

COURSE PROGRAM

Academic Year: 2024/2025

Identification and characteristics of the course			
Code	500007	ECTS Credits	6
Course name (English)	INTRODUCTION TO STATISTICS		
Course name (Spanish)	INTRODUCCIÓN A LA ESTADÍSTICA		
Degree programs	<ul style="list-style-type: none"> Bachelor's Degree in Economics. Bachelor's Degree in Business Administration. Double Bachelor's Degree in Business Administration and Law. Double Bachelor's Degree in Business Administration and Economics. Double Bachelor's Degree in Business Administration and Labor Relations and Human Resources. 		
Faculty/School	Faculty of Economics and Business Administration		
Semester	2º	Type of Course	Compulsory
Module	Basic training		
Matter	Statistics		
Lecturer/s			
Name	Office	E-mail	Web page
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Subject Area	Financial Economy and Accounting Quantitative Methods for Economics and Business		
Department	Financial Economy and Accounting Economics		
Coordinator (Only if there is more than one lecturer)	MARCELINO SÁNCHEZ RIVERO (FCCEE)		

Competencies*
CB1 – To demonstrate and understand a basic level of the field knowledge, showing a progress of knowledge from a basic secondary school level to an advanced level, through the study of the most recent research in the field.
CB2 – To apply their knowledge to their work in a professional manner. Students should possess the skills that are usually demonstrated through presenting arguments and solving problems within their area of study.
CB3 – 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 – To provide information, ideas, problems and solutions to both specialized and non-specialized audiences.
CB5 – To develop the necessary learning skills to undertake further studies with a high degree of autonomy.

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CG2 – To provide rationality to the analysis and description of any aspect of business reality.
CG3 – To apply professional criteria based on the management of technical instruments to the analysis of business problems.
CT1 – To manage, analyze, and synthesize.
CT3 – Oral and written communication skills in the native language.
CT5 – ICT literacy related to the field of study.
CT7 – To solve problems.
CT14 – To use critical thinking
CT17 – Independent learning ability.
CE9 –To identify and know how to use basic methodologies and precise quantitative instruments for business analysis, diagnostics, and planning, as well as for the study of business information, along with its economic and social environments.
Contents
Course outline*
Introduction to Statistics. One-dimensional frequency distributions. Main descriptive statistics of frequency distributions. Two-dimensional frequency distributions. Index numbers. Introduction to Probability. Random variables. Discrete probability distributions. Continuous probability distributions.
Course syllabus
Name of lesson 1: <u>Introduction to Descriptive Statistics. One-Dimensional frequency distributions.</u>
Contents of lesson 1:
<ul style="list-style-type: none"> 1.1. Definition of Statistics. 1.2. Steps of the scientific method in Statistics. 1.3. Branches of Statistics. 1.4. The importance of Statistics in economics. 1.5. Basic concepts of Statistics. 1.6. One-dimensional frequency distributions. <ul style="list-style-type: none"> 1.6.1. Graphical displays. <ul style="list-style-type: none"> 1.6.1.1. Measures of location. 1.6.1.2. Measures of variability. 1.6.1.3. Measures of shape. 1.6.1.4. Measures of concentration.
Description of the practical activities of lesson 1:
<ul style="list-style-type: none"> 1.1. Introduction to statistical software. 1.2. Construction of graphical presentations and discrete and continuous frequency distributions using statistical software. 1.3. Analysis of the frequency distributions. 1.4. Calculation of basic descriptive statistics using statistical software. 1.5. Analysis of the meaning and the representativeness of the measures.
Name of lesson 2: <u>Two-dimensional frequency distributions and index numbers</u>
Contents of lesson 2:
<ul style="list-style-type: none"> 2.1. Two-dimensional frequency distributions. <ul style="list-style-type: none"> 2.1.1. Crosstabulation. 2.1.2. Marginal and conditional distributions. 2.1.3. Covariance and correlation coefficient. 2.1.4. Statistical independence. 2.2. Index numbers. 2.3. Deflation of economic series.
Description of the practical activities of lesson 2:
<ul style="list-style-type: none"> 2.1. Construction a crosstabulation using statistical software. 2.2. Calculation of measures of association using statistical software.

