

Academic Year: (2022 / 2023)

Review date: 31-05-2022

Department assigned to the subject: Statistics Department

Coordinating teacher: MEILAN VILA, ANDREA

Type: Compulsory ECTS Credits : 6.0

Year : 3 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

It is advisable to have successfully completed the following courses:

Differential calculus - Course 1 - Semester 1

Integral calculus - Course 1 - Semester 2

Vector calculus - Course 1 - Semester 2

Probability - Course 2 - Semester 2

DESCRIPTION OF CONTENTS: PROGRAMME**1. Descriptive statistics.****1.1. Introduction.****1.2. Population and sample.****1.3. Statistical variables.****1.4. Statistical tables.****1.5. Statistical graphics.****1.6. Descriptive measures.****1.6.1. Measures of location.****1.6.2. Measures of dispersion.****1.6.3. Measures of shape.****2. Sampling****2.1. Introduction.****2.2. Sampling methods.****2.3. Statistics.****2.4. Sampling distributions.****2.5.1. Sampling distributions for normal populations.****2.5.2. Sampling distributions for large sample sizes.****3. Point estimation.****3.1. Introduction.****3.2. Estimation methods.****3.2.1. Method of moments.****3.2.2. Maximum likelihood estimation.****4 Confidence intervals.****4.1. Introduction.****4.1.1. Pivotal quantities.****4.2. Confidence intervals under the normal distribution.****4.2.1. Confidence intervals for one population.****4.2.2. Confidence intervals for two populations.****4.3. Asymptotic confidence intervals.****5. Hypothesis testing.****5.1. Introduction.****5.2. Type I and type II errors.****5.3. Power of a test.****5.4. p-value of a test.****5.5. Hypothesis testing under the normal distribution.****5.5.1. Tests for one populations.**

5.5.2. Tests for two populations.

5.6. Asymptotic tests.

6. Nonparametric tests.

6.1. Introduction.

6.2. Goodness-of-fit tests.

6.2.1. Graphical tools.

6.2.2. Chi square test.

6.2.3. Kolmogorov-Smirnov test.

6.2.4. Lilliefors test.

6.3. Tests of independence.

6.4. Tests of homogeneity.

7. Linear regression.

7.1. Introduction.

7.2. Simple linear regression.

7.2.1. Formulation of the model.

7.2.2. Model assumptions.

7.2.3. Parameter estimators.

7.2.4. The F test.

7.2.5. Model validation.

7.2.6. Transformations.

7.3. Multiple linear regression.

7.3.1. Formulation of the model.

7.3.2. Model assumptions.

7.3.3. Parameter estimators.

7.3.4. Diagnostic techniques.

7.3.5. Construction of regression models.

LEARNING ACTIVITIES AND METHODOLOGY

THEORETICAL-PRACTICAL CLASSES. [44 hours with 100% classroom instruction, 1.67 ECTS]

Knowledge and concepts students must acquire. Student receive course notes and will have basic reference texts to facilitate following the classes and carrying out follow up work. Students partake in exercises to resolve practical problems and participate in workshops and evaluation tests, all geared towards acquiring the necessary capabilities.

TUTORING SESSIONS. [4 hours of tutoring with 100% on-site attendance, 0.15 ECTS]

Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher.

STUDENT INDIVIDUAL WORK OR GROUP WORK [98 hours with 0 % on-site, 3.72 ECTS]

WORKSHOPS AND LABORATORY SESSIONS [8 hours with 100% on site, 0.3 ECTS]

FINAL EXAM. [4 hours with 100% on site, 0.15 ECTS]

Global assessment of knowledge, skills and capacities acquired throughout the course.

METHODOLOGIES

THEORY CLASS. Classroom presentations by the teacher with IT and audiovisual support in which the subject's main concepts are developed, while providing material and bibliography to complement student learning.

PRACTICAL CLASS. Resolution of practical cases and problem, posed by the teacher, and carried out individually or in a group.

TUTORING SESSIONS. Individualized attendance (individual tutoring sessions) or in-group (group tutoring sessions) for students with a teacher as tutor.

LABORATORY PRACTICAL SESSIONS. Applied/experimental learning/teaching in workshops and laboratories under the tutor's supervision.

ASSESSMENT SYSTEM

Continuous evaluation through two mid-term exams (40%) and final exam (60%).

% 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
- NEWBOLD, P., CARLSON, W.L., THORNE, B. Statistics for Business and Economics., Prentice-Hall, 2013
- WACKERLY, D.D., MENDENHALL, W., SCHEAFFER, R.L. Mathematical statistics with applications, Thomson, 2008

ADDITIONAL BIBLIOGRAPHY

- ARNOLD, S.F. Mathematical Statistics, Prentice Hall, 1990
- CASELLA, G., BERGER, R.L. Statistical Inference, Duxbury, 2002
- CONOVER, W.J. Practical nonparametric statistics, John Wiley & Sons, 1999
- PEÑA, D. Fundamentos de Estadística, Alianza Editorial, 2001
- PEÑA, D. Regresión y Diseño de Experimentos, Alianza Editorial, 2002