COURSE DESCRIPTION

STATISTICS I
1ST YEAR, 2ND SEMESTER

DEGREE IN BUSINESS ADMINISTRATION AND MANAGEMENT

TYPE OF COURSE: IN-CLASS TEACHING

ACADEMIC YEAR 2020/2021

SCHOOL OF BUSINESS AND ECONOMICS
## 1. COURSE/SUBJECT IDENTITY

### 1.- COURSE/SUBJECT:

<table>
<thead>
<tr>
<th>Name:</th>
<th>Statistics I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code:</td>
<td>b108</td>
</tr>
<tr>
<td>Year (s) course is taught:</td>
<td>First year</td>
</tr>
<tr>
<td>Semester(s) when the course is taught:</td>
<td>Second</td>
</tr>
<tr>
<td>Type:</td>
<td>Compulsory</td>
</tr>
<tr>
<td>ECTS of the course:</td>
<td>6</td>
</tr>
<tr>
<td>Hours ECTS:</td>
<td>30</td>
</tr>
<tr>
<td>Language:</td>
<td>English and Spanish</td>
</tr>
<tr>
<td>Type of course:</td>
<td>In-class teaching</td>
</tr>
<tr>
<td>Degree (s) in which the course is taught:</td>
<td>Business Management</td>
</tr>
<tr>
<td>School in which the course is taught:</td>
<td>School of Business and Economics</td>
</tr>
</tbody>
</table>

### 2.- ORGANIZATION OF THE COURSE:

- **Department:** Applied Mathematics and Statistics
- **Area of knowledge:** Statistics and Operations Researches

## 2. TEACHING STAFF OF THE COURSE

### 1.- IDENTITY OF TEACHING STAFF:

<table>
<thead>
<tr>
<th>Instructor in charge</th>
<th>CONTACT DETAILS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>Aguirre Arrabal, Cristina</td>
</tr>
<tr>
<td>Phone (ext):</td>
<td>Tfno.: 914566300  Ext.: 15361</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:aguiarr@ceu.es">aguiarr@ceu.es</a></td>
</tr>
<tr>
<td>Office:</td>
<td>JRB 0.05</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coordinator of the course</th>
<th>DATOS DE CONTACTO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>Inchausti Tabuenca, Elena</td>
</tr>
<tr>
<td>Phone (ext):</td>
<td>Tfno.: 914566300  Ext.: 15559</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:inctab@ceu.es">inctab@ceu.es</a></td>
</tr>
<tr>
<td>Office:</td>
<td>JRB 0.05</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Lecturer</th>
<th>DATOS DE CONTACTO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>Arribas Gimeno, Edgar</td>
</tr>
<tr>
<td>Tlfno (ext):</td>
<td>Tfno.: 914566300</td>
</tr>
<tr>
<td>Email:</td>
<td><a href="mailto:edgar.arribasgimeno@ceu.es">edgar.arribasgimeno@ceu.es</a></td>
</tr>
<tr>
<td>Office:</td>
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<table>
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<tr>
<th>Lecturer</th>
<th>DATOS DE CONTACTO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name:</td>
<td>Córdoba Bueno, Miguel</td>
</tr>
<tr>
<td>Tlfno (ext):</td>
<td>Tfno.: 914566300  Ext.: 15358</td>
</tr>
</tbody>
</table>
2. TUTORIAL ACTIVITY:
Students may contact the teacher(s) via email, phone or during office hours for any queries related to the course. Teacher's office hours will be published in the student's portal.

3. SUBJECT DESCRIPTION
This subject continues with the study of economic reality from data obtained from different statistical sources (INE, Eurostat, etc.), proceeding with the descriptive analysis of both quantitative and
qualitative economic variables, as well as the evolution of the variables in time, deepening the analysis of time series and its components.
In a second part of the subject the Probability Theory is introduced from its axioms and fundamental concepts to the definition of the main probability distributions and the Central Limit Theorem. This content is essential for the student to deepen their subsequent statistical training.
To take this subject it is advisable to have previous knowledge of Descriptive Statistics in one variable and Computer Science.

