SUBJECT TEACHING GUIDE

M1460 - Advanced Statistical and Numerical Techniques in Engineering

Master's Degree in Civil Engineering

Academic year 2019-2020

1. IDENTIFYING DATA					
Degree	Master's Degree in Civil Engineering			Type and Year	Optional. Year 2
Faculty	School of civil Engineering				
Discipline	Optional Training				
Course unit title and code	M1460 - Advanced Statistical and Numerical Techniques in Engineering				
Number of ECTS credits allocated	3	Term		Semester based (2)	
Web					
Language of instruction	Spanish	English Friendly	No	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICA APLICADA Y CIENCIAS DE LA COMPUTACION
Name of lecturer	AKEMI GALVEZ TOMIDA
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Other lecturers	ALBERTO LUCEÑO VAZQUEZ ANDRES IGLESIAS PRIETO

3.1 LEARNING OUTCOMES
- Understanding and applying statistical techniques to define models for engineering process control.
- Learning and applying statistical techniques about temporal series of data in engineering.
- Learning important computational aspects on geometric applications in engineering.
- Knowing and applying geometric and mathematical models for computer design of curves and surfaces, as well as computational techniques for curve and surface interrogation for application in engineering problems.

4. OBJECTIVES

Learning and using advanced statistical techniques and methods for engineering process analysis and control in which temporal evolution is a major factor.

Knowing and using advanced mathematical and computational aspects for computer-aided geometric design in engineering.

6. COURSE ORGANIZATION

CONTENTS	
1	Quality control and temporal series in engineering: statistical process control. Engineering process control. Exponential smoothing. Box-Jenkins methodology. Applications in engineering.
2	Computer-aided geometric design (CAGD): computational aspects in applied geometry. Bézier and B-spline models. Curve and surface design. Interrogation of geometric properties. Applications in engineering.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Attendance and active participation at the classroom in the quality control and temporal series part.	Others	No	No	10,00
Computer implementation of general statistical methods for temporal series.	Laboratory evaluation	No	Yes	20,00
Development and implementation of a case study about temporal series.	Work	No	Yes	20,00
Attendance and active participation at the classroom in the CAGD part.	Others	No	No	10,00
Computer implementation of general methods for CAGD.	Laboratory evaluation	No	Yes	20,00
Development and implementation of a case study about CAGD techniques.	Work	No	Yes	20,00
TOTAL				100,00

Observations

The teachers will assist the students to carry out the assignments.
The laboratory evaluation will be carried out through tests to assess students' learning process.

Observations for part-time students

Part-time students can ask their assessment to be performed through project evaluation for each part of the subject (one for quality control and temporal series and another for CAGD).

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

- Luceño, A. "Métodos de Estadística Aplicada" Public. ETS de Ingenieros de Caminos. Santander. 1989.
- Farin, G.: Curves and Surfaces for CAGD, Fifth Edition: A Practical Guide. Morgan Kaufmann (2001).
- Rogers, D.: An Introduction to NURBS: With Historical Perspective. Morgan Kaufmann (2000).