Teaching Guide 2017/2018

Principles of Statistics

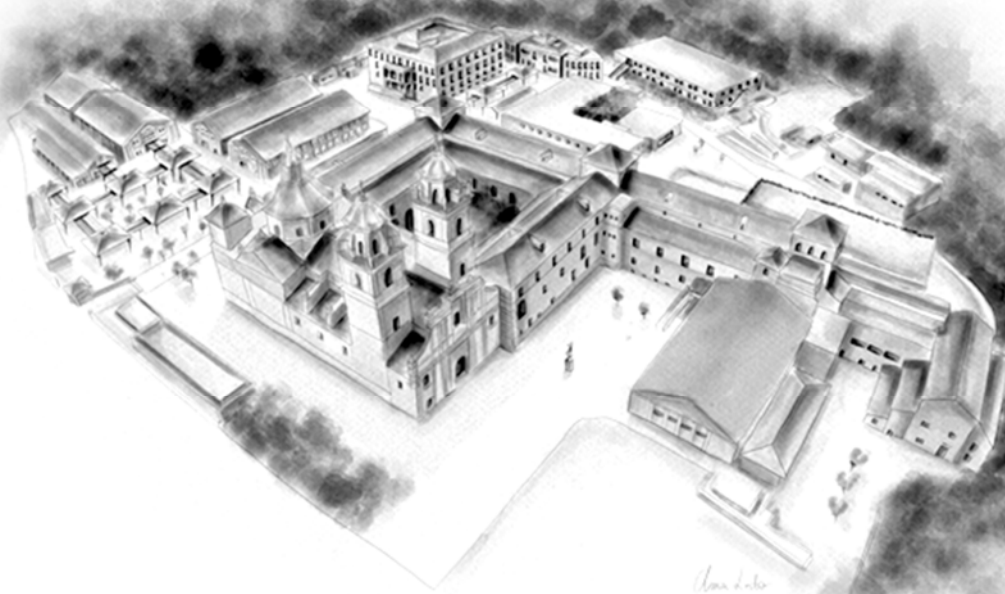## Business Administration Degree

Face-to-face tuition

UCAM | UNIVERSIDAD CATÓLICA DE MURCIA

Contents

Principles of Statistics

Module: **Quantitative Methods**.

Field: **Statistics**.

Character: **Basic Training**.

ECTS: **6 ECTS**.

Time period: **Second Course, 3rd semester**

Teacher: **Vita Zhukova**

Email: **vzhukova@ucam.edu**

Student's attention timetable: **Mondays 18h**

Module coordinator teacher: **Mª Concepción Pérez Cárceles**

Brief Description

The first part of the course on "Principles of Statistics" presents contents of Descriptive Statistics, knowledge of which makes possible to present business financial information in an objective manner, in order to facilitate the business decision-making process. The second part goes in depth into Probability Theory and Random Variables. The profile of the course is multidisciplinary, given that

there is no research, process or work aimed at obtaining quantitative information in general in which it does not have an immediate application.

Previous requirements

With the aim of maximize the learning results of this subject, the student should have previous knowledge about Linear Algebra, Real Number Succession and Single Variable Calculus, acquired in Secondary Education, in order to introduce important concepts in algebra and go deep into differential and integral calculus.

Aims

1. The student to get familiar with the descriptive statistical analysis knowledge and the probability theory.
2. To provide the student with a good command of methodological capacity to be able to produce objective and non-speculative information from real data.
3. To solve problems through economics interpretation to the mathematical solutions.

Competences and training results

Cross curricular competences

(**T1**) Analysis and synthesis skills

(**T2**) Planning and organizational skills

(**T5**) Computer science knowledge related to the field of study

(**T6**) Information management skills

(**T7**) Problem solving skills

(**T8**) Decision making skills

(**T9**) Teamwork

(**T14**) Critical reasoning

(**T16**) Autonomous learning

(**T22**) Motivation for quality

(**T24**) Reflection ability

(**UCAM1**) To be able to express oneself correctly in Spanish about this discipline

(**UCAM5**) To be able to use basic CIT tools

(**UCAM6**) Acquire the ability to work in a team, being in contact with other professionals of this or another field.

Specific Competences

(**E1**) Know and apply basic Statistics concepts

(**E19**) Acquire the ability to apply knowledge to the practice.

(**E37**) Identify and use suitable mathematical and statistical tools.

(**E38**) Identify and apply suitable software. Design information systems.

