VNIVERSITAT ĐVALÈNCIA

# COURSE DATA

## Data Subject

| | |
|---|---|
| **Code** | 34067 |
| **Name** | Statistics |
| **Cycle** | Grade |
| **ECTS Credits** | 6.0 |
| **Academic year** | 2019 - 2020 |

## Study (s)

| Degree | Center | Acad. year | Period |
|---|---|---|---|
| 1201 - Degree in Pharmacy | Faculty of Pharmacy and Food Sciences | 1 | First term |
| 1211 - Double Degree in Pharmacy and Human Nutrition and Dietetics | Faculty of Pharmacy and Food Sciences | 1 | First term |

## Subject-matter

| Degree | Subject-matter | Character |
|---|---|---|
| 1201 - Degree in Pharmacy | 7 - Statistics | Basic Training |
| 1211 - Double Degree in Pharmacy and Human Nutrition and Dietetics | 1 - Asignaturas obligatorias del PDG Farmacia-Nutrición Humana y Dietética | Obligatory |

## Coordination

| Name | Department |
|---|---|
| CORBERAN VALLET, ANA | 130 - Statistics and Operational Research |

# SUMMARY

This course aims to provide students with the tools and basic concepts of Statistics which are necessary to state statistical hypotheses, recognize simple probabilistic models, analyze data obtained by either direct observation of the environment or as a result of controlled experiments in laboratories and make decisions based on the conclusions drawn from this analysis. An additional purpose of this course is to motivate students in the study and application of Statistics, using the proper tools to solve real problems.

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# PREVIOUS KNOWLEDGE

## Relationship to other subjects of the same degree

There are no specified enrollment restrictions with other subjects of the curriculum.

## Other requirements

There are no recommendations as it is an introductory course.

# COMPETENCES (RD 1393/2007) // LEARNING OUTCOMES (RD 822/2021)

## 1201 - Degree in Pharmacy

- Calculate integrals with different methods for calculating primitives.
- Solve simple ordinary differential equations.
- Design simple experiments that may be useful to achieve the objectives of the study.
- Describe and synthesise the dataset observed in the experiment.
- Analyse the data observed using a statistical package.
- Interpret the results provided by statistical packages.
- Prepare and submit a report of the experimental study conducted.

# LEARNING OUTCOMES (RD 1393/2007) // NO CONTENT (RD 822/2021)

The students will know the basics of statistical inference and they will be able to both calculate probabilities associated with random events using a probabilistic model and to resolve the most commonly used tests for comparison of means, proportions and categorical data, including some non-parametric methods.

This course also aims to encourage the students to:

• work together.

• plan and organize the work.

• express suitably their thoughts and decisions.

# DESCRIPTION OF CONTENTS

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## 1. Exploratory data analysis

Samples and populations. Types of variables. Graphical and numerical description of samples and variables

## 2. Introduction to probability

Events and probability. Random variables. The binomial distribution. The Normal curves. Areas under a Normal curve.

## 3. Statistical analysis of a sample

Population parameters. Estimation of a population mean. Hypothesis testing for a population mean. Normality test. Non-parametric alternatives.

## 4. Statistical analysis of two samples

Comparison of two paired samples. Confidence interval and the paired-sample t test. Nonparametric alternatives.
Comparison of two independent samples. Confidence interval for the difference of two population means. Hypothesis testing: the test t. Nonparametric alternatives.

## 5. Statistical analysis of k independent samples

Statistical design of k independent samples. Analysis of Variance and post-hoc tests. Nonparametric alternatives

## 6. Analysis of categorical data

Analysis of a population proportion. The Chi-Square Goodness-of-fit test. Contingency tables. The Chi-Square test.

## 7. Linear regression models

Descriptive statistics of two numerical variables. Regression line. Statistical inference of the linear model. Confidence interval for the prediction. Other regression models

## 8. Elementary notions of Differential and Integral Calculus

Derivatives and integrals. Ordinary Differential Equations.

## 9. LABORATORY SESSIONS

Exploratory data analysis.
Statistical analysis of a sample.
Statistical analysis of independent samples.
Categorical data.
Linear regression models.

# WORKLOAD

| ACTIVITY | Hours | % To be attended |
|---|---|---|
| Theory classes | 45,00 | 100 |
| Computer classroom practice | 10,00 | 100 |
| Tutorials | 2,00 | 100 |
| Study and independent work | 45,00 | 0 |
| Preparation of evaluation activities | 30,00 | 0 |
| Preparation of practical classes and problem | 15,00 | 0 |
| **TOTAL** | **147,00** | |

# TEACHING METHODOLOGY

Theory classes will be devoted to develop the agenda and raise problems whose solution requires the methodology corresponding to each subject. WE will introduce the appropriate statistical technique and apply it to solve proposed problems using statistical software. For the preparation of the course the student will have a collection of proposed problems, separated by subjects, which they will have to resolve on their own.

The practical sessions will take place in a computer room and will be synchronized with the theory; they will allow the student to solve problems by applying several statistical procedures.

All materials will be available in the Virtual Classroom.

# EVALUATION

The knowledge acquired both in theory and practical sessions will be evaluated together, by means of an exam which may require the interpretation of results presented in the standard statistical software format used throughout the course. This evaluation will represent the 80% of the final grade. The remaining 20% of the final grade will come from work evaluated throughout the course.

Practical works (20% of the final grade) will be conducted in groups of 2 or 3 students. Each group will write its own report with resolution of the proposed tasks, including names of the authors. This evaluation cannot be replaced by an exam, and the grades will not be saved for posterior courses. To pass the course you must have at least a grade of 4/10 both in final grade, and the weighted mean of both grades greater than 5/10.

## REFERENCES

### Basic

- Samuels, M.L., Witmer, J.A. y Schaffner, A. Fundamentos de Estadística para las Ciencias de la Vida (4a ed.) Pearson Educación S.A. (2012)

- - Cobo, E. Bioestadística para no estadísticos. Elsevier-Masson. (2007)
  - Milton, J.S. Estadística para Biología y Ciencias de la Salud. (3ª ed.)  Madrid: McGraw-Hill Interamericana. (2001)

### Additional

-  Chase, W. & Brown, F. General Statistics. (2nd ed.) Wiley. (1992)
   - Norman, G.R. y Steiner, D.L. Bioestadística. Madrid: Mosby/Doyma Libros. (1996)

- Rueda, P. Curso básico de matemáticas para universitarios. Laboratori de Materials. Publicacions de la Universitat de València (2009).

## ADDENDUM COVID-19

**This addendum will only be activated if the health situation requires so and with the prior agreement of the Governing Council**

## English version is not available