DIPARTIMENTO DI SCIENZE

COURSE: **Applied Analytical Chemistry**			
ACADEMIC YEAR: 2017-2018			
TYPE OF EDUCATIONAL ACTIVITY: **Basic**			
TEACHER: **Bianco Giuliana**			
e-mail: giuliana.bianco@unibas.it		website: scienze.unibas.it/site/home.html	
phone: 00390971205451		mobile (optional):	
Language: italian			
ECTS: 2 lessons and 4 tutorials/practice	n. of hours: 18 lessons and 48 tutorials/practice	Campus: Potenza Dept./School: DIS Program: Chemistry (**L27**)	Semester: **II** **from 05/03/2018 to 15-30 June 2018**

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

This course will introduce the student to modern instrumental methods of chemical analysis from a practical point of view. The applications associated with optical methods covering molecular UV-vis and atomic absorption spectroscopy, atomic and flame emission spectroscopy, electroanalytical techniques including potentiometric, voltammetric methods. Practice of liquid chromatography with an emphasis on high performance liquid chromatography (HPLC). Practice of gas chromatography with emphasis in capillary GC..

PRE-REQUIREMENTS

Exam of Analytical Chemistry II

SYLLABUS

Sampling and sampling methods. Sample storage and packaging materials. Validation of an analytical method, Expression of results: confidence, confidence interval, tests of significance. Shapiro-Wilk test, univariate regression, linear regression using least squares method, correlation coefficient, linearity testing using t test, calibration charts. Practice mode to perform a complete regression. Assessment of uncertainties and the uncertainty of the slope, calculation of standard deviation of y. Calculation of the confidence of the extrapolated value. Tools available for quality assurance of analysis: certified reference materials or not. Concept of traceability. Control charts: Shewhart , Moving average ,CUSUM control chart, collaborative studies. Validation of the methods according to UNI CEI EN ISO / IEC 17025; selectivity, limit of detection and limit of quantification. Dynamic range and linear dynamic range. Accuracy and Procedures for the evaluation of precision: repeatability and reproducibility, limit of repeatability and reproducibility limit. Calculation of measurement uncertainty according to the metrological approach, holistic and empirical. Robustness, recovery. Quantitative methods.

TEACHING METHODS

Theoretical lessons. The course will be accompanied by a series of laboratory exercises on: optical methods covering molecular UV-vis and atomic absorption spectroscopy, electroanalytical techniques including potentiometric, voltammetric methods, liquid chromatography (HPLC) and gas chromatography.

EVALUATION METHODS

Discussion of a laboratory report and Oral examination

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- Assicurazione di qualità nel laboratorio chimico, Validazione dei metodi di analisi, Elio Desimoni, Barbara Brunetti, Bologna: CLUEB, 2003
- Chimica Analitica Quantitativa, Daniel C. Harris, seconda edizione italiana condotta sulla sesta edizione americana, Bologna: Zanichelli 2005 Skoog, West, Holler, Crouch “Fondamenti di Chimica Analitica”, Ed. EdiSES
- slides of the course

INTERACTION WITH STUDENTS

The teacher is open for discussion and additional teaching during the planned weekly colloquia, by email (giuliana.bianco@unibas.it) or by phone (0971 205451)

EXAMINATION SESSIONS (FORECAST)[1]

June-July-September-October-December 2018 January 2019

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

SEMINARS BY EXTERNAL EXPERTS	YES x	NO □

FURTHER INFORMATION

The lab reports must be submitted to the professor at least 3 weeks before the call for examination