

COURSE: ORGANIC CHEMISTRY OF BIOLOGICAL PROCESSES

ACADEMIC YEAR: 2017-2018

TYPE OF EDUCATIONAL ACTIVITY: Free choice

TEACHER: Prof. Brigida Bochicchio

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mobile (optional):

Language: Italian (English on request)

ECTS: 6 ( 6 of lessons)

n. of hours: 48 (48 of lessons)

Campus: Potenza  
Department of Science  
Program: Chemistry (L-27)

Semester: II  
from 05/03/2018 to  
30/06/2018

#### EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

The main object of the course is to interpret the main biological and biochemical processes in terms of organic chemistry. The course is mainly focused on the comprehension of the mechanism of action of enzymes.

After having completed the course, the student must be able to :

- 1) demonstrate knowledge of mechanism of action of main enzymes;
- 2) visualize of mechanism of action of main enzymes and their 3D structure through software;
- 3) articulate scientific information through oral communication;
- 4) articulate scientific information through written communication.

#### PRE-REQUIREMENTS

The student should have good knowledge of the basic principles of Organic Chemistry I and II.

#### SYLLABUS

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Introduction to Bioorganic chemistry. Basic Considerations: Proximity Effects in Organic Chemistry; Molecular Adaptation; Molecular Recognition and the Supramolecular Level; Bioorganic Chemistry of amino acids and polypeptides Chemistry of the living cells; Analogy between Organic Reactions and Biochemical Transformations Chemistry of the Peptide Bond; SPPS Synthesis; Non ribosomal Peptide bond formation; Asymmetric Synthesis of alpha-aminoacids Transition State Analogs; Molecular Recognition and Drug Design; Primary, Secondary, Tertiary structure of Polypeptides and Proteins; Spectroscopic techniques and secondary structure of Polipeptides and Proteins; The molecular Dynamics Simulations as useful tool to investigate the conformational space of polypeptides. Bioorganic Chemistry of Phosphate groups and Polynucleotides; Basic Considerations; Energy Storage; Hydrolytic Pathways and Pseudorotation: mechanism of action of ribonuclease A enzyme. Enzyme Chemistry. Introduction to Catalysis. Introduction to Enzymes. Multifunctional Catalysis and Simple Models; alpha-chymotrypsin. Other Hydrolytic Enzymes: lysozyme Metal Ions in Proteins and Biological Molecules: Carboxypeptidase A and the role of Zinc. Natural macromolecules: Carbohydrates, Aminoacids, Peptides, Lipids, Nucleic Acids.

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TEACHING METHODS

- Theoretical lessons. Classroom tutorials, Laboratory tutorials, Technical visits of pharmaceutical companies (if applicable) and lessons from experts in the field (if applicable).

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EVALUATION METHODS

The aim of the final examination is to evaluate the level of achievement of the educational goals .

The final examination consists of an oral examination.

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TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

- Hermann Dugas, Bioorganic Chemistry, Springer.

- A. Liljas, L. Liljas, J. Piskur, G. Lindblom, P. Nissen, M. Kieldgaard. Textbook on structural biology. World Scientific.

Original Scientific Papers

Teacher's Notes Course slides will be available from a shared Dropbox folder, whose link will be furnished to the students attending the classroom.

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INTERACTION WITH STUDENTS

At the beginning of the course the teacher will describe the educational goals, the syllabus and the examination methods to the students. They will give to the teacher their institutional e-mail addresses. All course information will be sent only to the institutional e-mail addresses.

Office hour: on Wednesday and Thursday from 16.00 to 17.00; alternatively, by email appointment

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EXAMINATION SESSIONS (FORECAST)

05/02/2018; 12/03/2018; 18/06/2018; 16/07/2018; 17/09/2018; 15/10/2018;12/11/2018

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SEMINARS BY EXTERNAL EXPERTS    YES X NO

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FURTHER INFORMATION

Students are strongly encouraged to attend all lessons.

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