

**Mathematics**

Code: 102808  
ECTS Credits: 9

Degree	Type	Year	Semester
2501915 Environmental Sciences	FB	1	1

**Contact**

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**Use of Languages**

Principal working language: catalan (cat)  
Some groups entirely in English: No  
Some groups entirely in Catalan: Yes  
Some groups entirely in Spanish: No

**Teachers**

Pere Ara Bertran  
Joan Orobitg Huguet  
Joaquín Martín Pedret

**Prerequisites**

High school math.

**Objectives and Contextualisation**

On one hand, we will review all fundamental concepts that have been worked at high school.. On the other hand, we will introduce some new concepts (as differential equations o calculus in several variables). But the most important point will be the emphasis in the use of these techniques in the mathematical modelization of several areas of interest.

**Competences**

- Adequately convey information verbally, written and graphic, including the use of new communication and information technologies.
- Analyze and use information critically.
- Collect, analyze and represent data and observations, both qualitative and quantitative, using secure adequate classroom, field and laboratory techniques
- Demonstrate adequate knowledge and use the tools and concepts of mathematics, computer science and statistics to analyze and manage environmental issues.
- Demonstrate concern for quality and praxis.
- Demonstrate initiative and adapt to new situations and problems.
- Learn and apply in practice the knowledge acquired and to solve problems.
- Teaming developing personal values regarding social skills and teamwork.
- Work autonomously

## Learning Outcomes

1. Adequately convey information verbally, written and graphic, including the use of new communication and information technologies.
2. Analyze and use information critically.
3. Demonstrate concern for quality and praxis.
4. Demonstrate initiative and adapt to new situations and problems.
5. Describe and use basic mathematical language.
6. Learn and apply in practice the knowledge acquired and to solve problems.
7. Observe, recognize, analyze, measure and adequately represent mathematical concepts.
8. Properly use the rules of differentiation and integration of functions.
9. Solve elementary differential equations.
10. Solve geometric problems and space plan.
11. Teaming developing personal values regarding social skills and teamwork.
12. Use basic techniques of statistics and probability.
13. Using the basic results of differential calculus in several real variables.
14. Work autonomously

## Content

1. Elementary functions
2. Exponential growth and other population models
3. Limits and continuity
4. The derivative and its applications
5. The integral and its applications
6. Introduction to differential equations

## Methodology

The course will be semi-presential. The students will be able to have presential teaching during some specific days. The rest of the teaching will be on-line.

The student will receive exercises lists for the work in the problem sessions.

The teaching of the course will use in essential form the virtual campus as means of communication, as well as other virtual tools. The students that want to communicate with the professors by e-mail must use the institutional address provided by the university (@autonoma.cat).

Naturally, the students will be able to ask questions about the development of the course during the presential hours.

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.

## Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Problems and resolution of problems	25	1	2, 6, 4, 3, 1, 14, 11

Theory	50	2	5, 7, 9, 10, 8, 13, 12
Type: Autonomous			
Resolution of problems	60	2.4	2, 6, 4, 3, 1, 14, 11
Theory	44	1.76	5, 7, 9, 10, 8, 13, 12
To prepare partial exams and to realize partial exams	36	1.44	2, 6, 5, 7, 9, 10, 1, 8, 13, 12

## Assessment

The following evaluation acts will be performed:

1. Two partial exams with a weight of 30% each
2. Several "quiz" test with a total weight of 40%.

The students not getting 5 points in the continuous evaluation can go to a final exam of all the subject if they have been previously evaluated of at least 2/3 of the total of the continuous evaluation. If the qualification of this exam is superior to the one obtained in the continuous evaluation, the final qualification will be the one coming from the recovery exam. If it's inferior, the final qualification will be the average between the continuous evaluation qualification and the recovery exam qualification. The students having 5 or more points in the continuous evaluation also can go to the final exam, but they need to be aware that the final qualification can then be inferior, and they can even fail the subject.

A student will be considered "presented" if has participated in activities leading to at least 2/3 of the qualification.

## Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Exercises	40%	4	0.16	2, 6, 4, 3, 5, 7, 9, 10, 1, 14, 11, 8, 13, 12
Partial exam 1	30%	3	0.12	2, 6, 4, 3, 5, 7, 9, 10, 1, 14, 11, 8, 13, 12
Partial exam 2	30%	3	0.12	2, 6, 4, 3, 5, 7, 9, 10, 1, 14, 11, 8, 13, 12

## Bibliography

Main text: "Matemàtiques i modelització per a les Ciències Ambientals" by J. Agudé. Free access from webpage of library UAB.

Secondary: Neuhauser, C., Matemáticas para ciencias. 2a, edición, Pearson, Prentice Hall.

## Software

We will use the free software SAGE. Also we will use the ACME platform.