

Degree	Type	Year
2503740 Computational Mathematics and Data Analytics	OB	3

Contact

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Teachers

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Teaching groups languages

You can view this information at the [end](#) of this document.

Prerequisites

The contents of calculus, probability and linear algebra given in the 1st year should be known. It is also necessary a fair command of the R and Python programming languages. It is advised to have followed the subjects Ordinary Differential Equations (2nd year) and Partial Differential Equations (3rd year).

Objectives and Contextualisation

To learn different points and alternatives related to the modelling of real world phenomena, as well as its formal and/or computational analysis according to the problem.

Learning Outcomes

1. CM25 (Competence) Assess the difficulty of doing an analytical probability calculation in complex situations.
2. CM25 (Competence) Assess the difficulty of doing an analytical probability calculation in complex situations.
3. CM25 (Competence) Assess the difficulty of doing an analytical probability calculation in complex situations.
4. CM25 (Competence) Assess the difficulty of doing an analytical probability calculation in complex situations.

5. CM27 (Competence) Create reality simulation models to establish and verify hypotheses in the study of more complex problems or situations.
6. CM27 (Competence) Create reality simulation models to establish and verify hypotheses in the study of more complex problems or situations.
7. KM22 (Knowledge) Identify the basics of logistics and other fields in which operations research is applied in the technological and industrial field.
8. KM22 (Knowledge) Identify the basics of logistics and other fields in which operations research is applied in the technological and industrial field.
9. SM20 (Skill) Distinguish, in a problem, what is important for the construction of the mathematical model and its solution from what is not.
10. SM21 (Skill) Distinguish when analytical probability calculations can be performed and when stochastic simulation should be used.
11. SM22 (Skill) Select models of the scientific or technological reality related to a decision-making problem, expressing them in the mathematical language of optimisation problems with dynamic programming or stochastic queueing.
12. SM22 (Skill) Select models of the scientific or technological reality related to a decision-making problem, expressing them in the mathematical language of optimisation problems with dynamic programming or stochastic queueing.
13. SM23 (Skill) Use computer applications for statistical analysis, numerical and symbolic calculation, graph visualisation, optimisation and others to experiment with and solve problems.

Content

1. Modelisation of physical phenomena
2. Discrete Event Simulation

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Theoretical lessons	20	0.8	
Type: Supervised			
Project	30	1.2	
Type: Autonomous			
Project development and personal study	96	3.84	

The methodology will combine theory and practical work with computers. In some chapters, the students will have material to study before the corresponding lecture.

Annotation: Within the schedule set by the centre or degree programme, 15 minutes of one class will be reserved for students to evaluate their lecturers and their courses or modules through questionnaires.

Assessment

Continous Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exams	45%	2	0.08	CM25, CM27, KM22, SM20, SM21, SM22, SM23
Oral presentations	25%	2	0.08	CM25, CM27, KM22, SM20, SM21, SM22, SM23
Written report and deliveries	30%	0	0	CM25, CM27, KM22, SM20, SM21, SM22, SM23

The evaluation is based on:

- Homework deliveries (30% of the final grade).
- Exams (70% of the final grade).

To pass the course you must:

- Get a minimum grade of 4.0/10 in each of the exams.
- Get a global mean of 5.0/10, which will be the final grade.

Grades not satisfying these conditions can be studied case by case.

Each exam will have a second call ("recuperació" in the official terminology of UAB). The attendance to the second call shall automatically invalidate the grade of the first one. There is no second call for the homework deliveries.

Student that have attended exams or hand-in homework for a total of 50% or more of the course, according to the weight that appears in the Avaluation Activities table, will be evaluated. Otherwise will be considered "not evauable".

For the eventual award of Special Honours ("Matricula de Honor" in the official terminology) the grades of second exam calls will not be taken into account.

The plagiarism in the homework deliveries will be considered an offense as serious as any kind of cheating in and exam, and shall be penalised with an automatic course failure.

Bibliography

All necessary material will be provided during the course. bibliographical reference and other resourcer will be sugested at the appropriate moment.

Software

During the course, the software will be precised, and instructions to install it willbe given if necessary

Language list

Name	Group	Language	Semester	Turn
(PLAB) Practical laboratories	1	Catalan	second semester	morning-mixed
(SEM) Seminars	1	Catalan	second semester	morning-mixed
(TE) Theory	1	Catalan	second semester	morning-mixed

PROVISIONAL