]

Evaluation criteria[1]

The assessment criteria for this subject are aimed at evaluating the acquisition of the general and specific competences of the subject. To this end, it will include the evaluation of both the theoretical and practical contents taught in the classroom classes, as well as those acquired through the student's autonomous work.

The evaluation of the subject in the ordinary call can be carried out, according to the regulations of the UAH, via either of the following procedures:

1. Continuous assessment system
2. Final assessment system

Each assessment system is explained below, although the application of the continuous assessment system will be adapted to the teaching resources and the number of students per group, and will be communicated in due time at the beginning of the classes.

Qualification criteria

On a numerical grading scale with one decimal place and a qualitative grade:
      0.0 - 4.9   FAIL
      5.0 - 6.9   PASSED

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[1] In accordance with the Regulations governing learning assessment processes, approved by the Governing Council on 24 March 2011, it is important to point out the assessment procedures e.g., continuous assessment, final assessment, self-assessment, co-assessment. Instruments and evidence: assignments, activities. Criteria or indicators to be assessed in relation to competences: mastery of conceptual knowledge, application, knowledge transfer. For the grading system consider the Regulations of the Governing Council of 16 July 2009.

7,0 - 8,9   REMARKABLE
9,0 – 10   OUTSTANDING
9,5 – 10   DISTINCTION (limited to 5% and ordinary call)

Evaluation procedure (ordinary call)

1) Continuous Assessment

The assessment criteria for this subject are aimed at assessing the acquisition of the general and specific competences of the subject. To this end, the assessment of the subject will include the evaluation of both the theoretical and practical contents taught in the classroom classes, as well as those acquired through the student's autonomous work.

For the continuous assessment of the competences acquired by students in the subject, students must attend class regularly (at least 75% of the sessions), participate actively, solve the practical cases that are proposed individually or in groups, and take all the assessment tests that are proposed throughout the course. This component contributes up to 30% to the final grade.

The evaluation of the course will include the evaluation of both theoretical and practical content acquired through classroom lectures and individual student work. In the middle of the term (approximately the 6th-7th week), the content of the course will be evaluated with a mid-term exam of combined theoretical and practical content (up to 30% of the final grade). After the end of the course, the content of the subject will be evaluated in a final exam consisting of a written theoretical-practical test (up to 40% of the final grade). Passing the course will be achieved with a score of at least 5 points (maximum 10).

The student's final grade will be calculated as a weighted sum of the scores obtained in each of the different assessment tests mentioned above.

2) Final assessment

This form of assessment may only be used by students who have been authorized to do so after applying for it at the Faculty at the beginning of the course.

Students who opt for this system must take a final exam consisting of a written theoretical-practical test. In this case, the grade will be solely and exclusively that obtained in this test. Passing the course will be achieved with a score of at least 5 points (maximum 10).

Extraordinary call

Aimed at all those students who did not pass the subject in the ordinary call. Participating in the extraordinary call is possible independent of the chosen evaluation procedure

The characteristics will be like those described in section 2) above (Ordinary call - Final Assessment) i.e., a final exam consisting of a theory and a practical part covering the whole course content.

Clarifications

The Regulations regulating the learning assessment processes, approved by the Governing Council on 24 March 2011, will be followed. It is important to point out the assessment procedures: for example, continuous assessment, final assessment, self-assessment, co-assessment. Instruments and evidence: assignments, activities. Criteria or indicators to be assessed in relation to competences: mastery of conceptual knowledge, application, knowledge transfer. For the grading system it is necessary to remember the Regulations of the Governing Council of 16 July 2009.

In order to carry out the different tests proposed as part of the assessment of the subject, the use of a calculator and/or any other support material that may be necessary will only be permitted <u>when explicitly authorized by the subject teacher,</u>

Students must necessarily attend all exams and assessment tests with their ID card and their University Smart Card (TUI).

During the development of the evaluation tests, the guidelines set out in the Regulations establishing the Rules of Coexistence of the University of Alcalá must be followed, as well as the possible implications of irregularities committed during these tests, including the consequences for committing academic fraud according to the Disciplinary Regulations of the Student Body of the University of Alcalá.

The teaching-learning methodology and the assessment process will be adapted as needed, in accordance with the guidelines of the Diversity Support Unit, to implement curricular adaptations for students with specific needs.

6. BIBLIOGRAPHY

Basic Bibliography
- GREENE, W., (1998), Econometric Analysis. Ed. Prentice Hall, Madrid.
- GUJARATI, D.N., PORTER,D.C. and Pal M., (2019), Basic Econometrics. 6th Ed. McGraw-Hill.
- WOOLDRIDGE, J.M., (2020), Introductory Econometrics. A modern approach. , 7th Ed. Cengage Learning.

Complementary Bibliography (optional)
- WOOLDRIDGE, J., (2002), Econometric Analysis of Cross Section and Panel Data. The MIT Press.