Mathematics I

Code: 102097
ECTS Credits: 6

2025/2026

Degree	Type	Year
Accounting and Finances	FB	1
Business and Information Technology	FB	1

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Teaching groups languages

You can view this information at the end of this document.

Prerequisites

Entry level pre-requisites have not been established. However, enrolment in the course requires the student to have achieved a knowledge of mathematics at secondary/high school level. It is strongly recommended that those students who do not meet those standards, or those with difficulties in mathematics (in particular those who have not studied higher levels maths in high school) to enrol in the preparation programme organised by the Faculty and/or other preparatory courses in order to achieve the minimal tools required to pass the course satisfactorily.

Objectives and Contextualisation

The objective of the Mathematics I course is to bring all the students to a certain level of mathematics that will allow them to acquire and consolidate theknowledge and skills necessary to understand and correctly manipulate basic mathematical concepts and carry out the analysis of a real variable. In addition, the student must be capable of applying such knowledge to simple models and problems as they pertain to an economics and business context.

The skills and knowledge acquired in Mathematics I, together with Mathematics II, will afford the student the necessary tools to study more advanced subjects.

For this reason, the objectives that are intended to be achieved are the following:

1. To familiarise the student with the formulation and mathematical reasoning.

2. To introduce the role of mathematical models in economics and business.

3. To identify and to know how to handle the main families of functions.

4. To work with derivatives and solve limits of functions in one variable.

5. To understand and to know how to determine the basic properties that exhibit the functions of one variable.

6. To represent functions of one variable graphically.

7. To solve optimisation problems with one variable.

8. To determine and to calculate anti-derivatives using the basic integration techniques.

Learning Outcomes

1. CM09 (Competence) Analyse the properties and notions of limits, derivatives and integrals using the graph of a function that describes economic and business behaviours.
2. CM10 (Competence) Refer to the operation of the most common mathematical programming algorithms for the resolution of optimization problems.
3. CM10 (Competence) Use mathematical language and basic demonstration methods for problems in the field of business and economics.
4. CM11 (Competence) Solve linear equation systems that represent problems in the field of business and economics.
5. CM11 (Competence) Analyse the properties and notions of limits, derivatives and integrals using the graph of a function that describes economic and business behaviours.
6. CM12 (Competence) Describe basic differential calculus results in one and several real variables to determine optimal solution.
7. CM12 (Competence) Analytically solve optimisation problems in the field of business and economics.
8. CM13 (Competence) Solve linear equation systems that represent problems in the field of business and economics.
9. CM14 (Competence) Analytically solve optimisation problems in the field of business and economics.
10. CM18 (Competence) Use mathematical language and basic demonstration methods for problems in the field of business and economics.
11. CM21 (Competence) Describe basic differential calculus results in one and several real variables to determine optimal solution.
12. KM07 (Knowledge) Describe the analytical tools required, both qualitative and quantitative, for problem-solving and decision-making at the different functional levels of the company.
13. KM12 (Knowledge) Describe the analytical tools required, both qualitative and quantitative, for problem-solving and decision-making at the different functional levels of the company.
14. KM19 (Knowledge) Define the mathematical and algorithmic principles applicable to solving business and technological problems.
15. SM05 (Skill) Use mathematical and algorithmic tools to solve problems in the business-economic sphere with deterministic components.
16. SM06 (Skill) Apply methods to convert data into relevant information for business control and decision making and to share these decisions within and outside the organisation.
17. SM06 (Skill) Use mathematical and algorithmic tools to solve problems in the business-economic sphere with deterministic components.
18. SM07 (Skill) Apply methods to convert data into relevant information for business control and decision making and to share these decisions within and outside the organisation.