<p>2.3. Analysis of the meaning of the measures in relation to the dependency or the independence between variables.</p> <p>2.4. Calculation of index numbers using statistical software.</p>
<p>Name of lesson 3: <u>Introduction to probability</u></p> <p>Contents of lesson 3:</p> <p>3.1. Introduction to the basic concepts of probability.</p> <p>3.2. Definition and calculation of probability.</p> <p>3.3. Conditional probability.</p> <p>3.4. Bayes' Theorem.</p> <p>3.5. Event Independence.</p> <p>Description of the practical activities of lesson 3:</p> <p>3.1. Probability calculation exercises.</p>
<p>Name of lesson 4: <u>Random variables and probability distributions</u></p> <p>Contents of lesson 4:</p> <p>4.1. One-dimensional random variables.</p> <p>4.1.1. Probability distribution.</p> <p>4.1.2. Expected value and variance. Properties.</p> <p>4.1.3. Standardizing a random variable.</p> <p>4.2. Two-dimensional random variables.</p> <p>4.2.1. Marginal and conditional distributions.</p> <p>4.2.2. Joint expected value.</p> <p>4.2.3. Covariance and correlation coefficient. Covariance properties.</p> <p>4.2.4. Statistical independence.</p> <p>4.3. Main discrete probability distributions: Bernoulli, binomial, Poisson and hypergeometric.</p> <p>4.4. Main continuous probability distributions: normal, Pearson's <i>chi-squared</i>, Student's <i>t</i> and Snedecor's <i>F</i> distribution.</p> <p>4.5. Central Limit Theorem.</p> <p>Description of the practical activities of lesson 4:</p> <p>4.1. Calculation exercises with one-dimensional random variables.</p> <p>4.2. Calculation exercises with two-dimensional random variables.</p> <p>4.3. Calculation of probabilities of discrete distribution using statistical software.</p> <p>4.4. Calculation of probabilities of continuous distribution using statistical software.</p>

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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	17	7						10
1. Practice	9	3						6
2. Theory	23	9						14
2. Practice	18	8						10
3. Theory	10	4						6
3. Practice	10	4						6
4. Theory	27	11						16
4. Practice	26	11						15
Assessment **	10	3						7
TOTAL ECTS	150	60						90

L: Lectures (85 students)

HI: Hospital internships (7 students)

LAB: Laboratory or field practices (15 students)

COM: Computer room or language laboratory practices (20 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. Lectures. The professor presents or talks about 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* (E-Campus).
5. Learning assessment. Students take some tests in order to assess their progress and reinforce their learning process.

Learning outcomes *

Students will be able to interpret and critically assess the results obtained from the analysis of the information as well as to handle computer and ICT tools applied to the statistical field from the knowledge and understanding of the main principles and concepts of Statistics as an instrument to measure economic and social facts.

Assessment systems *

As it is established in the regulations for evaluating learning results and the skills acquired by students in official degrees at the University of Extremadura (DOE No. 212, 3 November 2020) and according to the Verified Report of the degree, the following methods of assessment are established:

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

1) **Continuous assessment.** This type of assessment consists either in doing partial exams throughout the term or in a final exam. The average score for the partial exams or the final exam will be 100% of the final grade for the course.

The overall grade obtained by the students who choose this system will come from the average score of the written tests completed throughout the course -as long as they are all passed with a minimum score of 4 points out of a maximum of 10 points- or from the score obtained by the student in the final exam when not all the written tests have been passed. The final assessment criteria will then be the same as those applied to the assessment with a single global final test.

