

SUBJECT TEACHING GUIDE

M1514 - Elements of Stereology and Stochastic Geometry

Master's Degree in Mathematics and Computing

Academic year 2019-2020

1. IDENTIFYING DATA					
Degree	Master's Degree in Mathematics and Computing			Type and Year	Optional. Year 1
Faculty	Faculty of Sciences				
Discipline					
Course unit title and code	M1514 - Elements of Stereology and Stochastic Geometry				
Number of ECTS credits allocated	3	Term	Semester based (2)		
Web					
Language of instruction	Spanish	English Friendly	Yes	Mode of delivery	Face-to-face

Department	DPTO. MATEMATICAS, ESTADISTICA Y COMPUTACION				
Name of lecturer	MARCOS CRUZ RODRIGUEZ				
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Office	Facultad de Ciencias. Planta: + 1. DESPACHO (1053)				
Other lecturers	ANA ISABEL GOMEZ PEREZ				

3.1 LEARNING OUTCOMES

- Learn basics of geometric sampling with applications in stereology, combining elements of integral geometry, probability and statistics. The methods are applied to real problems requiring the quantification of geometric structures.

4. OBJECTIVES

This is an applied and methodological course aimed for statistics, applied mathematics, biomedicine or material science students. Geometric sampling principles are used to estimate quantities such as volume, surface, length, number of cells or granules, etc. from sections or projections of the material. The techniques are based in geometric probability, integral geometry and statistics. The methods are illustrated with microscopy, tomography, ecography or magnetic resonance images.

6. COURSE ORGANIZATION

CONTENTS

1	Review of sampling and estimation concepts. Systematic sampling in R1, R2 and R3. Area estimation.
2	Number and size of particles in the plane and in space.
3	Curve length and surface area in space.

7. ASSESSMENT METHODS AND CRITERIA

Description	Type	Final Eval.	Reassessn	%
Exercices	Work	No	Yes	50,00
Work and exercises	Work	No	Yes	50,00
TOTAL				100,00
Observations				
Assessment is continuous and class attendance is compulsory.				
Observations for part-time students				

8. BIBLIOGRAPHY AND TEACHING MATERIALS

BASIC

Baddeley, A. & Jensen, E.B.V. (2005) Stereology for Statisticians. Chapman & Hall/ CRC.
 Cruz-Orive, L.M. Notes and Practical Exercises of Stereology.
 Howard, C.V. & Reed, M.G. (2005) Unbiased Stereology. Three-dimensional Measurement in Microscopy. 2nd ed.
 Bios/Taylor & Francis.