Universidad del País Vasco — Euskal Herriko Unibertsitatea

COURSE GUIDE 2025/26

Faculty 215 - Faculty of Chemistry

Cycle .

Degree GQUIMI20 - Bachelor's Degree in Chemistry

Year Third year

COURSE

26128 - Analytical Chemistry II

Credits, ECTS: 9

COURSE DESCRIPTION

This subject deals with instrumental analysis concepts and contents, the basis of the instruments functioning and instrumental techniques classification. Students are trained in methods of standardization and univariate calibration. Finally, and more in detail, the following instrumental
techniques are described: spectroscopic, chromatographic and electroanalytic techniques.

COMPETENCIES/LEARNING RESULTS FOR THE SUBJECT

The specific M02CM04 skill and cross-skills M02CM08, M02CM09 and M02CM10 are
developing.
M02CM04 - Possess knowledge of the analytical process and the various stages involved and be able to plan, apply and process the most appropriate analytical methods in each specific case.
M02CM08 - Be able to select different simple or combined instrumental techniques for the characterisation of chemical substances.
M02CM09 - Be able to make verbal and written presentations of phenomena and processes related to chemistry and similar subjects in a comprehensible way.
M02CM10 - Be able to search for and select information in the field of chemistry and other sciences through the use of the literature and information technologies.

Vertical and horizontal coordination of the subject in the module and the Bachelor’s
Degree corresponds to the Bachelor’s Degree coordination commission.

Theoretical and Practical Contents

1. Instrumental data treatment
OPTICAL METHODS
2. Fundamentals of optical methods
3. Spectrophotometry
4. Spectrofluorimetry
5. Turbidimetry and nephelometry
6. Atomic spectroscopy
CHROMATOGRAPHIC AND ELECTROPHORETIC METHODS
7. Fundamentals of chromatography
8. Gas chromatography (GC).
9. Liquid chromatography (HPLC).
10. Capillary electrophoresis
ELECTROCHEMICAL METHODS
11. Potentiometry
12. Methods based on electrochemistry

TEACHING METHODS

Lessons consist of:
a. Explanation of theory and exercises. In some cases, a computer is used.
b. Realization of exercises and works by students, in groups or individually. In some cases, a computer is used.
c. Oral presentation of a work.

TYPES OF TEACHING

Types of teaching	M	S	GA	GL	GO	GCL	TA	TI	GCA
Hours of face-to-face teaching	40	27	13		10				
Horas de Actividad No Presencial del Alumno/a	60	44	19		12				

Legend:
M: Lecture-based — S: Seminar — GA: Applied classroom-based groups
GL: Applied laboratory-based groups — GO: Applied computer-based groups — GCL: Applied clinical-based groups
TA: Workshop — TI: Industrial workshop — GCA: Applied fieldwork groups

Evaluation methods

- Continuous evaluation

- End-of-course evaluation

Evaluation tools and percentages of final mark

- Written test, open questions 79%
- Otros 21%

ORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

CONTINUOUS EVALUATION:
It is necessary to participate in all parts in which the subject is divided.
It is mandatory to attend all the classes in the computers room.
Marks below 5.0 out of 10.0 can not be compensated.
It is necessary that the mark is compensated among the questions in theory and problems in order to pass the exam. A cut-off mark of 3.0 is applied.
Marks among first and second mid-term have to be compensated in order to pass the exam. A minimum mark of 5.0 is necessary in each part.
Students under continuous evaluation can refuse exam call at any time until a month before the ending of the classes by a writing addressed to the teacher. Otherwise, students are having a failing grade in the subject even though they are not attending the exam. These criteria are specified in chapter 2, article 12 of the EHU Bachelor’s Degree students evaluation regulation.
FINAL EVALUATION:
A final proof able to evaluate of the skills to be acquired in the subject is given. All the individual parts of the proof should be passed.
To be evaluated by an unique final proof, students have a period of 18 weeks from the beginning of the course to ask for this option. Criteria to refuse to the continuous evaluation are stablished in chapter 2, article 12 of the EHU Bachelor’s Degree students evaluation regulation.

EXTRAORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

The extraordinary call consists of a final proof. Anyway, positive partial results obtained in the ordinary call can be saved.

MANDATORY MATERIALS

Consult the student guide.

BIBLIOGRAPHY

Basic bibliography

Daniel C. Harris, Quantitative Chemical Analysis, 7th edition. W.H. Freeman, 2007.

D.A. Skoog, F. J. Holler, S. R. Crouch, Principles of Instrumental Analysis, 7th edition. Cengage Learning, Boston, MA, 2017.

G.D. Christian, Analytical Chemistry 6th ed. Wiley (2004).

G. Schwedt, The Essential Guide to Analytical Chemistry. Wiley (Chichester, 1997).

J.C. Miller, J.N. Miller, Statistics and Chemometrics for Analytical Chemistry, 5th edition., Pearson, England, 2005.

Detailed bibliography

K.H. Esbensen. Multivariate data analysis-in practice, 5th ed. Camo AB, 2006.

S. R. Crouch, F.J. Holler, Applications of Microsoft Excel in Analytical Chemistry. (Thomson, 2004).

Journals

Journal of Chemical Education. Ed. American Chemical Society, Washington. http://jchemed.chem.wisc.edu/
Analytica Chimica Acta. Ed. Elsevier Scientific, Amsterdam. http://www.sciencedirect.com/
Talanta. Ed. Elsevier Scientific, Amsterdam. http://www.sciencedirect.com/
Analytical Chemistry. Ed. American Chemical Society,Washington. http://pubs.acs.org/journals/ancham/index.html
Analytical and Bioanalytical Chemistry. Ed. Springer Berlin / Heidelberg. www.springer.com
The Analyst. Ed. RSC Publishing, Cambridge. http://www.rsc.org/Publishing/Journals/an/index.asp

Web sites of interest

http://www.asdlib.org
http://www.chromacademy.com/

OBSERVATIONS