2) **Assessment with a single global final test.** This system will consist of taking a single final exam on the official date. If a theoretical test and a practical test are carried out separately in this final exam, a minimum score of 4 points (of a maximum of 10 points) will be required in each part to proceed to the calculation of the average grade.

The student must notify the professor of the type of assessment that he or she has chosen during the first quarter of the teaching period or until the last day of the enrollment extension period in case of being later. If there is no notification, continuous assessment will be selected as the default method.

The partial exams and the final exam will consist in carrying out theoretical and practical tests aimed at assessing the understanding of theoretical concepts and the application of the statistical methods of the syllabus. These tests may be carried out both in writing and/or with a computer using the statistical software developed throughout the course.

The teacher will inform the students of the date of the partial exams at least fifteen days in advance. The partial exams not passed by the students will be retaken in the final exam in any of the calls for the subject. In the final exam it is not possible to do only those parts of the course that have not been passed in the partial exams.

In both assessment systems, students' class attendance and active participation in class will be highly valued. Therefore, the teacher of the subject may control class attendance when he/she considers it appropriate and as many times as necessary.

In both assessments, the course will be considered to have been passed when the average grade is equal to or greater than 5 points.

The details of the date, time and place of the final exam will correspond to each faculty, and these will be published on the notice boards and on the university website.

At the time of taking the tests or the final exam, the only material allowed is that related to writing. Smart devices (e.g., mobile phones, tablets, smartwatches...) are not permitted. If at some point during the exam their use is detected, the student will be expelled immediately.

Bibliography (basic and complementary)

a) Basic Bibliography:

- ANDERSON, D.R., SWEENEY, D.J., WILLIAMS, T.A, CAMM, J.D., and COCHRAN, J.J. (2017): *Statistics for Business and Economics*, 13th Edition. Cengage Learning.
- MCFEDRIES, P. (2019): *Microsoft Excel 2019 Formulas and Functions*. Pearson Education.
- RUIZ MACÍAS, P.; AUSÍN GÓMEZ, J.M. (2000): *Estadística descriptiva, teórica e inferencial*. Editorial Universitas, Badajoz.
- SÁNCHEZ RIVERO, M. (2021): *Estadística aplicada a la Economía y la Empresa*. García-Maroto Editores, S.L.
- SÁNCHEZ RIVERO, M., RICCI RISQUETE, A. y CORRALES DIOS, N. (2022): *Ejercicios de Estadística aplicada a la Economía y la Empresa*. García-Maroto Editores, S.L.

b) Supplementary Bibliography:

ARNALDOS GARCÍA, F., DÍAZ DELFA, M.T., FAURA MARTINEZ, U., MOLERA PERIS, L. y PARRA FRUTOS, I. (2003): Estadística Descriptiva para Economía y Administración de Empresas. Editorial AC (Thomson), 1ª edición.

LEVIN, R.I., RUBIN, D.S., BALDERAS, DEL VALLE y GOMEZ (2004), 7ª Edición: *Estadística para Administración y Economía*. Editorial Pearson-Prentice Hall, México.

LIND, D., MARCHAL, W. and WATHEN, S. (2018): *Statistical Techniques in Business and Economics*, 17th Edition Mc Graw Hill.

LLORENTE GALERA, F., MARÍN FERÍA, S. y TORRA PORRAS, S. (2003): Principios de estadística descriptiva aplicada a la empresa. Editorial Centro de Estudios Ramón Areces, S.A. Madrid.

NEWBOLD, P., CARLSON, W., and THORNE, B. (2013): *Statistics for Business and Economics*, 8th Edition. Pearson.

PERALTA ASTUDILLO, M.J., RÚA VIEYTES, A., REDONDO PALOMO, R. y DEL CAMPO CAMPOS, C. (2007): *Estadística: problemas resueltos*. Ediciones Pirámide. Madrid.

Other resources and complementary educational materials

- Virtual campus of the University of Extremadura.
- Web pages with statistical content.
- Statistical data repository at regional, national, or international level.