

| MODULE | CONTENT | YEAR | TERM | CREDITS | TYPE |
|--|--------------------|------|---|---------|------------|
| CHEMICALS | Analytic chemistry | 1º | 2º | 6 | Obligatory |
| LECTURER(S) | | | Postal address, telephone nº, e-mail address | | |
| <ul style="list-style-type: none"> • Jose Luís Vilchez Quero (Group A) ¹ • Francisco Jesús Lara Vargas (Group B) ² • Ana María Gómez Caravaca (Group C) ¹ • Laura Gámiz Gracia (Group D) ² • Alejandro Lapresta Fernández (Group E) ¹ • David Arráez Román (Group F) ² | | | ¹ Dept. of Analytical Chemistry, 3rd floor-Building 3, Faculty of Sciences. Emails: jvilchez@ugr.es; anagomez@ugr.es, and lapresta@ugr.es ² Dept. of Analytical Chemistry, Ground Floor-Building 4, Faculty of Sciences. Emails: frjlara@ugr.es; lgamiz@ugr.es; and darraez@ugr.es | | |
| DEGREE WITHIN WHICH THE SUBJECT IS TAUGHT | | | | | |
| Degree in Pharmacy | | | | | |
| PREREQUISITES and/or RECOMMENDATIONS (if necessary) | | | | | |
| To have taken the subjects Basic Principles of Chemistry and Instrumental Techniques Have adequate knowledge about: <ul style="list-style-type: none"> • Formulation • Basic math | | | | | |
| BRIEF ACCOUNT OF THE SUBJECT PROGRAMME (ACCORDING TO THE DEGREE) | | | | | |
| Analytical methodology Qualitative and quantitative chemical analysis. Analytical methods of separation. Trace analysis Analytical techniques applied to the analysis of drugs, cosmetics, water, food and the environment. | | | | | |
| GENERAL AND PARTICULAR ABILITIES | | | | | |
| A. Generic competences <ul style="list-style-type: none"> • CG1. Identify, design, obtain, analyze, control and produce drugs and medicines, as well as other products and raw materials of sanitary interest for human or veterinary use. • CG10. Design, apply and evaluate reagents, methods and clinical analytical techniques, knowing the basic | | | | | |



fundamentals of clinical analysis and the characteristics and contents of laboratory diagnosis reports.

- CG12. Develop hygienic-sanitary analysis, especially those related to food and the environment.
- CG15. Recognize their own limitations and the need to maintain and update professional competence, paying special attention to the self-learning of new knowledge based on the available scientific evidence.

B. Specific competences

- CE01. Identify, design, obtain, analyze and produce active ingredients, drugs and other products and materials of sanitary interest.
- CE02. Select the appropriate techniques and procedures in the design, application and evaluation of reagents, methods and analytical techniques.
- CE03. Conduct standard laboratory processes including the use of scientific synthesis and analysis equipment, appropriate instrumentation included.
- CE09. Know the origin, nature, design, procurement, analysis and control of medicines and health products.
- CE10. Know the principles and procedures for the analytical determination of compounds: analytical techniques applied to the analysis of water, food and environment

OBJECTIVES (EXPRESSED IN TERMS OF EXPECTED RESULTS OF THE TEACHING PROGRAMME)

- Introduce the student to the study of the methodology in Analytical Chemistry.
- Provide the student with the minimum skills necessary for the numerical resolution of problems related to Analytical Chemistry.
- Train the student to correctly manipulate the usual analytical techniques in chemical analysis laboratories.

DETAILED SUBJECT SYLLABUS

THEORETICAL SUBJECT:

Block 1: Analytical methodology.

- Topic 1. Introduction to Analytical Chemistry. Definition of the problem
- Topic 2. Sample taking and preparation
- Topic 3. Introduction to analytical measurement
- Topic 4. Evaluation and expression of analytical results.

Block 2: Analytical techniques applied to the analysis of drugs, cosmetics, water, food and the environment.

- Topic 5. Analytical Methods.
- Topic 6. Application to the analysis of drugs, cosmetics, water, food and environmental samples.

PRACTICAL SUBJECT:

Seminars / Workshops

Resolution of numerical problems / Work exhibitions

Laboratory practices

Practice 1: Determination of the conductivity and turbidity of a water sample. Turbidimetric determination of sulphates in a water sample.

Practice 2: Determination of acetylsalicylic acid in a pharmaceutical preparation.

Practice 3: Determination of potassium by flame photometry.



Practice 4: Potentiometric determination of fluorides in a mouthwash.
Practice 5: Photometric determination of iron in wines

READING

FUNDAMENTAL BIBLIOGRAPHY:

- *Análisis Químico*, Ramiro Avidad, Ignacio de Orbe. Universidad de Granada 2006
- *Análisis Químico*, F. Rouessac y A. Rouessac. Editorial McGraw Hill, 2003.
- *Fundamentos de Química Analítica. Una aproximación docente-discente*, Miguel Valcárcel Cases, Angela I. López Lorente, M^a. Ángeles López Jiménez, Ed. Universidad de Cordoba, 2017.
- *Análisis Químico Cuantitativo*, Daniel C. Harris, 3^a Edición, Ed. Reverté, 2007.
- *Fundamentos de Química Analítica*, D. A. Skoog, D. M. West, F. J. Holler y S. R. Crouch, 9^a Edición, Ed. Thomson, 2014.
- *Química Analítica Contemporánea*, J.F. Rubinson y K.A. Rubinson, Ed. Pearson Educación, 2000.
- *Química Analítica*, G. Christian, 6^a Edición, Ed. Mc Graw Hill, 2001.

FURTHER READING:

- *Introducción al Análisis Instrumental*, L. Hernández Hernández y C. González Pérez. Ariel Ciencia (2002).
- *Principios de Análisis Instrumental*, D.A. Skoog, F.J. Holler, T.A., S. R. Crouch 6^a Edición, Ed. Mc Graw Hill, 2007
- *Técnicas instrumentales en Farmacia y Ciencias de la Salud*, O. Valls y B. Del Castillo, 4^a Edición, Ed. Piros, Barcelona, 1998.
- *Problemas de laboratorio químico y farmacéutico*, J. Ruiz Soriano, Ed. Harcourt Brace, Madrid 1997.
- *Estadística y Quimiometría para Química Analítica*, Miller y Miller. Ed. Prentice Hall. 2002.
- *Toma y tratamiento de muestra*, C. Cámara, P. Fernández, A. Martín-Esteban, C. Pérez-Conde y M. Vidal, Ed. Síntesis, Madrid 2004.
- *Garantía de calidad en los laboratorios analíticos*, R. Compañó y A. Ríos. Editorial Síntesis, 2002.

RECOMMENDED INTERNET LINKS

General bibliography: <http://www.ugr.es/~biblio/>

Glossary of Analytical Terms: http://seqa.es/SEQA2013/Glosario_archivo_final.pdf

Software, animations, etc .:

http://www.shsu.edu/~chm_tgc/sounds/sound.html

<http://www.educaplus.org/luz/index.html>

<http://micro.magnet.fsu.edu/primer/lightandcolor/>

http://www.mncn.csic.es/docs/repositorio/es_ES/investigacion/cromatografia/principios_de_cromatografia.pdf

<http://www.espectrometria.com>

