COURSE SYLLABUS

Academic Year: 2020-2021

Identification and characteristics of the course			
Code	500013	ECTS Credits	6
Course title (English)	STATISTICS AND INTRODUCTION TO ECONOMETRICS		
Course title (Spanish)	ESTADÍSTICA E INTRODUCCIÓN A LA ECONOMETRÍA		
Degree programs	• Bachelor's Degree in Business Administration and Management (GADE) • Bachelor's Double Degree in Business Administration and Management and Law (PCEO ADE-DCHO) • Bachelor's Double Degree in Business Administration and Management and Economics (PCEO ADE-ECO) • Bachelor's Double Degree in Business Administration and Management and Labor Relations and Human Resources (PCEO ADE-RRLL)		
Faculty/School	Faculty of Economics and Business Administration		
Semester	3	Course type (compulsory/optional)	Compulsory
Module	Quantitative Methods for Business Management		
Subject matter	Statistics		
Lecturer/s			
Name	Room	E-mail	Web page
RICCI RISQUETE, ALEJANDRO	69	alericci@unex.es	—
Subject Area	Quantitative Methods for Economics and Business		
Department	Economics		
Coordinator (Only if there is more than one lecturer)	Cortés Sierra, M. A. Georgina		

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 business problems in the private and/or public domains. CG2 – Ability to provide rationality for the analysis and description of any aspect of business reality. CG3 – Ability to apply professional criteria based on the management of technical instruments to the analysis of business problems. CG4 – Ability to design, manage and write business projects and to issue advice reports on specific situations of the company.
Transversal Skills: CT1, CT2, CT3, CT5, CT6, CT7, CT8, CT9, CT10, CT11, CT12, CT13, CT14, CT15, CT16, CT17, CT18, CT19, CT22, CT23. CT1 – Ability to manage, analyze, and synthesize. CT2 – Organizational and planning abilities. CT3 – Oral and written communication skills in the mother tongue. CT5 – Computer and ICT literacy related to the field of study. CT6 – Ability to analyze and search for information from diverse sources. CT7 – Ability to solve problems. CT8 – Ability to make decisions. CT9 – Ability to work in a team. CT10 – Ability to work in an interdisciplinary team. CT11 – Ability to work in an international context. CT12 – Ability to develop personal relationships. CT13 – Ability to work in diverse and multicultural environments. CT14 – Critical thinking and self-criticism. CT15 – Ethical commitment at work. CT16 – Ability to work in pressure environments. CT17 – Independent learning ability. CT18 – Ability to adapt to new situations. CT19 – Creativity. CT22 – Motivation and commitment to quality. CT23 – Sensitivity to environmental and social issues.
Specific Skills: CE9. CE9 – Identify and know how to use basic methodologies and precise quantitative instruments for business analysis, diagnosis, and planning, as well as for the study of business information and its economic and social environments.

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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*
a) Introduction to statistical inference b) Point and interval estimation c) Hypothesis tests d) Simple and multiple linear regression models
Course contents
PART A – STATISTICAL INFERENCE
Title of unit 1: Introduction to Statistical Inference Contents of unit 1: 1.1. Concept of statistical inference 1.2. Sampling methods. Random sampling 1.3. Sample statistics and population parameters 1.4. Sampling distributions for Normal populations Description of practical activities for unit 1: 1.1. Calculating the probability of sample statistics (mean, variance, difference between two population means, and ratio of two population variances)
Title of unit 2: Parametric Estimation and Hypothesis Tests Contents of unit 2: 2.1. Estimation and estimators 2.2. Point estimation. Properties of point estimators 2.3. Estimation using confidence intervals. Confidence intervals for mean, variance, difference between two population means, and ratio of two population variances of a Normal distribution 2.4. Determining the sample size 2.5. Concepts associated with parametric hypothesis testing 2.6. Hypothesis tests about the Normal population mean and variance 2.7. Hypothesis tests about the difference between two Normal population means, and the ratio of two Normal and independent population variances 2.8. Analysis of variance Description of practical activities for unit 2: 2.1. Obtaining point estimates for mean and variance of a Normal population 2.2. Obtaining interval estimates for mean, variance, difference of means, and ratio of variances of two Normal and independent populations 2.3. Developing hypothesis tests for means and variances of a Normal population 2.4. Developing hypothesis tests for difference of means, and ratio of variances of two Normal populations

Contents
Course contents

PART B – INTRODUCTION TO ECONOMETRICS

Title of unit 3: Introduction to Econometrics

Contents of unit 3:
3.1. Definition of Econometrics
3.2. Economic models
3.3. Econometric models
3.4. Elements of an econometric model
3.5. Basic principles for the user of Econometrics

Description of practical activities for unit 3:
3.1. Introduction to statistical/econometric software
3.2. Statistical sources for econometric analysis

Title of unit 4: The Linear Regression Model and its Assumptions

Contents of unit 4:
4.1. Introduction
4.2. The linear regression model. Assumptions of the linear regression model
4.3. Goodness of fit
4.4. Inference in linear regression (I). Testing hypotheses about a single population parameter: the t test and confidence intervals
4.5. Inference in linear regression (II). Testing multiple linear restrictions: the restricted least squares estimator
4.6. Prediction in the linear regression model
4.7. Functional form
4.8. Evaluation of econometric models