Content

Topic 7. OPTIMISATION WITH RESPECT TO ONE VARIABLE

7.1. Optimisation issues. Local extrema and optimum solutions

7.2. Optimisation over closed intervals. The Weierstrass theorem

PART IV. PRINCIPLES OF INTEGRATION

Topic 8. INTRODUCTION TO INTEGRATION

8.1. The concept of integral

8.2. Anti-derivatives and calculation of integrals

8.3. Definite integrals

Topic 9. CALCULATION OF INTERGALS

9.1. Integration by substitution

9.2. Integration by parts

Activities and Methodology

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
Problem sets resolution	17	0.68	
Theory lectures	32.5	1.3	
Type: Supervised			
Follow-up of homework	3	0.12	
Tutorships	3.5	0.14	
Type: Autonomous			
Study	90	3.6	

To achieve the objectives previously outlined, the following types of activities will be used:

1. Theoretical lectures where instructors will present the main concepts

The objective of this activity is to present the fundamental notions of the subject, and to facilitate their learning through the analysis of examples, which will emphasise both intuitive aspects and applications and explanations in the field of Economics.

2. Practical classes where problem solving will be discussed

This activity has the purpose to answer doubts that students may have encountered during the resolution of the problems and to correct possible errors committed. The presentation of solutions by students will be prioritised, either orally as a first step in their discussion, or in written form.

3. Problem solving by students (independent work)

Each topic will have a list of associated problems, which the students will have to solve independently. This activity has a dual objective of allowing the student to demonstrate that he/she has assimilated the theoretical concepts and work tools presented in class and that he/she has acquired the necessary skills to solve exercises and problems.

4. Attending office hours

The student will have access to some tutorials with the teacher that presents the course, in order to address doubts that may have arisen during the study of the subject and in the resolution of the problems. Due to the use of mathematical symbols that this activity implies, the tutorials will be developed in person.

The proposed teaching methodology may undergo some modifications according to the restrictions imposed by the health authorities onon-campus courses.

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
Continous assessment activities	20%	0	0	CM09, CM10, CM11, CM12, CM13, CM14, CM18, CM21, KM07, KM12, KM19, SM05, SM06, SM07
Final exam	50%	2	0.08	CM09, CM10, CM11, CM12, CM13, CM14, CM18, CM21, KM07, KM12, KM19, SM05, SM06, SM07
Mid-term exam	30%	2	0.08	CM09, CM10, CM11, CM12, CM13, CM14, CM18, CM21, KM07, KM12, KM19, SM05, SM06, SM07

This subject/module does not offer the option for comprehensive evaluation.

The evaluation of the course will be carried out in a continuous way, through partial assessments and a final exam. The type of activities and their relative weight in the final note is the following:

- Final exam: 50% of the final mark (it will include the totality of the syllabus)
- Mid-term exam: 30% of the final mark
- Continuous assessment activities: a total of 20% of the final mark

The final grade will be the weighted average of all the activities. The minimum mark for any activity is not set.

If, once applied the above mentioned percentage the mark achieved is 5 or higher, the course is considered as passed and this will not be subject to a new evaluation. In case of a grade less than 3.5, the student will have to sit it again in the following year. For those students who have obtained a grade that is equal to or greater than 3.5 and less than 5 there will be a re-take exam. The teachers of the subject will decide the modality of this re-take exam. This re-take exam is scheduled in the last week of the semester. The re-take exam grade will be qualitative and will only have two possible options: PASS or NO PASS. If the student obtains a PASS grade, it is considered that they have passed the subject with a maximum numerical grade equal to 5. If the student obtains a NO PASS score, they do not have passed the subject and the final grade will be equal to the one obtained before the re-take exam.

A student is considered to be "Not Evaluated" in the subject as long as he/she has not participated in any of the assessment activities. Therefore, it is considered that a student who carries out some components of the continuous assessment modality can no longer opt for a "Not Evaluated".

Students attending the subject for the second, third or fourth time have the option to follow the continuous modality or to sit directly and only the final exam, which will count 100% of the final grade. The choice of this last option must accordingly be notified to their teacher during the first weeks of the semester, prior to any of the continuous evaluation activities. Submission of any of such activities shall be understood as to implicitly waiving this option.

