

Academic Year: (2021 / 2022)

Review date: 04-06-2021

Department assigned to the subject: Statistics Department

Coordinating teacher: CASCOS FERNANDEZ, IGNACIO

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 2

Branch of knowledge: Social Sciences and Law

OBJECTIVES

By the end of this course, students will be able to have:

1. knowledge and understanding of the statistic principles underlying their branch of engineering;
2. the ability to apply their knowledge and understanding to identify, formulate and solve statistic problems using established methods;
3. the ability to apply their knowledge and understanding to analyse engineering products, processes and methods;
4. an understanding of statistics methodologies, and an ability to use them.
5. the ability to select and use appropriate statistic tools and methods;
6. the ability to combine theory and practice to solve engineering problems;
7. an understanding of applicable statistic techniques and methods, and of their limitations;

DESCRIPTION OF CONTENTS: PROGRAMME**BLOCK 0: DESCRIPTIVE STATISTICS**

0. Descriptive Statistics

BLOCK I: PROBABILITY

1. Introduction to Probability

1.1 Introduction

1.2 Random phenomena

1.3 Definition of probability and properties

1.4 Assessment of probabilities in practice

1.5 Conditional probability

1.6 Bayes Theorem

2. Random variables

2.1 Definition of random variable

2.2 Discrete random variables

2.3 Continuous random variables

2.4 Characteristic features of a random variable

2.5 Independence of random variables

BLOCK II: PARAMETRIC MODELS AND INFERENCE

3. Distribution models

3.1 Binomial distribution

3.2 Geometric distribution

3.3 Poisson distribution

3.4 Uniform distribution (continuous)

3.5 Exponential distribution

3.6 Normal distribution (with CLT)

4. Statistical Inference

4.1 Introduction

4.2 Estimators and their distributions

4.3 Confidence Intervals

4.4 Hypothesis testing

4.5 Particular tests on a single sample

4.6 Comparison of two populations

BLOCK III: APPLICATIONS

5. Quality control

5.1 Introduction, control charts

5.2 Variables control charts, the X-bar chart

5.3 Attributes control charts, the p and np charts

6. Linear regression

6.1 Introduction

6.2 Simple linear regression

6.3 Multiple linear regression

LEARNING ACTIVITIES AND METHODOLOGY

- Lectures: introducing the theoretical concepts and developments with examples, 2.2 ECTS
- Problem solving sessions: 2.2 ECTS
- Computer (practical) sessions: 0.6 ECTS -- 4 SESSIONS
- Evaluation sessions (continuous evaluation and final exam): 1 ECTS

ASSESSMENT SYSTEM

The evaluation of the course will be based on continuous evaluation and a final exam with the weighting given below:

40% - final exam,

60% - continuous evaluation.

There is no requirement for a minimum score at any of these parts.

Continuous evaluation

There will be continuous evaluation by means of two midterm exams (40%+55%) and computer lab assignments (5%).

At the partial examinations there will be some questions about the computer sessions at those exams.

Final exam - regular session

- The final exam will consist of solving problems using all the tools learnt during the course.
- The final grade will be 60% continuous evaluation + 40% final exam

Final exam - extraordinary session

- The final exam will consist of solving problems using all the tools learnt during the course.
- The evaluation system in the extraordinary session will be the maximum between the following criteria:
 - a) 100% final exam
 - b) 60% continuous evaluation + 40% final exam

% end-of-term-examination:	40
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% of continuous assessment (assignments, laboratory, practicals...):	60
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BASIC BIBLIOGRAPHY

- MONTGOMERY, D.C., RUNGER, G.C. Applied Statistics and Probability for Engineers, John Wiley & Sons, 2003
- Navidi, W. Statistics for Engineers and Scientists, McGraw-Hill, 2006
- SONG, TT Fundamentals of Probability and Statistics for Engineers, John Wiley & Sons, 2004

ADDITIONAL BIBLIOGRAPHY

- GUTTMAN, L., WILKS, S.S., HUNTER, J.S. Introductory Engineering Statistics, Wiley, 1992
- PEÑA, D. Regresión y Diseño de Experimentos, Alianza Editorial, 2002
- PEÑA, D. Fundamentos de Estadística, Alianza Editorial, 2001