COURSE DATA

DATA SUBJECT

Code: 34187
Name: Mathematics I
Cycle: Undergraduate Studies
ECTS Credits: 6
Academic year: 2025-26

STUDY (S)

Degree	Center	Acad. year	Period
1110 - Degree in Chemistry	Facultat de Química	1	First quarter

SUBJECT-MATTER

Degree	Subject-matter	Character
1110 - Degree in Chemistry	Matemáticas	BASIC

COORDINATION

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SUMMARY

The subject Mathematics I is part of the basic knowledge module which, together with the subject Mathematics II, make up the subject area of Mathematics of the Degree in Chemistry, and which provide the specific training required by students in this Degree.

The contents covered in this subject are essential for the proper understanding of many other subjects of the Degree in Chemistry.

PREVIOUS KNOWLEDGE

RELATIONSHIP TO OTHER SUBJECTS OF THE SAME DEGREE

There are no specified enrollment restrictions with other subjects of the curriculum.

OTHER REQUIREMENTS

To successfully complete this subject, students should know the contents of Mathematics I and II taught in upper secondary education.

COMPETENCES / LEARNING OUTCOMES

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Collaborate effectively in work teams, assume responsibilities and leadership roles, and contribute to collective improvement and development.

Communicate effectively both orally and in writing, adapting to the context and audience.

Demonstrate ability to communicate information, ideas, problems and solutions to both specialist and non-specialist audiences and using information technology, as appropriate.

Demonstrate ability to work in teams both in interdisciplinary teams and in an international context.

Demonstrate a commitment to ethics, equality values and social responsibility as a citizen and as a professional.

Demonstrate both inductive and deductive reasoning skills.

Demonstrate critical and self-critical thinking, considering professional ethics, moral values and social implications of the different activities carried out throughout the degree.

Demonstrate leadership and management skills, entrepreneurship, initiative, creativity, organization, planning, control, leadership, decision making and negotiation.

Demonstrate the ability to analyse, synthesise and reason critically.

Develop capacity for analysis, synthesis and critical thinking.

Evaluate, interpret and synthesise chemical data and information.

Express ideas correctly, both orally and in writing, in any of the official languages of the Valencian Community.

Express oneself correctly, both orally and in writing, in any of the official languages of the Valencian Community.

Interpret data from observations and measurements in the laboratory in terms of their significance and the theories that underpin them.

Prepare reports, assessments, and industrial and environmental projects in the field of chemistry.

Prepare reports, surveys and industrial and environmental projects in the field of chemistry.

Relate chemistry to other disciplines.

Relate chemistry with other disciplines.

Relate theory and experimentation.

Relate theory to experimentation.

Show inductive and deductive reasoning ability.

Solve qualitative and quantitative problems following previously developed models.

Students must be able to apply their knowledge to their work or vocation in a professional manner and have acquired the competences required for the preparation and defence of arguments and for problem solving in their field of study.

Students must be able to communicate information, ideas, problems and solutions to both expert and lay audiences.

Students must have acquired knowledge and understanding in a specific field of study, on the basis of general secondary education and at a level that includes mainly knowledge drawn from advanced textbooks, but also some cutting-edge knowledge in their field of study.

Students must have developed the learning skills needed to undertake further study with a high degree of autonomy.

Students must have the ability to gather and interpret relevant data (usually in their field of study) to make judgements that take relevant social, scientific or ethical issues into consideration.

Understand and analyse, from the perspective of the degree programme, social inequalities based on sex and gender; integrate gender-sensitive approaches into problem-solving and solution design.

DESCRIPTION OF CONTENTS

1. Complex numbers

Operations with complex numbers. Factorisation of polynomials. Trigonometry.

2. Differential calculus in several variables.

Calculation of derivatives. Taylor expansions for functions of one variable. Partial derivatives and directional derivatives. The gradient vector. Tangent plane to a surface. Derivative of a composition (chain rule) and implicit derivatives.

3. Integration of functions of several variables.

Calculation of antiderivatives. The definite integral. Calculation of plane areas. Double integral. Change of variables in a double integral. Polar coordinates. Calculation of volumes.

4. Ordinary differential equations.

Basic concepts. Some first order differential equations: Modelling. Introduction to higher order differential equations.

WORKLOAD

PRESENCIAL ACTIVITIES

Activity	Hours
Tutorials	7,00
Theory	41,00
Computer classroom practice	12,00
Total hours	**60,00**

NON PRESENCIAL ACTIVITIES

Activity	Hours
Attendance at other activities	0,00
Individual or group project	20,00
Independent study and work	50,00
Preparation of lessons	10,00
Preparation for assessment activities	10,00
Resolution of case studies	0,00
Total hours	**90,00**

TEACHING METHODOLOGY

Theory contents and practical tools for the resolution of problems will be gradually introduced and developed. The concepts presented in the lectures will be applied to answer possible questions and to problem solving.

A series of results, questions and problems will be proposed for students to prepare a project. This project will be supervised and assessed. In tutoring sessions, the problems proposed will be reviewed. Also in these sessions, students will present their solutions to the problems proposed.

A computer software pack for symbolic calculus will be used to supplement the theory lectures, both visually and conceptually and as regards problem solving. This should also be useful as an experimentation method which may provide an improvement of intuitive knowledge.

EVALUATION

Each student will be required to demonstrate knowledge of the basic concepts of the subject and

demonstrate sufficient skills in the area through a written exam in which their capacity for solving problems and exercises will be assessed.

The exam will contain one or two questions related to basic concepts; To pass the course it is mandatory to answer them correctly.

The mark obtained in this exam will contribute 80% of the student's final mark. It will be necessary to obtain a minimum of 4.5 out of 10 in the final exam in order to pass the course. The exam will normally be the same for all groups. Participation in the tasks proposed by the lecturer will be taken into consideration; these tasks will account for 10% of the final mark. Assessment of the computer-aided sessions will be based on attendance, participation and learning; this component will contribute 10% of the final mark.The same assessment system will be applied for the second examination sitting. For the second examination sitting the marks corresponding to the tasks and the computer-aided sessions are maintained. Both activities can't be regraded.Students who are unable to attend the usual lectures will be assessed based on a final written exam andon the individual assignments that they submit to the lecturer whe never required. The mark awarded for practical course work in the computer room may be transferred from the immediately previous academic year at the request of the student.

Final warning

Copying or plagiarism of any assignment that is part of the evaluation will make it impossible to pass the course, and the student will be subject to the appropriate disciplinary procedures.

Please note that, according to Article 13 d) of the University Student Statute (RD 1791/2010, December 30), "*it is the duty of a student to refrain from using or cooperating in fraudulent procedures in evaluation tests, in the work performed or in official University documents*".

REFERENCES

- APOSTOL, T. M. Calculus Ed. Reverté, 1985. 813 p. ISBN 997151396X
- DEMIDOVICH, B. 5000 Problemas de Análisis Matemático (9a ed., reprint) Thomson, 2002. 600 p. ISBN 9788497321419
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- MARSDEN, J. E, TROMBA, A. J. Cálculo Vectorial. Ed. Addison-Wesley, 1991. 665 p. ISBN 0201629356

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- STEWART, J. Cálculo multivariable. Ed. Thomson Learning, 2003. 510 p. ISBN 9706861238