### 4. SKILLS

#### 1. SKILLS

<table>
<thead>
<tr>
<th>Code</th>
<th>Basic and General Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS1</td>
<td>Students should have demonstrated that they have gained knowledge of and understand an area of study at a level beyond secondary education that, even though based on advanced textbooks, it also includes aspects that are acquired from knowledge deriving from the state-of-the-art of the field of study.</td>
</tr>
<tr>
<td>BS2</td>
<td>Students should know how to apply their knowledge to their work or vocation in a professional manner and should have the skills that are usually demonstrated by compiling and defending arguments and resolving problems within their area of study.</td>
</tr>
<tr>
<td>BS3</td>
<td>Students should have the capacity to collect and interpret relevant data (usually within their area of study) to form opinions based on reflection on relevant topics of a social, scientific or ethical nature.</td>
</tr>
<tr>
<td>GS1</td>
<td>Capacity for the analytic and critic thinking.</td>
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<table>
<thead>
<tr>
<th>Code</th>
<th>Specific Skills</th>
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<tbody>
<tr>
<td>SS2</td>
<td>Capacity to identify, formulate and resolve problems, applying professional criteria and understanding the competitive and institutional position of the organization, identifying its strengths and weaknesses.</td>
</tr>
<tr>
<td>SS4</td>
<td>Capacity of critical analysis in quantitative and qualitative terms, including data analysis, interpretation and extrapolation to a given business reality.</td>
</tr>
</tbody>
</table>

#### 2. LEARNING RESULTS

- Use the appropriate statistical tools for the treatment and analysis of data
- Interpret correctly, from an economic perspective, the results of the statistical analysis
- Ability to make a descriptive report of a sector with data obtained from the different statistical sources

### 5. FORMATIVE ACTIVITIES

#### 1. STUDENT WORK DISTRIBUTION

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>On-campus hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA2</td>
<td>Seminar</td>
<td>38</td>
</tr>
<tr>
<td>EA4</td>
<td>Practice</td>
<td>27</td>
</tr>
<tr>
<td>TOTAL Hours</td>
<td></td>
<td>65</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Not on-campus hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EA0</td>
<td>Independent work</td>
<td>115</td>
</tr>
</tbody>
</table>

Subject total hours: 180
2.- FORMATIVE ACTIVITIES DESCRIPTION

<table>
<thead>
<tr>
<th>Educational Activity</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>EA2 - Seminar</td>
<td>Educational activity focused especially on the competence of the students to develop the learning skills enabling them to assimilate content acquired beforehand, while relating economic concepts and those of similar and/or auxiliary disciplines and different theoretical and methodological approaches. Students study each subject in depth to a large extent independently. This educational activity is also centred on encouraging students to acquire the skills necessary to communicate their conclusions – and the understanding and underlying reasons supporting them – to both the specialist and non-specialist public clearly and unequivocally. Priority is given to the participation of students and their sharing of the reasoned interpretation of knowledge and the sources of their fields of study, all of which is coordinated by the professor.</td>
</tr>
<tr>
<td>EA4 - Practise</td>
<td>Educational activity focused especially on the competence of the students to collect, manipulate and process relevant data and variables for economic, statistical, financial, accounting and tax analyses. Priority is placed on students undertaking activities that involve the application of theoretical and/or technical knowledge acquired, which may be done individually or in a group, depending on the subject and the skills to be acquired.</td>
</tr>
<tr>
<td>EA0 - Student Autonomous Work</td>
<td>Educational activity whereby students independently manage their own learning by the study of the course material.</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). As students may be absent 25% of the classes, no attenuating circumstances will be accepted for absences.

2.- ASSESSMENT SYSTEMS AND CRITERIA:

<table>
<thead>
<tr>
<th>ASSESSMENT SYSTEMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code</td>
</tr>
<tr>
<td>AS4</td>
</tr>
<tr>
<td>AS9</td>
</tr>
</tbody>
</table>

3.- ASSESSMENT SYSTEMS DESCRIPTION

ORDINARY EVALUATION. CONTINUOUS ASSESSMENT:
The student assessment will be done based on:
1. One exams: with exercises, tests and reasoning questions for the evaluation of the acquired knowledge. Scheduled tests: 20%.
2. Written tests: about each course unit, in class (20%).
3. Individual work consisting on the elaboration of an economic report with data from different statistical sources applying the knowledge acquired in the subject (10%). Mandatory, needed to be graded above 5 to enjoy the continuous assessment, otherwise just the final exam will be accounted in the grading.
4. Final test: compulsory exam, written, with exercises, tests and reasoning questions to evaluate the acquired knowledge in the semester (50%).
Assistance is not evaluated, however a minimum assistance of a 75% is required and a minimum grade of 4 out of 10 in the final ordinary exam and the individual work for being eligible for the continuous assessment.