Students must be examined in the classroom assigned to the group where they are enrolled. Doing the exam in the classroom assigned to another group may entail invalidation of the exam and it will be classed as 'Not-attended'.

Calendar of evaluation activities

The dates of the evaluation activities (midterm exams, exercises in the classroom, assignments, ...) will be announced well in advance during the semester.

The date of the final exam is scheduled in the assessment calendar of the Faculty.

"The dates of evaluation activities cannot be modified, unless there is an exceptional and duly justified reason why an evaluation activity cannot be carried out. In this case, the degree coordinator will contact both the teaching staff and the affected student, and a new date will be scheduled within the same academic period to make up for the missed evaluation activity." Section 1 of Article 115. Calendar of evaluation activities (Academic Regulations UAB). Students of the Faculty of Economics and Business, who in accordance with the previous paragraph need to change an evaluation activity date must process the request by filling out an Application for exams' reschedule
https://eformularis.uab.cat/group/deganat_feie/application-for-exams-reschedule

Grade revision process

After all grading activities have ended, students will be informed of the date and way in which the course grades will be published. Students will also be informed of the procedure, place, date and time of grade revision following University regulations.

Retake Process

"To be eligible to participate in the retake process, it is required for students to have been previously been evaluated for at least two thirds of the total evaluation activities of the subject." ***Section 3 of Article 112 ter. The recovery (UAB Academic Regulations)***. Additionally, it is required that the student to have achieved an average grade of the subject between 3.5 and 4.9.

The date of the retake exam will be posted in the calendar of evaluation activities of the Faculty. Students who take this exam and pass, will get a grade of 5 for the subject. If the student does not pass the retake, the grade will remain unchanged, and hence, student will fail the course.

Irregularities in evaluation activities

In spite of other disciplinary measures deemed appropriate, and in accordance with current academic regulations, *"in the case that the student makes any irregularity that could lead to a significant variation in the grade of an evaluation activity, it will be graded with a 0, regardless of the disciplinary process that can be instructed. In case of various irregularities occur in the evaluation of the same subject, the final grade of this subject will be 0"*. ***Section 10 of Article 116. Results of the evaluation. (UAB Academic Regulations).***

The proposed evaluation activities may undergo some changes according to the restrictions imposed by the health authorities on on-campus courses.

Bibliography

Main textbooks:

- Sydsaeter, K. and P.J. Hammond, *Mathematics for Economic Analysis*. London, Prentice Hall (1995). (available in UAB library, online)
- Sydsaeter, K. and P.J. Hammond, *Essential Mathematics for Economic Analysis*. Fourth edition. Pearson Education (2012). (available in UAB library, online)

Complementary textbooks:

- Alejandre, F., F. Llerena, i C. Villela, *Problemes de matemàtiques per a econòmiques i empresarials,* Editorial Media (1995).
- Chiang, A.C., Fundamental Methods of Mathematical Economics, McGraw-Hill. (2005).
- Hoffmann, L.D., G.L. Bradley, G., and K.H. Rosen, 2005, Applied Calculus for Business, Economics, and the Social and Life Sciences, McGraw-Hill (2005).
- Alegre, P., L. Jorba, F.J. Orti, G. Rodriguez, J.B. Saez, T. Sancho i A. Terceño, *Ejercicios Resueltos de Matemáticas Empresariales II*. Editorial Alfacentauro, Madrid (2000).

Software

No special software will be used

Groups and Languages

Please note that this information is provisional until 30 November 2025. You can check it through this link. To consult the language you will need to enter the CODE of the subject.

Name	Group	Language	Semester	Turn
(PAUL) Classroom practices	101	Catalan	first semester	morning-mixed
(PAUL) Classroom practices	201	Catalan	first semester	morning-mixed
(PAUL) Classroom practices	501	Catalan	first semester	afternoon
(TE) Theory	10	Catalan	first semester	morning-mixed
(TE) Theory	20	Catalan	first semester	morning-mixed
(TE) Theory	50	Catalan	first semester	afternoon