
COURSE: Applied Biochemistry

ACADEMIC YEAR: 2016-2017

TYPE OF EDUCATIONAL ACTIVITY: (Basic, Characterizing, Affine, Free choice, Other) Basic

TEACHER: Angelo Bracalello

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website:

phone: **0971205949**mobile (optional):

Language: **ITALIAN**

ECTS: 6

(5 of lessons end 1 of laboratory)

n. of hours: 52

(40 of lessons end 12 of laboratory)

Campus: PotenzaDept./School: **Science**Program: **Biotechnology (L2)****Semester: II**(expected dates of course beginning and end: 03/10/2016, 15-31/03/2017)

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The course aims to provide students with the theoretical and practical skills of the main basic methods used in the laboratories of biochemistry and molecular biology.

At the end of the course students must be able to illustrate the principles underlying the methods covered during the course and knowing how to formulate operational schemes models

PRE-REQUIREMENTS

Not required but they are recommended solid knowledges of Biochemistry and Molecular Biology, General and Organic Chemistry, as well as some principles of physics in order to reaching a comprehensive understanding of the proposed topics

SYLLABUS:

Electrophoretic techniques : general principles , supporting materials. Polyacrylamide and agarose gel. Protein electrophoresis : SDS -PAGE . Electrophoresis under native conditions . Gradient electrophoresis . Two-dimensional electrophoresis . Isoelectrofocusing . Electrophoresis of nucleic acids: electrophoresis on agarose gel , electrophoresis on polyacrylamide gel . Western , Southern and Northern blotting. PFGE

Radioisotopic techniques : atomic structure . Stability and atomic radiation . Types of radioactive decay. Measure of radioactivity. Main isotopes used in biotechnology . Detection and measurement of radioactivity . Methods based on the ionization of gases: the Geiger-Muller counter . Methods based on the excitation : the scintillation counters . Methods based on the exposure of photographic emulsions : autoradiography , dosimeters . Fluorescence and fluorochromes : physic-chemical and spectral characteristics.

Centrifugation techniques : basic principles of sedimentation , the sedimentation coefficient . Types of centrifuges. Preparative and analytical ultra-centrifuge . Types of rotors. Clearing Factor. Isopycnic and zonal centrifugation . Differential centrifugation . Density gradient centrifugation .

Chromatographic techniques : general principles . Low-pressure chromatography on a column. High performance liquid chromatography (HPLC , FPLC) . Partition chromatography : normal -phase liquid chromatography and reverse phase . Molecular exclusion chromatography . Ionic-exchange chromatography. Affinity chromatography.

Analysis of nucleic acids: Northern and Southern blotting . Restriction and modification enzymes . The polymerase chain reaction . Cloning and expression vectors.

TEACHING METHODS

Theoretical lessons, laboratory activities

EVALUATION METHODS

Oral examination which involves the formulation of at least three questions. The rating is assigned depending on the maturity and skills demonstrated by the student in the answers exposure.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

K. Wilson , J. Walker Biochimica e Biologia Molecolare, principi e tecniche Ed. R. Cortina

Susan J. Karcher Laboratorio di Biologia Molecolare Ed. Zanichelli

Slides of the course to consult with the agreement with the teacher.

INTERACTION WITH STUDENTS

Reception hours: Tuesdays 'and Thursday' from 14.30 to 16.30.

Outside of these hours you can always have a talk with the teacher by appointment.

EXAMINATION SESSIONS (FORECAST)¹

31/01/2017; 07/02/2017; 01/03/2017; 27/06/2017; !8/07/2017; 12/09/2017; 18/12/2017.

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.