Description of practical activities for unit 4:
4.1. Estimating linear regression models by Ordinary Least Squares (OLS) with statistical/econometric software
4.2. Analyzing econometric results from statistical and economic perspectives
4.3. Developing hypothesis tests and confidence intervals from the estimated models
4.4. Estimating linear regression models by Restricted Least Squares (RLS)
4.5. Simulating and predicting responses to new data from the estimated models
4.6. Validating OLS-estimated models

Educational activities*

Student workload (hours per lesson)		Lectures	Practical sessions				Monitoring activity	Homework
Lesson	Total	L	HI	LAB	COM	SEM	SGT	PS
1. Theory	13	4			0			9
1. Practice	9	2			2			5
2. Theory	20	8			0			12
2. Practice	26	5			5			16
3. Theory	6	2			0			4
3. Practice	6	1			1			4
4. Theory	28	12			0			16
4. Practice	30	6			7			17
Assessment**	12	5			0			7
TOTAL ECTS	150	45			15			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

Teaching methodology*

1. Lecture method. The professor presents or talks on a particular topic to a group of students by introducing concepts and ideas or delivering facts and solving example problems.
2. Problem-solving method. The professor sets out a problem and helps students to understand it, and students collaboratively try to find a solution by applying problem-solving techniques.
3. Case studies, projects and experiments.
4. Collaborative activities based on digital resources and tools, particularly those available at the Campus Virtual de la UEx.
5. 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 apply statistical inference methods to measure economic and business processes.
b) Students will be able to detect relationships among economic variables by using simple econometric models.
c) Students will be able to interpret and evaluate the results obtained from the application of statistical inference methods and the estimation of econometric models, especially in a critical way.
d) Students will be able to handle ICT tools for statistical and econometric analyses.

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

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 of the type of assessment that he or she has chosen in the first 3 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 los resultados de aprendizaje y de las competencias adquiridas por el alumnado en las titulaciones oficiales de la Universidad de Extremadura", DOE No. 236, 12 December 2016 (in Spanish).]

a) Continuous assessment

Students who do not notify the professor of the type of assessment must enter for continuous assessment. This system consists of the following activities:

- Course assignments and classroom participation.
- Mid-semester written test on units 1 and 2.
- End-of-semester written test on units 3 and 4.
- Final exam (if necessary). Theoretical and practical contents and skills of all units (i.e., from 1 to 4) 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 =
20% Continuous assessment assignments' grades +
80% (45% Mid-semester test grade + 55% 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 =
20% Continuous assessment assignments' grades + 80% 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 Universidad de Extremadura regulations, there are two opportunities per academic year to take the course final exam, the "ordinary call" in January and the "extraordinary call" in June or in July. Students must check in advance that they are entitled to take an exam or will not be evaluated.

Assessment methods*

b) Final examination

Students who do not choose continuous assessment can enter for final examination. This system consists of a single written test:

- Final exam. Theoretical and practical contents and skills of all units (i.e., from 1 to 4) 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 Universidad de Extremadura regulations, there are two opportunities per academic year to take the course final exam, the "ordinary call" in January and the "extraordinary call" in June or in July. Students must check in advance that they are entitled to take an exam or will not be evaluated.

Rules for taking exams/tests

1. Candidate details should be clearly written in capital letters.
2. Students must identify themselves with their EEA national ID card, their passport, their University ID card, or another document that shows proof of identity.
3. Exams/tests are composed of several exercises, which can contain more than one part. The number of points is given in brackets [ ] at the beginning of each exercise or question part. Spelling, punctuation, and presentation are also considered.
4. For full (or partial) credit, the work on exercises or question parts should be explicitly written on the question paper or on the answer sheets. Clear and concise answers are appreciated.
5. When testing a hypothesis, the relevant null and alternative hypotheses and the appropriate test ought to be specified.
6. A 5-percent significance level is required, except where otherwise stated.
7. All answers must be written in dark blue or black pen. Smart devices (e.g., mobile phones, tablets, smartwatches…) are not permitted.

Bibliography (basic and complementary)

Basic bibliography
<u>Theory and practice</u>
- Anderson, D. R., Sweeney, D. J., Williams, T. A., Camm, J. D., & Cochran, J. J. (2017). Statistics for Business and Economics, 13th Edition. Cengage Learning.

Supplementary bibliography
<u>Theory and practice</u>
- Gujarati, D. N., & Porter, D. C. (2008). Basic Econometrics, 5th Edition. McGraw-Hill Education.
- Newbold, P., Carlson, W., & Thorne, B. (2013). Statistics for Business and Economics, 8th Edition. Pearson.
- Wooldridge, J. M. (2015). Introductory Econometrics: A Modern Approach, 6th Edition. Cengage Learning.

Other resources and complementary materials

Learning tools
Throughout the course, the professor will provide other suitable material (theoretical and practical pdf handouts) via Campus Virtual de la UEx > https://campusvirtual.unex.es/portal/

Additional teaching material
Economic data can be obtained for free from the following sources:
- National Statistics Institute (INE) > https://www.ine.es/en/
- Eurostat – the statistical office of the European Union > https://ec.europa.eu/eurostat
- Bank of Spain > https://www.bde.es/bde/en/
- FUNCAS – Spanish Foundation of Saving Banks (forecasts and indicators) > https://www.funcas.es/indicadores/
- International Monetary Fund (IMF) > https://www.imf.org/
- Organisation for Economic Co-operation and Development (OECD) > https://www.oecd.org/
- CIS – Center of Sociological Research > http://www.cis.es/cis/opencms/EN/index.html
- RFE: Resources for Economists on the Internet > https://www.aeaweb.org/rfe/