

<b>Qualification:</b> INDUSTRIAL TECHNICAL ENGINEERING, SPEC. IN INDUSTRIAL CHEMISTRY		<b>Year:</b> 2 <sup>nd</sup>	<b>Terms offered:</b> Term 1
<b>Code:</b> 19094	<b>Subject:</b> ANALYTICAL CHEMISTRY	<b>Type:</b> Core	<b>Language:</b> Spanish
<b>Academic Year:</b> 2008 / 2009		<b>Credits:</b> 6	

<b>Lecturers:</b>	<b>Theory:</b> José Miguel Merino Torrens
	<b>Practice:</b> José Miguel Merino Torrens

#### Objectives:

To learn the theoretical and practical foundations of ionic equilibria, from a numerical as well as graphical point of view, through the use of logarithmic diagrams. To apply this knowledge to quantitative analysis: titration and gravimetric analysis. To understand the principles and applications of instrumental analysis: electroanalysis, chromatographic separation techniques and spectroscopic methods. Various sources of information are used.

#### Syllabus / Content (theoretical and practical):

UNIT 1 : CONCEPTS OF ANALYTICAL CHEMISTRY.

UNIT 2 : CHEMOMETRICS.

UNIT 3 : ACID-BASE EQUILIBRIA

UNIT 4 : COMPLEX FORMATION EQUILIBRIA

UNIT 5 : PRECIPITATION EQUILIBRIA

UNIT 6 : GRAVIMETRIC ANALYSIS.

UNIT 7 : OXIDATION-REDUCTION EQUILIBRIA.

UNIT 8 : ELECTROANALYSIS.

Potentiometric methods: Fundamentals. Indicating electrodes. Analytical applications. Conductimetric methods.

UNIT 9 : CHROMATOGRAPHY.

Classification of chromatographic techniques. Theory of elution chromatography. Gas chromatograph.

Basic foundations of liquid chromatography. HPLC technique.

UNIT 10 : SPECTROSCOPY.

Laws of absorptiometry. Limitations of the Lambert-Beer law. Flame photometry. Atomic absorption.

Atomic emission spectroscopy. Regions of the spectrum. The Fourier transform.

#### Bibliography:

HARRIS, D.C. *Análisis Químico Cuantitativo*. Barcelona: Ed. Reverté, S.A., 2001.

SKOOG, D.A.; WEST, D.M.; HOLLER, F.J. *Fundamentos de Química analítica*. Madrid: Ed. Thompson, 2005.

SAWYER, C.N.; MCARTY, P.L. *Química para ingeniería ambiental*. Bogotá (Colombia): Ed. McGraw Hill, 2000.

YÁÑEZ-SEDEÑO, P; PINGARRÓN, J.M. *Problemas resueltos de química analítica*. Madrid: Ed. Síntesis, 2003.

LÓPEZ CANCIO, J.A. *Problemas resueltos de Química analítica*. Madrid: Ed. Thompson, 2005

#### Assessment:

60 % Partial exam 1 at the end of November (students who pass this exam do not have to take an exam on this part of the course again).

20 % Partial exam 2 (or, where applicable, global exam 1+2)

20 % Class attendance and submission of solved problems and summaries throughout the course.

#### Supplementary information on the Web:

<http://www.geocities.com/proyectoweb2001>

<http://www.webanalytes.com/education.htm>

<http://ull.chemistry.uakron.edu/analytical/>