Mathematics II

Code: 105038
ECTS Credits: 6

Degree	Type	Year	Semester
2502444 Chemistry	FB	1	2

Contact

Name: Juan Carlos Cantero Guardeño

Email: juancarlos.cantero@uab.cat

Teaching groups languages

You can check it through this link. To consult the language you will need to enter the CODE of the subject. Please note that this information is provisional until 30 November 2023.

Prerequisites

Matemàtiques I

Objectives and Contextualisation

The course has three fundamental parts: the differential calculus, integral calculus and vector analysis.

The objectives of the course are:
(i) Understand the basics in each of these parts. These concepts include
(ii) Know how to apply the concepts studied coherently to the approach a
(iii) Acquire skills in mathematical writing and in calculus.

Competences

- Adapt to new situations.
- Communicate orally and in writing in one's own language.
- Learn autonomously.
- Manage, analyse and synthesise information.
- Obtain information, including by digital means.
- Propose creative ideas and solutions.
- Reason in a critical manner
- Recognise and analyse chemical problems and propose suitable answers or studies to resolve them.
- Resolve problems and make decisions.

- Show an understanding of the basic concepts, principles, theories and facts of the different areas of chemistry.

Learning Outcomes

1. Adapt to new situations.
2. Apply the suitable mathematical tools to deal with and resolve chemistry problems.
3. Communicate orally and in writing in one's own language.
4. Interpret mathematical language to deal with chemistry problems.
5. Learn autonomously.
6. Manage, analyse and synthesise information.
7. Obtain information, including by digital means.
8. Propose creative ideas and solutions.
9. Reason in a critical manner
10. Resolve problems and make decisions.

Content

(1) Functions of several variables
- Geometry of the plane and space.
- Graph of a function, curves and level surfaces.
- Directional derivatives, gradient.
- Differentiality. Chain rule. Derivatives of higher order. Absolute and rela
- Critical points, saddle points. Hessian criterion for the relative extrems.
(2) Multiple integrals.
- Iterated integrals. Fubini theorem. Principle of Cavalieri.
- Variable change theorem. Polar, cylindrical and spherical coordinates. (
(3) Integral on curves and surfaces.
- Parametric curves and surfaces.
- implicitly given surfaces. Vector tangent to a curve at one point. Tanger
- Length of a curve. Line integrals.
- Area of a surface. Flow of a vector field.

- Green, Gauss and Stokes theorems.

Methodology

The methodology will be the standard for this type of subject with theory classes, problems and a practical sessic

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	22	0.88	1, 2, 5, 3, 6, 4, 7, 8, 9, 10
Seminars	2	0.08	1, 2, 5, 3, 6, 4, 7, 8, 9, 10
Solving problems	39	1.56	1, 2, 5, 3, 6, 4, 7, 8, 9, 10
Theory	25	1	1, 2, 5, 3, 6, 4, 7, 8, 9, 10
Type: Supervised			
Tutories	12	0.48	1, 2, 5, 3, 6, 4, 7, 8, 9, 10
Type: Autonomous			
Study	39	1.56	1, 2, 5, 3, 6, 4, 7, 8, 9, 10

Assessment

The assessment consists of a work (compulsory), which will count 10% of the semester's score, of an intersemestral exam (compulsory) that will count 40% of the semester's mark, and a final semester exam (obligatory) that will count 50% of the note of the semester. In order to pass the subject, the average of the corresponding qualifications will be greater or equal to 5, and that each one of these qualifications will be greater or equal to 3. There will be a recovery exam at the end of the course and the student will approve the subject if he / she meets the above conditions by substituting the partial and final exam grades for those obtained in the recovery exam. To participate in the recovery students must have previously been evaluated in a set of activities whose weight equals to a minimum of two thirds of the total grade of the subject.

Students who have chosen the single evaluation mode will have to take a final test consisting of an exam where block (1) of the contents will be evaluated with a weight of 40% of the total and where blocks (2) and (3) will also be evaluated with a weight of 50% of the total. Afterwards, the student will have to take an oral test where he/she will have to solve a series of exercises similar to those that have been worked on in the seminar sessions and which will have a weight of 10% of the total.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Final Exam	50%	3	0.12	1, 2, 5, 3, 6, 4, 7, 8, 9, 10
Midterm Exam	40%	3	0.12	1, 2, 5, 3, 6, 4, 7, 8, 9, 10
Recovery Exam	90%	3	0.12	1, 2, 5, 3, 6, 4, 7, 8, 9, 10
Work in group	10%	2	0.08	1, 2, 5, 3, 6, 4, 7, 8, 9, 10

Bibliography

J. E. Marsden y A.J. Tromba. Cálculo vectorial, cuarta edición. Addison-Wesley Longman, 1998.

S. L. Salas y E. Hille. Calculus, Vol. 1 y 2, tercera edición. Reverté, Barcelona, 1995 y 1994.

B. Demidovich. Problemas y ejercicios de Análisis Matemático. Ed. Paraninfo.

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Software

None.