

## Stochastic Numerical Methods

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**ECTS:** 6 ECTS

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**COORDINATOR:** Carlos Vázquez Cendón [carlosv@udc.es]

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**UNIVERSITY WHERE THE COORDINATOR IS:** UDC

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**HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES?** Yes

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**LECTURER 1:** María del carmen Calvo Garrido [mcalvog@udc.es]

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**UNIVERSITY WHERE THE LECTURER 1 IS:** UDC

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**HAVE YOU GIVEN PERMISSION TO RECORD YOUR CLASSES?** Yes

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### SUBJECT CONTENTS

1. Introduction to stochastic processes
2. Monte Carlo methods
3. Ito calculus
4. Stochastic differential equations
5. Numerical methods for stochastic differential equations

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### METHODOLOGY

Main subject contents will be presented in expository lectures converging 75% of the time schedule, thus including presentation of concepts, results and examples of their applications. The remaining 25% will be devoted to exercises, computer implementation of numerical methods and application to other disciplines models, paying special attention to examples from the finance field.

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**LANGUAGE USED IN CLASS:** Will depend on the audience.

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**IS IT COMPULSORY TO ATTEND CLASS?** Students can attend via conference system.

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## **BIBLIOGRAPHY**

1. P. Glasserman, Monte Carlo methods in financial engineering, Springer, 2004
  2. P. Kloeden, E. Platen, Numerical solution of stochastic differential equations, Springer, 1992
  3. T. Mikosh, Elementary stochastic calculus with finance in view, World Scientific, 1998
  4. B. Oksendal, Stochastic differential equations. An introduction with applications, Universitext, Springer, 5th Edition, Springer, 1998
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## **SKILLS**

### Basic:

CG3: To be able to integrate knowledge in order to state opinions using information that even incomplete or limited, include reflecting on social and ethical responsibilities linked to the application of their knowledge.

CG5: To have the appropriate learning skills to enable them to continue studying in a way that will be largely self-directed or autonomous, and also to be able to successfully undertake doctoral studies.

### Specific:

CE4: To be able to select a set of numerical techniques, languages and tools, appropriate to solve a mathematical model.

### Numerical simulation specialization:

CS2: To adapt, modify and implement software tools for numerical simulation.

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**WILL YOU BE USING A VIRTUAL PLATFORM?** No.

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**WILL YOU BE USING ANY SPECIFIC SOFTWARE?** Yes. MATLAB

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## **CRITERIA FOR THE 1ST ASSESSMENT OPPORTUNITY**

- At least 50% of the qualification relates to the final exam. Skills CG3, CG5, CE4 and CS2 will be evaluated.
  - The rest of the qualification derives from the exercises and proposed practical tasks solved by the student during the subject. Skills CG3, CG5, CE4 and CS2 will be evaluated.
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## CRITERIA FOR THE 2ND ASSESSMENT OPPORTUNITY

The same as in the 1<sup>st</sup> assessment opportunity.

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