SUBJECT TEACHING GUIDE

572 - Experimental methods and statistical analysis of Environmental Variables

Master's degree in integrated management of water systems

Academic year 2023-2024

1. IDENTIFYING DATA				
Degree	Master's degree in integrated management of water systems		Type and Year	Compulsory. Year 1
Faculty	School of civil Engineering			
Discipline				
Course unit title and code	572 - Experimental methods and statistical analysis of Environmental Variables			
Number of ECTS credits allocated	4	Term	Semester based (2)	
Web				
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. CIENCIAS Y TECNICAS DEL AGUA Y DEL MEDIO AMBIENTE
Name of lecturer	MARIA ARACELI PUENTE TRUEBA
E-mail	araceli.puente@unican.es
Office	E.T.S. de Ingenieros de Caminos, Canales y Puertos. Planta: + 0. DESPACHO MARIA ARACELI PUENTE TRUEBA (0025)
Other lecturers	JOSE BARQUIN ORTIZ

3.1 LEARNING OUTCOMES
- Students will learn the basics and principles of the scientific method
- Students will learn concepts and techniques of experimental design and simulation of the aquatic environment
- Students will be able to address the statistical treatment of biotic and abiotic variables commonly used for the description and analysis of aquatic communities
- Students will be able to characterize specific sample data using from descriptive statistics to the statistical mathematical modeling based on known distribution functions

4. OBJECTIVES
The course aims to deepen into the concepts, methods and techniques used in experimental studies related to the characterization of the processes of aquatic systems.
The course also aims to show the main types of statistical analyzes that are currently applied to the study of abiotic and biotic variables that characterize aquatic systems.

6. COURSE ORGANIZATION	
CONTENTS	
1	1. Types, characteristics and distribution of environmental variables
2	2. Experimental design
3	3. Test of significance and hypotesis testing
4	4. Correlation and regression
5	5. Temporal series analysis
6	6. Multivariate analysis
7	Final exam

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Final exam	Written exam	Yes	Yes	20,00
Moodle test	Activity evaluation with Virtual Media	No	Yes	10,00
Practical task. Exprimental desing of a case study	Work	No	Yes	20,00
Practical task. Statistical treatment of a set of environmental data	Work	No	Yes	30,00
Practical task. Test of significance and regression analysis	Work	No	Yes	10,00
Practical task. Time series analysis and multivariate approaches	Work	No	Yes	10,00
TOTAL				100,00

Observations
As accorded by the relevant committees: As a general rule and unless stated otherwise anywhere in this guide, a student cannot request a reexamination if the original grade obtained in the evaluation was not a fail. As a general rule and unless stated otherwise anywhere in this guide, the reexamination activity will take the same form than the original evaluation activity. Grades are measured on a numeric scale going from 0 to 10, where values smaller than 5 are a Fail. Only for sufficiently justified reasons (i.e. sanitary restrictions), the evaluation activities could be organized online, if authorized by the School Director.

Observations for part-time students
Part-time students will need to agree with the responsible professor a teaching and evaluation plan to ensure an adequate transfer of knowledge as well as a fair evaluation procedure. The minimum requirement for this students will be to complete a piece of homework and to assist to the final exam of the subject. The weights of each part will be proportional to the weight those parts presents in the general evaluation scheme of the subject.

8. BIBLIOGRAPHY AND TEACHING MATERIALS
BASIC
Borcard, D. 2006. Multivariate analysis. Université de Montréal.
Chalmers, N., Parker, P. 1988. The OU Project Guide. Fieldwork and Statistic for Ecological Projects. The Open University.
Chatfield, C. 2003. The analysis of time series. An introduction. Ed: Chapman & Hall/CRC.
Dytham, C. 2011. Choosing and using statistics. A biologist's guide. Willey-Blackwell.
Gauch, H.G. 1982. Multivariate Analysis in Community Ecology. Cambridge University Press.
Gotelli, N.J., Ellison, A.M. 2004. A Primer of ecological statistics. Sinauer Associates, Inc.
Luceño, A., González, F.J. 2004. Métodos estadísticos para medir, describir y controlar la variabilidad. Servicio de Publicaciones de la Universidad de Cantabria
Valiela, I. 2001. Doing science. Design, analysis and communication of scientific research. Oxford University Press.