

Ministry of Education  
Federal University of Santa Maria  
Rural Science Center  
**Graduate Program in Soil Science**

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## **Course: Statistics Applied to Soil Science**

### **Identification**

**Code:** SOL873

**Credits:** 3 (1-2)

**Level:** Master/Doctorate

**Professor:** Ricardo Bergamo Schenato

**System:** Annual (II semester)

### **Discipline objectives**

To deepen the students' knowledge in the analysis of experimental data; to enable the interpretation of results; to encourage discussion based on the relationships between variables; to enable the use of free software in statistical analysis;

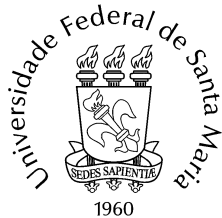
### **Syllabus**

Principles of experimentation; significance tests; experimental design; factorial experiments; experiments in subdivided plots; analysis of experiment groups; regression.

### **Methodology and teaching instruments**

The discipline will be based on expositive presentations on the topics and the resolution of proposed problems. The participation of all students in discussions will be encouraged and will result in better learning of the theoretical content. The practical part will be based on the presentation of problem situations by the professor and the resolution, with autonomy, by the students, aiming at the contact with real cases of application of the content covered. The classes will be expository, online, and available on the class's Moodle page. At class time, a video conference will be opened and the link will be available on Moodle. The instruments to be used are computers with internet access, Moodle as a virtual learning environment, the R environment, and RStudio, which can be obtained for free.

### **Forms of evaluation**



The monitoring of the learning process will be carried out through proposed work at the end of each unit in the syllabus and involving theory and practice.

## **Syllabus**

### **Unit 1 - Initial conceptual bases**

- 1.1 - Review of basic concepts in statistics
- 1.2 - Principles of experimentation
- 1.3 - Characteristics of an experiment

### **Unit 2 - Significance tests**

- 2.1 - Introduction
- 2.2 - Test F in the analysis of variance
- 2.3 - Tests for comparison of means

### **Unit 3 - Experimental designs**

- 3.1 - Completely randomized design (CRD)
  - 3.1.1 - Introduction
  - 3.1.2 - Assumptions and hypotheses for the validation of variance

analysis

- 3.1.3 - Obtaining the analysis of variance
  - 3.1.4 - Interpretation of results

- 3.2 - Randomized block design

- 3.2.1 - Introduction
  - 3.2.2 - Assumptions and hypotheses for the validation of variance

analysis

- 3.2.3 - Obtaining the analysis of variance
  - 3.1.4 - Interpretation of results

### **Unit 4 - Factorial experiments**

- 4.1 - Introduction
- 4.2 - Analysis and interpretation of factorial experiments

### **Unit 5 - Experiments in subdivided plots**

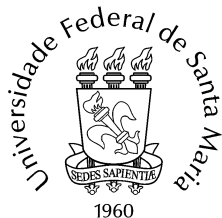
- 5.1 - Introduction
- 5.2 - Obtaining the analysis of variance with significant interaction
- 5.3 - Obtaining the analysis of variance with non-significant interaction

### **Unit 6 - Analysis of experimental groups**

- 6.1 - Introduction
- 6.2 - Analysis and interpretation procedures

### **Unit 7 - Regression analysis**

- 7.1 - Introduction
- 7.2 - Obtaining the regression model



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### 7.3 - Testing the model parameters

#### Recommended literature

- FERREIRA, D. F. **Estatística Básica**. Viçosa: UFLA, 2005, 664 p.
- BANZATTO, D. A., KRONKA, S. N. **Experimentação agrícola**. 3. Ed. Jaboticabal: FUNEP, 1995. 247 p.
- STORCK, L., GARCIA, D.C., LOPES, S. J., ESTEFANEL, V. **Experimentação vegetal**. Santa Maria: UFSM, 2000. 198 p.
- FILHO, A.C.; LÚCIO, A.C. **Análise de variância e testes complementares: teoria e aplicações**. Santa Maria: UFSM, 2008. 121 p.
- MOORE, D. S.; MCCABE, G. P. **Introdução à prática da estatística**. 3. Ed. Rio de Janeiro: LTC, 2002. 536 p.
- ZIMMERMANN, F. J. P. **Estatística Aplicada à pesquisa agrícola**. Santo Antônio de Goiás: Embrapa Arroz e Feijão, 2004. 402 p.
- OTT, R. LYMAN. **An introduction to statistical methods and data analysis**. 6th ed. Belmont, CA : Brooks/Cole Cengage Learning, 2010. 1273 p.
- MELLO, M.P.; PETERNELLI, L.A. **Conhecendo o R – uma visão mais que Estatística**. Viçosa, MG: Ed. UFV, 2013. 222p.
- R Core Team (2015)**. R: A language and environment for statistical computing. R foundation for statistical computing, Vienna, Austria. URL [http:// http://www.r-project.org/](http://www.r-project.org/).