(**E53**) Originate from the data relevant information impossible to recognize by non-professionals.

(**E57**) Communicate fluently with the environment and work in teams.

Learning results

- Understand, reason and synthetize contents related to statistics.
- Manage and organize statistic information acquired during the learning process.
- Know and use the possibilities that computer science offers, within its different applications, in the study of statistics.
- Organize and know how to use the information coming from different resources related to statistics field.
- Acquire the necessary abilities to solve statistical problems.
- Decide, in a comprehensive and critical way, among the different options in the resolutions of a hypothetical scenario or statistical problem necessary to take a business decision.
- Acquire and implement collaboration strategies and abilities to foster teamwork in the resolution of statistical problems.
- Acquire and implement collaboration strategies and abilities to favour teamwork in statistical problem resolution.
- Issue sentences and take a critical stance before the diversity of different situations to cope with and that need the application of a technique or statistical tool for its resolution.
- Manage their learning process in the statistical field in a pro-active way.
- Generate learning abilities leading to follow future studies in Statistics with a high degree of autonomy.
- Value the importance of the suitable performance of their work when solving statistical problems or hypothetical scenarios within this field.
- Think reasonably and under a critical point of view about questions related to Statistics study.
- Use statistical terminology, orthographic and grammar rules, both in written and oral language, in a suitable way.
- Know and use statistical resources provided by new technologies of information and communication in a suitable way.
- Collaborate with other professionals to get to know the different contributions from other knowledge fields, which implement statistics in their professional activities.
- Have and understand other statistical knowledge based on text books with aspects that involve knowledge coming from the vanguard of this field.
- Transcribe reality to a mathematical model for its best comprehension and later analysis.
- Draw relevant information from a combination of data of socio-economic and managerial character.
- Use the different descriptive statistics and interpret the results.
- Have a good command of probability theory basics.
- Know how to apply statistical inference to draw out relevant information.

- Understand and apply statistical knowledge to practice by devising and supplying documentary and well supported evidence.
- Apply the most convenient statistical methodology to solve business problems.
- Be able to distinguish among the different statistical elements according to particular criteria for particular problems.
- Deal with statistical tools suitable to solve different economic problems.
- Know and use different computer science tools specialized in the different Statistics knowledge areas.
- Issue sentences about statistical field aspects by gathering and interpreting relevant information, impossible to be recognized by non-professionals.
- Obtain general conclusions from the information provided in the different economic problems.
- Apply suitable descriptive Statistics methods to the information available in order to know the problem magnitude.
- Estimate the suitability of the possible solutions to a socio- economic problem by means of the statistical inference implementation.
- Communicate information, ideas, problems and solutions in an effective and suitable way within the statistical scope.
- Solve statistical problems in work teams.
- Use a logical structure and write with orthographic correction.
- Use correct terminology in the task performance.

Methodology	Hours	Face-to-face work hours	Non-face-to-face work hours
Master class (60%)	36	60 hours (40 %)	
Practice workshops (13%)	7,75		
Assessment (7%)	4,25		
Tutorials (20%)	12		
Personal study (45%)	40,50		90 hours (60 %)
Tasks (30%)	27		
Practice classes (15%)	13,50		
Bibliographic search (10%)	9		

TOTAL	150	60	90

Methodology

Syllabus

Unit 1: Frequency distributions

    1.1. Unidimensional frequency distribution

    1.2. Measures of position

    1.3. Measures of dispersion

    1.4. Measures of asymmetry

    1.5. Measures of concentration

    1.6. Bidimensional frequency distributions

    1.7. Practice

Practice Unit 2: Index numbers

    2.1. Index numbers definition and classification

    2.2. Price indexes

    2.3. Quantity indexes

    2.4. Properties of index numbers

    2.5. Operations with index numbers

    2.6. Deflation of economic series

    2.7. Practice

Unit 3: Time series analysis

    3.1. Definition and components of time series

    3.2. Time series analysis.

    3.3. Trend determination.

    3.4. Seasonal variation determination.

    3.5. Deseasonalized time series

    3.6. Practice

Unit 4: Probability theory

    4.1. Basic concepts.

    4.2. Operations with events.

    4.3. Laplace rule.

    4.4. Probability properties.

    4.5. Conditional probability.

    4.6. Total probability theorem

    4.7. Bayes' Theorem.

    4.8. Events independence.

    4.9. Practice

Unit 5: Random Variables

    5.1. Definition.

    5.2. Unidimensional random variables.

    5.3. Mathematical expectation of unidimensional random variables.

    5.4. Moments of unidimensional random variable.

    5.5. Factorial moment generating function.

    5.6. Bidimensional random variables.

    5.7. Marginal distributions.

    5.8. Conditional distributions.

    5.9. Independence.

    5.10. Mathematical expectation of bidimensional random variables.

    5.11. Moments of bidimensional random variable.

    5.12. Practice

Practice tuition program

Seminar 1. Frequency Distributions.

