



PRESENTATION

Brief Description: In this course we will learn *statistical techniques* that will allow us to *analyse the relation between economic variables*. More specifically, after this course we will be able to **i)** *estimate* the relation between economic variables; **ii)** make *tests* regarding such relation; **iii)** determine how *good a fit* our model is for the data; **iv)** explore different issues of model specification, selection, and treatment of different types of data; and **v)** the different problems our model may face and how we can correct them.

- **Name of the course:** Econometrics I
- **Year:** Second (or Third, in some double degrees)
- **Semester:** Second (Spring, 2024)
- **Credits (ECTS):** 6
- **Type of course:** Required (i.e., OB)
- **Language:** English
- **Department:** Economics
- **Degrees:** Economics, ADE
- **School:** Economics
- **Professor:** Ernesto María Gavassa-Pérez
 - **Address:** Office 2020, Edificio Amigos
 - **Email:** egavass@unav.es
 - **Office hours:** Send an email to arrange a meeting for any of the following slots
 - Monday: 10:00 – 14:00
- **Lecture Schedule:**
 - Monday: 17:30 – 19:30
 - Thursday: 8:00 – 10:00

COMPETENCIES

Basic

1. **BC2.** Students should be able to apply their knowledge to their job or vocation in a professional way. They should be able to prove their general competencies by developing and defending arguments and solving problems within their subject area.
2. **BC3.** Students should be able to gather and interpret relevant data (normally within their field of study) in order to make judgments that encompass consideration of relevant social, scientific and ethical topics.
3. **BC5.** Students should have developed the learning skills necessary to undertake higher programs of study with greater independence.

General

1. **GC3.** Mastering the digital, mathematical and technical tools necessary for academic and professional activity in economics and business.



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2. **GC5.** Developing the capacity for independent critical thought on matters relevant to economics and business.

Specific

Economics

1. **SC10.** Using mathematical reasoning and quantitative tools to analyze the economic context.
2. **SC11.** Properly using software applications in quantitative analysis of economic questions.
3. **SC12.** Applying prediction methods and knowing how to judge their reliability.
4. **SC16.** Practically applying the knowledge, abilities and skills acquired.
5. **SC19.** Smartly applying quantitative techniques, suitable software and methodological procedures when working on economic issues.

Management

1. **SC8.** Developing case studies on subjects related to economics and business.
2. **SC9.** Incorporating computer applications in a business's decision-making processes.
3. **SC10.** Incorporating mathematical reasoning and quantitative tools in a business's decision-making processes.
4. **SC11.** Understanding prediction methods and using computer applications for quantitative analysis of business management.

Course

1. **SC10.** Using mathematical reasoning and quantitative tools to analyse the economic context
2. **SC11.** Properly using software applications in quantitative analysis of economic questions
3. **SC17.** Knowing how to combine economic reasoning with other disciplines.

SYLLABUS

PART 1. Introduction and Review

1. What is econometrics? Intuition and the big picture
2. Review of Mathematics, Probability, and Statistics

PART 2. Regression Analysis with Cross-Sectional Data

1. Simple Regression Model
 1. Definition
 2. Derivation of Estimates
 3. Properties
 4. Goodness-of-Fit Measures
 5. Miscellanea
2. Multiple Regression Model
 1. Derivation of Estimates
 2. Interpretation of Estimates
 3. Goodness-of-Fit Revisited



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4. Misspecification Problems: the Efficiency-Unbiasedness Trade-off
5. Best Linear Unbiased Estimator (BLUE): the Gauss-Markov Theorem
3. Regression Models: Inference
 1. The t-test: Testing Hypotheses of a Single Parameter
 2. Confidence Intervals
 3. Testing Hypotheses of a Linear Combination of Parameters
 4. The F-test: Testing Hypotheses of Multiple Linear Restrictions
4. Regression Models: Further Issues
 1. Data Scaling and Interpretation
 2. Functional Form of the Regression Model: Non-Linear Regression Functions and Interaction Terms
 3. Dummy Variables: Dealing with Qualitative Information
5. Applied Regression Analysis: Putting all into Practice

PART 3. Non-graded – but Useful – Material

1. Philosophy of Science and Econometrics

FORMATIVE ACTIVITIES

There will be two type of classes:

- **Lectures:** We will cover the material of the course here.
- **Tutorials:** These are exercise sessions. We will solve exercises related to the content material. They will allow us to solidify our learning.

EVALUATION

NOTE: Students retaking the course **MUST** contact me at the beginning of the Semester.

