

Academic Year: (2019 / 2020)

Review date: 20-04-2020

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 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

There will be continuous evaluation by means of two partial examinations (40%+55%) and computer lab assignments (5%). At the partial examinations there will be some questions about the computer sessions at those exams.

If the grade obtained at the continuous evaluation is 6 or higher, the student should not attend the final exam and his/her final grade will be the grade of the continuous evaluation.

If the grade obtained at the continuous evaluation is lower than 6, the student will have to attend the final exam. For those students, the final grade will be computed giving a 40% weight to the partial examinations, and a 60% weight to the grade at the final exam.

The grade for the students attending the extraordinary examination will be the grade obtained at such exam.

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

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