Seminar 2. Index Numbers

Seminar 3. Time series Analysis.

Seminar 4. Probability Theory.

Seminar 5. Random Variables.

Seminar 6. Research task.

Analysis of one or more economic series to be chosen by the student by means of descriptive statistical calculus, index numbers and time series to obtain conclusions about the evolution in the last years.

Connection with other subjects of the study plan

The student should have previous knowledge of Mathematics for Business I and II of first course about linear algebra, real numbers successions and calculus in a variable to introduce algebra, differential and integral calculus and descriptive Statistics important concepts. On the other hand, it is also a good basic support tool for the subjects of applied Statistics to the business, Econometrics.

Assessment system

February/June Call

- **Theoretical part**: 80%. There will be two exams with a series of theory, theory-practice and practice questions. The first exam will be 30% and the next one 50%.
- **Practice part**: 20% of the total. The student's involvement in the training activities that conform the subject will be assessed through the issuing and correction of the exercises, tasks, case studies and problems carried out individually and in groups; the public presentation of some of these tasks and the taking part on the debate forums.

September Call:

- **Theoretical part**: 80%.
- **Practice part**: 20% of the total. The student's involvement in the training activities that conform the subject will be assessed through the issuing and correction of the exercises, tasks, case studies and problems carried out individually and in groups; the public presentation of some of these tasks and the taking part on the debate forums.

February/June Call

The student will pass the subject in the February/June call when the arithmetic mean, according to the three grade percentages (two written exams and involvement) is equal or higher than 5, whenever none of the other two grades is lower than 4.

If the student has less than 5 points in any of the three grades (the two written exams and the involvement), he/she will have to resit to pass in September, keeping the grades equal or higher than 5.

September Call:

The student will pass the subject in September call when the arithmetic mean, according to the three grade percentages fixed in the three grades (two written exams and involvement) is equal or higher than 5, whenever none of the other two grades is lower than 4.

In case of not passing, he/she will have to resit for the whole subject in later calls.

Grading system

The ratings system (RD 1.125/2003. from 5th September) as follows:

0-4,9 Fail (SS)

5,0-6,9 Pass (AP)

7,0-8,9 Good (NT)

9,0-10 Distinction (SB)

The "Honors" mention can be awarded to those students with a degree of 9,0 or higher. This cannot be awarded to more than 5% of the students registered in a subject in each academic year, unless the number of students registered is less than 20, when there will be awarded only one mention.

Bibliography and reference sources
Basic bibliography

- Paul Newbold, William L. Carlson, Betty M. Thorne, (2010), Statistics for business and economics. 7th ed., Upper Saddle River, N.J. : Pearson, cop. 2010

Webs associated

- http://www.bde.es/ Bank of Spain

- http://www.worldbank.org/ World Bank

- http://www.ine.es/ Instituto Nacional de Estadística

Recommendations for future study

We recommend the student to face individually practice problems of the kind after listening to the theoretical instructions.

Instructional Material

It will be necessary to have a PC with all the necessary programs installed (text editor, spreadsheet, presentation tools, etc.) We also recommend students to use memory devices (USB, CDs or DVDs) to make easier the interchange of information in presentations such as Power Point, exercises, case study, etc., during the face-to-face classes. We also recommend the use of calculator and access to the Internet. It will be necessary scientific calculator.

Tutorials

Brief description

Academic tutorial:

These tutorials have the aim of consolidating knowledge and abilities taught in the classes of the subject, at the same time will help to solve problems and doubts asked by the students. There will be an assessment and follow up of the different tasks in order to contribute to the understanding of the subject methodology and systems of assessment.

Personal Tutorial:

The university also has a Special Team for tutorials with the students enrolled in the degree. All students registered in UCAM have a personal tutor from the Special Tutors Team, when they register for the first time in the university; hence, the student has this accompaniment during the complete university period. Criteria and aspects can be consulted in:
http://www.ucam.edu/servicios/tutorias/preguntas-frecuentes/que-es-tutoria