

Scientific-Disciplinary Sector (SSD): CHIM01 – Analytical Chemistry

Academic year: 2017-2018

Faculty: Department of Chemistry – School of Sciences and Technologies

Study courses: Analytical Chemistry II

Study plans/Curricula: 1<sup>st</sup> Level Degree in Chemistry

Type: Characterizing didactic activity (type b exam)

Total Credits: 6

Didactic Methods: Lectures

Didactic Period: 3<sup>rd</sup> year, 1<sup>st</sup> semester (October-January)

Exam type: Oral

Professor in charge: **Ilario Losito**

**Training objectives:** Acquisition of knowledge on principles and applications of the most relevant instrumental analytical techniques.

**Prerequisites:** Knowledge of main topics in General Chemistry, Volumetric Analytical Chemistry and Physics

**Didactic Methods:** Lectures with PowerPoint presentation

### **Course programme**

PROGRAMME:

Lectures: (48 h – 24 lessons lasting 2 h)

1. General introduction to Analytical Chemistry
2. General principles of chromatography: efficiency, selectivity and resolution
3. Gas chromatography 1: general description of instrumentation; temperature control during elution
4. Gas chromatography 2: detectors
5. Gas chromatography 3: types of stationary phases and applications
6. Liquid Chromatography 1: pumps, pulse dampeners, detectors
7. Liquid Chromatography 2: types of stationary phases and applications
8. Liquid Chromatography 3: optimization of separations
9. Mass spectrometry: general concepts and description of instrumental components
10. Mass spectrometry: vacuum systems, sample introduction devices and ion detectors
11. Mass spectrometry: ionization sources
12. Mass spectrometry: mass analyzers
13. Coupling between gas chromatography and mass spectrometry

14. Coupling between liquid chromatography and mass spectrometry
15. Capillary Electrophoresis
16. Field Flow Fractionation
17. Solid Phase MicroExtraction
18. Atomic spectroscopy: general concepts
19. Atomic emission spectroscopy
20. Atomic absorption spectroscopy
21. Electroanalytical chemistry: general concepts
22. Potentiometric analysis
23. Voltammetric analysis
24. Amperometric titrations. Electrochemical detectors for liquid chromatography.

### **Reference Texts**

Skoog, Holler, Crouch, *Chimica Analitica Strumentale*, EdiSES, Napoli, 2009

Kellner, Mermet, Otto, Widmer, *Chimica Analitica*, EdiSES, Napoli, 2003

Harris, *Chimica Analitica Quantitativa*, Zanichelli, Bologna, 2017