

## COURSE GUIDE 2018-19

### DETAILS OF THE COURSE

Subject:	Statistics applied to Horticulture		
Code:	70784253	Studies:	Master en Horticultura Mediterranea bajo Invernadero
Year:	2017-18	Level:	Master
Course:	1st	Type:	Optative
Length:	1st semester		

### TIMING

ECTS Credits:	3
Total Hours:	75
On-line Platform:	Teaching support

### LECTURER

Name	<b>Rumí Rodríguez, Rafael</b>		
Department	Mathematics		
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### CONTEXT

#### Main objective of the course

This subject strengthens the approach of statistics as a tool for obtaining and analyzing data from the Horticulture field through the treatment and modelling of databases using statistical inference techniques. In this way, the procedures included in this subject provide us with methods to infer properties of a population from a small part of it, called sample. Also, by designing an experiment one gets more precise data and more complete information on a studied phenomenon with a minimal number of experiments and the lowest possible material cost. The subject is organized in three modules: 1. Data analysis and Statistical inference 2. Design of experiments and 3. Regression models. Each module contains a theoretical introduction, study guide, real world applications of the studied techniques and self-assessments. This subject also offers the student the opportunity to learn and experience with the statistical software Statgraphics, which will be used to perform the statistical studies with datasets.

#### Previous knowledge

Some basic knowledge of Mathematics and Computing are needed.

#### Prior conditions

None

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<b>COMPETENCIES</b>	
General Competencies	
<i>UAL transverse competencies</i>	
<ul style="list-style-type: none"> <li>• Capacity to solve problems</li> <li>• Ability in ICT</li> </ul>	
<i>Basic competencies</i>	
<ul style="list-style-type: none"> <li>• Understand and own knowledge</li> <li>• Capacity to transmit and social aptitude</li> <li>• Ability in learning</li> </ul>	
Specific competencies	
CET 1. <i>Design experiments and carry out a statistical analysis of experimental data</i>	
CET 2. <i>Knowing and applying the scientific communication methods</i>	
<b>LEARNING OBJECTIVES AND RESULTS</b>	
<p>Knowledge about how to classify, represent and resume statistical data.</p> <p>Knowing, applying and assessing the usefulness of estimation methods and hypothesis tests (parametric and non-parametric)</p> <p>Understanding and management of experimental design techniques in order to improve the experimentation.</p> <p>Knowing, assessing the models that allow us to study the dependency relationships between variables.</p> <p>Knowing and operating with ease the computer program for statistical analysis Statgraphics.</p>	
<b>CONTENTS</b>	
<b>Units</b>	
<b>Module I: Data Analysis and Statistical Inference</b>	
Unit 1: Descriptive Statistics	
<ol style="list-style-type: none"> <li>1. Statistical variables</li> <li>2. Describing datasets</li> <li>3. Summarizing datasets</li> <li>4. Paired datasets and the sample correlation coefficient.</li> </ol>	
Unit 2: Statistical Inference	
<ol style="list-style-type: none"> <li>1. Parametric point estimation</li> <li>2. Confidence intervals estimation</li> <li>3. Parametric hypothesis tests</li> <li>4. Non-parametric hypothesis tests</li> </ol>	
<b>Module II: Design of experiments</b>	
Unit 3: Experiments with a single factor.	
<ol style="list-style-type: none"> <li>1. Introduction to design of experiments</li> <li>2. Analysis of variance</li> </ol>	

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3. Experiments with blocks

Unit 4: Designs with two or more factors

1. Factorial design with two blocking factors
2. General factorial experiments
3. Fractional factorial experiments
4. Nested models

**Module III: Regression models**

Unit 5: Regression models

1. Simple regression model
2. Parameter estimates and inferences over the model
3. Checking previous assumptions
4. Multiple linear regression model - Multicollinearity

**Methodology and activities**

1. Lectures and theoretical study of the statistical procedures.
2. Solving practical problems using a statistical software.
3. Exercises.

**EVALUATION OF THE COMPETENCIES**

**Criteria**

The total mark of the subject is 10 points, divided in this way:

**Six points, as maximum**, can be obtained through a practical final exam covering the contents of the subject. The exam will take place in a computer room.

**Four points, as maximum**, can be obtained through individual assignments to be handed in using the on-line platform. In order to obtain the three points, it is an essential requirement to deliver the required exercises before the established deadline.

**Follow up**

- On-line platform sign in and access.
- Handing in activities in class.
- Handing in activities through on-line platform.

**BIBLIOGRAPHY**

**Recommended Reading**

- Design and analysis of experiments (Montgomery, D.)  
 Introduction to design and analysis of experiments (Cobb, G.)  
 Design and Analysis of experiments (Hinkelmann, K. Kempthorne, O.)  
 Fundamental concepts in the design of experiments (Hicks, C.R., Turner, K.V.)  
 Design and Analysis of experiments (Dean a. Voss, D.)

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Bibliography link

<http://almirez.ual.es/search/x?SEARCH=70784253>

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