Monte Carlo Methods

Lecturer
Pierre-Etienne LABEAU (Coordinator)

Course mnemonic
MATH-H507

ECTS credits
2 credits

Language(s) of instruction
English

Course period
First term

Campus
Solbosch

Course content

Introduction to Monte Carlo methods. Generation of random numbers (continuous and discrete distributions). Monte Carlo estimation of integrals of definite dimensions. Accuracy of the estimation. Variance reduction techniques. Analogue simulation of stochastic problems.

Objectives (and/or specific learning outcomes)

Explain the potentialities of Monte Carlo methods in several domains of applications. The student should be able at the end of the course to write a simple Monte Carlo program.

Pre-requisits and co-requisits

Course having this one as pre-requisit

PHYS-H501 | Introduction to medical physics | 3 crédits

Teaching method and learning activities

Lectures: 14h

Exercises : 4h

Given the sanitary situation, the lectures will also be available online.

Contribution to the teaching profile

This teaching unit contributes to the following competences:

- Abstraire, modéliser et simuler des systèmes physiques complexes rencontrés dans les applications biomédicales (bioélectricité, biomécanique, écoulements, etc.)
- Se représenter les mécanismes biologiques fondamentaux depuis la biochimie de la cellule jusqu'au fonctionnement des principaux systèmes de la physiologie humaine

References, bibliography and recommended reading

I.M. Sobol', A primer for the Monte Carlo method, CRC Press

Other information

Place(s) of teaching

Solbosch

Contact(s)

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Evaluation method(s)

Other

Evaluation method(s) (additional information)

Oral examination : the student will present a review paper chosen from a selection

Determination of the mark (including the weighting of partial marks)

examination : 100%

Main language(s) of evaluation

English

Programmes

Programmes proposing this course at the Brussels School of Engineering

MA-IRCB | Master of science in Biomedical Engineering | finalité Professional/unit 2