FIRST SIT

We will carry out several activities that will contribute towards your final mark in the course:

Continuous Assessment Activities:

- **Class Attendance and Participation:** 10%.
- **Problem Sets:** 20%. During the Semester, I will provide you with two lists of exercises (10% each). These serve the purpose of giving you a chance to build a good mark (*provided that you work during the Semester*) and take some stress that you naturally associate with the final exam. They will also allow you to assess whether you understand each topic and, if not, take action quickly (e.g., contact me if a topic feels difficult and set up a meeting to clarify doubts).
- **Empirical Project:** 20%. The main goal of this module is for you to understand how you can analyse economic relations. Although we will put special focus on the theoretical grounds that underpins this analysis, I want you to end up the course knowing how to apply the new knowledge you have developed. Otherwise, this course would have been useless. I will propose a (*rather brief, and simple*) empirical project so that you can carry out a regression analysis and



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interpret the results of it. So that you take this exercise seriously, this empirical project will bear the same weight on your final mark as all the problem sets!

Exams:

- **Midterm exam:** 10%. There will be a midterm exam where you will have the chance to face a graded assessment in the same time conditions you'll face during the final exam. This is supposed to give you the incentives to study since day 1 in order to get a good mark. It will also allow you to get a grasp of the inherent challenges of a timed examination: you do not only need to know a topic, but you need to know it well enough so that you can answer the questions in a limited time frame. Knowing what to expect beforehand will allow you to prepare more effectively for the final examination.
- **Final Exam:** 40%. I will announce the structure of the final exam beforehand so that you know what to expect.

RESIT

Students that fail will have a second chance to pass the course. This time, the final mark will be computed taking into account the following activities:

- **Resit of Final Exam:** 70%. This exam will have the same structure of the Final Exam, but will obviously be composed of different questions.
- **Empirical Project or problem sets:** 30%. The final Mark of the resit will partially be based on the coursework you do throughout the semester. More specifically, I will only carry forward the highest mark of the continuous assessment activities (i.e., average mark of problem sets; empirical project). This is an extra incentive for you to study during the course, as the mark you get will also impact your performance mark-wise in the resit.

NON-GRADED, OPTIONAL ACTIVITIES

An integral part of university education is to develop your curiosity for a subject, and your independence as subjects of knowledge-acquisition. At the same time, we want to give you a personal experience. In order to work on both fronts, I will provide you with two activities that are optional and non-graded. That is, you do not need to do them if you do not want to, and your performance (either good or bad) will not influence your mark. I describe them in some detail below.

- **Mock Exam Feedback:** During the Semester, I will propose a question of the type you will encounter on the final exam. You will have a couple of weeks to craft an answer if you wish, and send it back to me. I will, then, mark it and send it back to you with the mark I would have awarded in the exam providing a brief rationale for the mark. Although not necessary, it would be ideal for you to time yourself and restrict to use the equivalent time you'd have to answer it in the final exam.
- **Final topic:** I have included a topic that has not been covered in past years (Philosophy of Science and Econometrics), and hence it is not examinable material. This means you are not required to study it for the exam.



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ACADEMIC INTEGRITY, DIVERSITY, EQUITY, AND INCLUSION

There are a number of behaviours that are deemed morally wrong and that will be sanctioned in accordance with the [University Norms on Student Academic Discipline](#). Such behaviours include, but are not limited to, cheating in exams, plagiarism, and any act of harassment and/or discrimination of others based on their religion, race, gender, or any other protected characteristic. These offences will be dealt with by either the Professor of the course, or the Dean of Students, or the Vice President for Student Affairs according to their severity. Sanctions include formal warnings, loss of scholarships, and a failing grade for the course. You should read the document and contact me for any doubts on what constitutes academic misconduct and harassment, but as a rule of thumb remember that *Honesty and common sense are the best Policies. If you feel uncomfortable with any behaviour of a colleague, the procedures on how to report wrongful conduct are outlined [here](#).*

OFFICE HOURS

Dr. Ernesto M. Gavassa-Perez (egavass@unav.es)

- **Address:** Office 2020, Amigos Building. 2nd Floor.
- **Office Hours:** Send an email to arrange a meeting for any of the following slots
 - Monday: 10:00 – 14:00

BIBLIOGRAPHY

Basic

We will refer to two main textbooks during the course:

Stock, J.H. and Watson M.W., 2015, Introduction to Econometrics, Pearson: Global Edition, Updated 3rd Edition

Wooldridge, J.M., 2009, Introductory Econometrics: A Modern Approach, South-Western: International Student Edition.

I will tell you what parts of each book correspond to each part of the syllabus in due time. You are strongly advised to either borrow one textbook from the library, or purchase it.

Complementary

There are great sources of textbooks for econometrics. However, I will not reference them here in order not to overwhelm you. That been said, if you want to deepen your knowledge on the more applied side of econometrics, there are three excellent books with examples:



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Baddeley, M.C., and Barrowclough, D.V., 2014, Running Regressions, Cambridge University Press

Chatterjee, S., and Hadi, A.S., 2013, Regression analysis by Example, Wiley, 5th Edition

- **Gujarati, D.N.**, 2015, Econometrics by Example, Palgrave, 2nd edition.