SUBJECT DESCRIPTION

NAME: STATISTICS AND ECONOMETRICS FOR BUSINESS
YEAR: 3 SEMESTER: 1
BUSINESS ADMINISTRATION
IN-CLASS TEACHING
ACADEMIC YEAR: 2018/2019
SCHOOL OF BUSINESS & ECONOMICS
1. SUBJECT IDENTIFICATION

1.- SUBJECT:

Name: Statistics and Econometrics for Business  
Code: b307  
Year (s) course is taught: Third  
Semester (s) when the course is taught: First  
Type: Core  
ECTS of the course: 9  
Hours ECTS: 45  
Language: Spanish and English  
In-class teaching  
Degree (s) in which the course is taught: Business Administration  
School which the course is taught: School of Business & Economics

2.- ORGANIZATION OF THE COURSE:

Department: Applied Mathematics and Statistics  
Area of knowledge: Statistics and Operations Research

2. LECTURERS OF THE SUBJECT

1.- LECTURERS:

Instructor in charge  
Nombre: Diego Mondéjar Ruiz  
Tlfno (ext): 91 456 63 00 (15393)  
Email: diego.mondejarruiz@ceu.es  
Despacho: 0.08B

Lecturer(s)  
Nombre: Antonio Franco Rodríguez de Lázaro  
Tlfno (ext): 91456 63 00 (15363)  
Email: fralaz@ceu.es  
Despacho: 0.07B

Lecturer(s)  
Nombre: Aguirre Arrabal, Cristina  
Tlfno (ext): 91 456 63 00 (15659)  
Email: aguiarr@ceu.es  
Despacho: JRB 0.05
2.- TUTORIALS:

For any queries students can contact lecturers by e-mail, phone or visiting their office during the teacher's tutorial times published on the students' Virtual Campus.

3. SUBJECT DESCRIPTION

The observed information follows a behaviour which allows generalising the sample behaviour to the represented population. Big Data is flooding our socioeconomic environment, so it is essential to know Statistical Inference in order to understand the current times and having the adequate basis to make predictions and estimations, either temporary or cross-sectional.

To take this subject, it is recommendable to have prior knowledge of Descriptive Statistics and Computing.
4. COMPETENCIES

1.- COMPETENCIES

<table>
<thead>
<tr>
<th>Basic and General Competencies</th>
<th>Specific Competencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB1</td>
<td>CE2</td>
</tr>
<tr>
<td>CB2</td>
<td>CE4</td>
</tr>
<tr>
<td>CB3</td>
<td></td>
</tr>
<tr>
<td>CG1</td>
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</tbody>
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2.- LEARNING OUTCOMES:

- Application of appropriate statistical tools to study and analysis of data.
- Interpretation of statistical analysis from an economic viewpoint.
- To apply the statistical techniques for decision making in risk ambiance within the context of economic research.

5. LEARNING ACTIVITIES

1.- DISTRIBUTION OF STUDENTS` ASSIGNMENT:

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>On-campus hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>AF2</td>
<td>Seminar</td>
<td>58</td>
</tr>
<tr>
<td>AF4</td>
<td>Practical cases</td>
<td>41</td>
</tr>
<tr>
<td>TOTAL</td>
<td>Presence Hours</td>
<td>99</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Not on-campus hours</th>
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</thead>
<tbody>
<tr>
<td>AF0</td>
<td>Self student work</td>
<td>171</td>
</tr>
</tbody>
</table>
6. ASSESSMENT OF LEARNING

1.- CLASS ATTENDANCE:

In order to be eligible for examination by continuous assessment students must attend at least 75% of scheduled class time (attendance sheets will be used), except for students of 4th and 5th course. As students may be absent 25% of the classes, no attenuating circumstances will be accepted for absences.

2.- ASSESSMENT SYSTEM AND CRITERIA:

<table>
<thead>
<tr>
<th>ASSESSMENT SYSTEM</th>
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<tbody>
<tr>
<td>Code</td>
</tr>
<tr>
<td>SE4</td>
</tr>
<tr>
<td>SE3</td>
</tr>
<tr>
<td>Total assessment</td>
</tr>
</tbody>
</table>

ORDINARY (CONTINUAL) EVALUATION

Continuous evaluation will be done considering the following:

- Two written examinations: with questions of essay type, test and exercises; each exam will count 25% towards the final grade.
- A final examination: compulsory exam consisting of problems, essay type questions and test, meant to show knowledge of the topics covered during the semester. The weight of this exam on the final grade will be 50%. To apply the continual evaluation system the student should get a minimum of 3 (over 10) in this exam.