EXTRAORDINARY EVALUATION

Students not passing the subject in the ordinary evaluation will be called to participate in the final exam of the extraordinary evaluation, consisting on two parts:

1. First part: written exam with exercises, tests and reasoning questions for the evaluation of the acquired knowledge (90%)
2. Second part: individual work consisting on the elaboration of an economic report with data from different statistical sources applying the knowledge acquired in the subject (10%). The mark of the Work delivered in the ordinary call will be kept if it exceeds the minimum grade of 5. The student must repeat the Work if he did not arrive in the ordinary call to have more than 5. Also, the Work can be returned to the student who, obtaining a grade higher than 5 in the ordinary call, wishes to upload a grade.

7. COURSE PROGRAMME

1.- COURSE PROGRAMME:

THEORETICAL

PART A: ATTRIBUTE, INDEXES, RATE OF CHANGE AND TIME SERIES.

UNIT 1. ATTRIBUTE STATISTICS
Association between qualitative variables.
Ranks correlation.
Contingency tables.

UNIT 2. INDEXES
Concept types of indexes.
Properties of indexes.
Change of base and deflation.
Proportional contribution of products.
Exercises in Excel.

UNIT 3. RATE OF CHANGE
Concept of rate of change.
Types of rates.
Average and equivalent rate of change.
Exercises in Excel.

UNIT 4. INTRODUCTION TO TIME SERIES
Concept of time series.
Main components of a time series.
Trend and seasonal analysis.
Practical exercises with Excel

PART B: PROBABILITY THEORY

UNIT 5. FUNDAMENTS OF PROBABILITY
Random experiment.
Probability interpretations.
Events. Operations with events.
Kolmogorov probability axioms.
Theorems of probability calculations.
Conditional probability. Independent events.
UNIT 6. 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.

UNIT 7. DISCRETE PROBABILITY MODELS

- Binomial.
- Poisson.
- Multinomial.
- Other univariate probability models.

UNIT 8. CONTINUOUS PROBABILITY MODELS

- Uniform.
- Normal.
- Distributions derived from the normal: χ², t and F.
- Central limit theorem.

PRACTICAL:
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. BIBLIOGRAPHY

1. - BASIC READING:


KELLER, G. (2014):

MARTÍN PLIEGO, F.J. (2007):
Introducción a la Estadística Económica y Empresarial. Ed. Paraninfo

Fundamentos de Probabilidad. Ed. Thomson

Problemas de Probabilidad. Ed. Thomson

2. - COMPLEMENTARY READING:

CARLBERG, C. (2011):
Análisis estadistico con Excel. Anaya Multimedia.


HERNÁNDEZ, A. (2008):


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.

Students should observe the following norms while in class:

- Sit properly.
- Switch off mobiles during class, exams and other classroom activities.
- Maintain at all times a respectful attitude, both to the fellow students and to teachers and other staff of the University.
- Do not enter a classroom with food or drinks.
- Do not read or handle material other than those of the subject being taught.
- Show respect to the University and its facilities.

Attempt to copy in an exam, in whatever form, is considered a very serious offence, contrary to the spirit of the University. As per the rules of behaviour for students (approved by the University Council on December 17th, 1997), any such attempt will result on the opening of a case to study the situation, and it could result on the temporary or permanent expulsion of the student from the University.

10. EXCEPTIONAL MEASURES
Should an exceptional situation occur which prevents continuing with face-to-face teaching under the conditions previously established to this end, the University will take appropriate decisions and adopt the necessary measures to guarantee the acquisition of skills and attainment of learning outcomes as established in this Course Unit Guide. This will be done in accordance with the teaching coordination mechanisms included in the Internal Quality Assurance System of each degree.