
COURSE: ANALYTICAL CHEMISTRY

ACADEMIC YEAR: 2016-2017

TYPE OF EDUCATIONAL ACTIVITY: Basic

TEACHER: Fabiana Crispo, PhD

e-mail: **fabiana.crispo@unibas.it**

website:

phone:

mobile (optional):

Language: **Italian**

ECTS: **12**
(8 lessons and 4
tutorials/practice)n. of hours: **112 (64 lessons**
and 48 tutorials/practice)Campus: **Potenza**
Dept./School: **Science Department**
Program: **Biotechnology**Semester: **annual**

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The course aspires to provide the students with the fundamental theoretical and technician concepts of analytical chemistry and the basic knowledge of the most common analytical instruments in laboratory. The aim of the course is to lead the students in a critical analysis of experimental results and to show them the potentiality of analytical techniques in the biotechnologies. At the end of the course the students should be competent both in the choice of the most suitable method for analysis and in the execution of the basic analytical techniques in laboratory.

PRE-REQUIREMENTS

- attendance of lectures: **HIGLY** suggested
 - attendance of lab activities: **COMPULSORY**
 - preparatory exams: Istituzioni di Matematica, Fisica, Chimica generale e inorganica
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SYLLABUS

Fundamentals in analytical chemistry: applications of analytical techniques, analytical problems and their solutions, method validation, results analysis. Data errors, statistics and data analysis.

Chemical equilibrium in solution, pH and buffer solution. Titrations. Redox processes, electrochemical reactions and equilibria. Electrochemical methods, instrumentation and applications. Potentiometry, pHmeters, ion selective electrodes.

Spectroscopy: emission, absorption, fluorescence. Instrumentation in spectroscopy, methods and biotechnological applications. Separation techniques and chromatographic methods: fundamentals, instrumentation and biotechnological application. Electrophoresis and capillary electrophoresis.

Immunochemistry and immunoassay: RIA, EIA and FIA.

Fundamentals in mass spectrometry, instrumentation and biotechnological application.

LAB ACTIVITIES:

- Standard solution, use of analytical scale, dilution.
 - Titration of chloridric acid
 - Titration of sodium hydroxide
 - Acetic acid determination in commercial vinegar
 - pH-meter: use of pH-meter, calibration and pH determination in aqueous solution
 - UV-VIS spectrophotometry: use of spectrophotometer, UV-VIS spectrum of cytochrome c, calibration curve.
 - Voltammetry lab activity
 - Chromatography lab activity
 - Capillary electrophoresis lab activity
 - Mass spectrometry lab activity
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TEACHING METHODS

Theoretical lessons and practical lab activities with a short introductive lesson.

EVALUATION METHODS

Oral examination with discussion about lab activities.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

Students will consult the following books. Supplementary materials will be available for lab activities.

- **Title:** Fondamenti di chimica analitica
Autors: Skoog Douglas A., West Donald M., Holler James F.
Editor: Edises
- **Title:** Chimica analitica strumentale
Autors: Skoog Douglas A., West Donald M.
Editor: Edises
- **Title:** Elementi di Chimica Analitica
Autors: Harris Daniel C.
Editor: Zanichelli

INTERACTION WITH STUDENTS

Email contact for discussions and deepening of lectures and lab activities.

EXAMINATION SESSIONS (FORECAST)¹

Month	Year	Exam date
June	2017	27
July	2017	25
September	2017	12
October	2017	31
November	2017	15
December	2017	5

EXAMINATION PANEL:

President: Fabiana Crispo, PhD
Member: Prof. Antonio Guerrieri
Member: Prof. Rosanna Ciriello
Member: Prof. Giuliana Bianco

SEMINARS BY EXTERNAL EXPERTS YES ☐ NO ☒

FURTHER INFORMATION

¹ Subject to possible changes: check the web site of the Teacher or the Department/School for updates.

