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# METODOLOGIE DIAGNOSTICHE DI BIOCHIMICA CLINICA E DI BIOLOGIA MOLECOLARE CLINICA

6 CFU - 1° Semester

## Teaching Staff

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## LEARNING OBJECTIVES

### ▪ **BIOCHIMICA E CHIMICA DELL'INQUINAMENTO, TECNICHE DI ANALISI CHIMICO CLINICHE E CONTROLLO DI QUALITA'**

The aim of the course is to make the student understand the main pollution phenomena, the processes of action and transport of the most widespread pollutants in the environment. The module proposes to develop the knowledge for identifying the chemical and physical agents inherent in environmental exposures. At the end of the course the student will acquire the knowledge needed to use control tools to maintain high quality and safety standards, to monitor the accuracy and accuracy of the analytical methods used, and to ensure the reliability of the results obtained for quality improvement and corrective actions.

### ▪ **LABORATORY DIAGNOSTICS METHODS**

The specific training objectives of the Laboratory Diagnostic Methodologies Course are to enable students to acquire the basic notions for critical evaluation and interpretation of the results of the main diagnostic and biomolecular techniques used in clinical practice and basic research.

## COURSE STRUCTURE

### ▪ **BIOCHIMICA E CHIMICA DELL'INQUINAMENTO, TECNICHE DI ANALISI CHIMICO CLINICHE E CONTROLLO DI QUALITA'**

The course takes place through lecture with slide projection.

Oral exam.

Should teaching be carried out in mixed mode or remotely, it may be necessary to introduce changes with respect to previous statements, in line with the programme planned and outlined in the syllabus. Learning assessment may also be carried out on line, should the conditions require it.

### ▪ **LABORATORY DIAGNOSTICS METHODS**

**The teaching will be carried out through the provision of classroom teaching lessons plus laboratory exercises to be carried out in the laboratories of the Biological Tower in order to improve the theoretical and practical knowledge acquired during the hours spent in the classroom.**

Should teaching be carried out in mixed mode or remotely, it may be necessary to introduce changes with respect to previous statements, in line with the programme planned and outlined in the syllabus.

**The learning assessment consists of an oral test on the contents indicated in the program.**

Learning assessment may also be carried out on line, should the conditions require it.

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## DETAILED COURSE CONTENT

### ▪ **BIOCHIMICA E CHIMICA DELL'INQUINAMENTO, TECNICHE DI ANALISI CHIMICO CLINICHE E CONTROLLO DI QUALITA'**

1. Definition of environment. Biogeochemical cycles (carbon, nitrogen, oxygen, phosphorus, sulfur).  
2. Environmental and health consequences of pollution. Primary and secondary pollutants. 3. Toxic heavy metals. Chemical pollutants: organic and inorganic: pesticides and fertilizers, PCBs, PAHs. 4. Analytical and statistical concepts in data analysis: diagnostic sensitivity and specificity, predictive value of a test. Separation and measurement techniques in clinical chemistry. 5. Clinical chemical analysis techniques, immunochemical methods. 6. The Quality System. Certification and Accreditation. Regulations and guidelines. Westgard Rules, Multi-Rules CQ. Control card: Levey-Jennings card.

### ▪ **LABORATORY DIAGNOSTICS METHODS**

First generation sequencing: Sanger and Pyrosequencing

Microarray of gene expression

New generation sequencing NGS - Illumina and Roche 454 technology

Digital PCR - Droplet Digital PCR

Consultation of scientific literature and design of primers for PCR

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## TEXTBOOK INFORMATION

- **BIOCHIMICA E CHIMICA DELL'INQUINAMENTO, TECNICHE DI ANALISI CHIMICO CLINICHE E CONTROLLO DI QUALITA'**

1) Chimica ambientale. [C. Baird](#), [M. Cann](#), Zanichelli.

2) Le analisi personalizzate nella medicina di laboratorio. L. Spandrio, B. Milanesi, Piccin.

- **LABORATORY DIAGNOSTICS METHODS**

1) Widmann: Interpretazione clinica degli esami di laboratorio. Ronald A. Sacher e Richard A. McPherson. 2001 Undicesima edizione. Mc Graw Hill libri Italia (Milano)

2) Giorgio Federici: Medicina di Laboratorio. 2008 Terza edizione. Mc Graw Hill libri Italia (Milano)

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