Class attendance will not be counted in the computation of the final grade. However, a minimum attendance of 75% is required in order to apply the continual evaluation.

EXTRAORDINARY EVALUATION

A student who does not pass the subject in the Continual Evaluation system can be assessed in the Extraordinary Evaluation. This evaluation is a written exam consisting of problems, essay type questions and test, meant to show knowledge of the topics covered during the semester. The weight of this exam on the final grade will be 100%
7. SUBJECT PROGRAMME

1.- SUBJECT PROGRAMME:

THEORETICAL:

PART I: PROBABILITY THEORY

1. FUNDAMENTS OF PROBABILITY
   - Random experiment.
   - Probability interpretations.
   - Events. Operations with events.
   - Kolmogorov probability axioms.
   - Theorems of probability calculations.
   - Conditional probability. Independent events.

2. UNIVARIATE RANDOM VARIABLE. CHARACTERISTICS OF A PROBABILITY DISTRIBUTION
   - Random variable.
   - Cumulative distribution function. Properties.
   - Discrete random variables. Probability mass function.
   - Continuous random variables. Probability density function.
   - Expected value.
   - Dispersion.

PART II: POPULATION PROBABILITY DISTRIBUTIONS

3. SAMPLE THEORY
   - Concept of Inference. Statistical Inference.
   - Concept of population, census and sample.
   - Types of sampling. Simple random sampling.
   - Concept of Statistic.

4. DISCRETE PROBABILITY MODELS
   - Binomial.
   - Poisson.
   - Multinomial.
   - Other univariate probability models.

5. CONTINUOUS PROBABILITY MODELS
   - Uniform.
   - Normal.
   - Distributions derived from the normal: $\chi^2$, t and F.
   - Central limit theorem.

PART III: STATISTICAL INFERENCE AND STATISTICAL SAMPLE DISTRIBUTIONS

6. ESTIMATION THEORY
   - Concept of Estimator. Sample mean, sample variance and unbiased sample variance. Characteristics.
   - Probability distributions of estimators according with the different types of population probability distributions.
   - Properties of estimators: unbiased, efficiency, consistency, sufficiency, invariance and robustness.
7. INTERVAL ESTIMATION
- Concept of confidence interval.
- Confidence intervals of population mean in different population probability distributions.
- Confidence intervals of population variance in normal distributions.
- Application of Chebyshev’s theorem to obtain confidence intervals.
- Determination of sample size.

PART IV: STATISTICAL HYPOTHESIS TESTING
8. GENERAL CONCEPTS OF TESTS
- Statistical hypothesis.
- Types of tests.
- Errors of the first and second kind: significance level and power of the test.
- Critical region and region of acceptance.

9. NONPARAMETRIC TESTS
- Sample randomness tests.
- Population normality tests.
- Population distribution tests.
- Independence tests. Homogeneity tests.

10. PARAMETRIC TESTS
- Significance tests.
- Neyman-Pearson tests.

PRACTICAL WORK PROGRAMME:
After completion of each theoretical block, a series of practical exercises will be carried out. The teacher shall solve some exercises with the participation of the students. The students must solve some problems given as homework, and hand them back to the teacher. Such homework, as well as other complementary and support documentation, will be available in the Students Portal.

8. RECOMMENDED READING

1.- ESSENTIAL BIBLIOGRAPHY:

2.- ADDITIONAL BIBLIOGRAPHY:
KELLER, G. and WARRACK, B. (2003):


3.- WEB RESOURCES:

Instituto Nacional de Estadística: www.ine.es
Comunidad de Madrid: www.madrid.org
Eurostat: epp.eurostat.ec.europa.eu
Banco de España: www.bde.es

9. ATTITUDE IN THE CLASSROOM

1.- REGULATIONS

Any irregular act of academic integrity (no reference to cited sources, plagiarism of work or inappropriate use of prohibited information during examinations) or signing the attendance sheet for fellow students not present in class will result in the student not being eligible for continuous assessment and possibly being penalized according to the University regulations.