



General information	
Academic subject	Biochemistry with principles of molecular biology
Degree course	Natural sciences
Academic Year	2021-22
European Credit Transfer and Accumulation System (ECTS)	6
Language	Italian
Academic calendar (starting and ending date)	4/10/2021 – 21/01/2022
Attendance	Strongly advised

Professor/ Lecturer	
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Department and address	Dip. Bioscienze, Biotecnologie, Biofarmaceutica - Studio 214 I piano ex facoltà di Farmacia Via E. Orabona, 4 -70125 Bari
Virtual headquarters	Teams code "i1ewna2"
Tutoring (time and day)	Monday and Thursday; the time and details of the meetings will be scheduled upon contact via email

Syllabus	
Learning Objectives	Learning of the main biochemical pathways concerning the catabolism and biosynthesis of the main macromolecules of biological interest (carbohydrates, proteins, lipids), with reference to pathophysiological and environmental processes.
Course prerequisites	Basic knowledge in Biology, General chemistry, inorganic and organic chemistry. These prerequisites are needed for both attending and not attending students
Contents	Basic principles of Chemistry and cellular biology. Amino acids: structure and properties. Peptide bond Proteins: structures and main classifications. Protein modifications. Transport proteins. Binding oxygen proteins: mioglobin ed haemoglobin. Enzymes: principles of enzymatic kinetic: regulation and inhibition. Hormonal receptors and cell transduction signals. Vitamins and coenzymes. General concepts of thermodynamic in metabolic reactions. Energetic role of ATP. Metabolic pathways. Glucose metabolism: glycolysis. Fermentations. Gluconeogenesis. Glycogen metabolism. Pentose phosphate pathway. β -oxidation of fatty acids. Mitochondrial respiration and involved enzymes. TCA cycle. Ketone bodies. Mitochondrial respiratory chain and oxidative phosphorylation. Urea Cycle. Fatty acids biosynthesis. Photosynthesis. DNA: Structure and properties. DNA synthesis. Structure and function of RNAs. Transcription of DNA (RNA synthesis). RNA post-trascriptional modifications. Genetic code. Ribosomes: structure and function and protein synthesis. Viral replication cycles.
Books and bibliography	-) Nelson, Cox, Principi di biochimica di Lehninger, ed. Zanichelli; -) Nelson, Cox, Introduzione alla biochimica di Lehninger, ed. Zanichelli; -) Devlin T, Biochimica - Ed. Edises; -) Mathews, Van Holde Biochimica – casa editrice Ambrosiana; -) Pollegioni L. – Fondamenti di Biochimica – Ed. Edises. -) Berg ,Stryer – Biochimica – Ed. Zanichelli -) Koolman Rohm, Testo atlante di Biochimica, Ed. Zanichelli
Additional materials	Lectures will be integrated with available pdf lessons or other materials



Work schedule			
Total	Lectures	Hands on (Laboratory, working groups, seminars, field trips)	Out-of-class study hours/ Self-study hours
Hours			
51,5	45	6,5	
ECTS			
6	5,5	0,5	100
Teaching strategy			
<i>blended learning with demonstrative activity in laboratories</i>			
Expected learning outcomes			
Knowledge and understanding on:	<ul style="list-style-type: none"> ○ By means of lessons, shared teaching materials and scientific articles, the course intends to provide appropriate knowledge of the main biochemical pathways and principles of molecular biology. 		
Applying knowledge and understanding on:	<ul style="list-style-type: none"> ○ The course intends to provide ○ Basic information for the acquisition of the main methodology in the field of biochemistry and molecular biology, even for potential diagnostic-molecular investigations 		
Soft skills	<ul style="list-style-type: none"> ● <i>Making informed judgments and choices</i> <ul style="list-style-type: none"> ○ The program of study intends to provide to the students the ability to comprehend not only the main biochemical processes, but also their reciprocal integration and complementarity for the correct functioning of the cells in the various organisms and in the various environmental conditions. ○ <i>Communicating knowledge and understanding</i> ○ <i>The course will provide to the students the correct scientific lexicon and terminology for a clear discussion of concepts and arguments described and more deeply studied during the lessons.</i> ● <i>Capacities to continue learning</i> <ul style="list-style-type: none"> ○ The lessons will provide the bases for a critical and autonomous comprehension, also from the additional recommended literary sources, of the subjects described during the courses, hopefully useful for applications in the productive and working position. 		

Assessment and feedback	
Methods of assessment	<i>Oral exam with written demonstration of enzyme reaction mechanisms and their involvement in biochemical pathways</i>
Evaluation criteria	<ul style="list-style-type: none"> ● <i>Knowledge and understanding</i> The students will have to demonstrate critical knowledge of the arguments described during the lessons also on the basis of a further study with the recommended books and scientific articles. ○ <i>Applying knowledge and understanding</i> Of great importance will be the ability of the students to integrate the acquired knowledge of the biochemical processes with contents and subjects developed and studies in other programs of studies of the degree course ○ <i>Autonomy of judgment</i> <i>It will be positively evaluated the capacity of the students to discuss the complementarity of the studied cell biochemical processes in the various organisms in different biological contexts.</i> ● <i>Communicating knowledge and understanding</i> For positive evaluation, the students will have to demonstrate the critical



	<p>acquisition of the discussed biochemical processes and their integration in the cells, also in physiological and/or pathological conditions</p> <ul style="list-style-type: none">○ <i>Communication skills</i> <i>The students will have to demonstrate clarity of presentation and appropriate use of scientific terminology.</i>
Criteria for assessment and attribution of the final mark	<p><i>The oral exam will be also structured in writing sessions. No intermediate exams will be done. The exhibition and synthesis methods will be evaluated, as well as the ability to identify the interactions between the biochemical pathways studied during the course and their involvement in pathological processes or their possible biotechnological use in the environmental field. The mark is out of thirty and the exam is passed with a minimum score of 18/30. For the attribution of honors, the student's learning will be assessed with additional questions even in areas of study not included in the program, but still connected to the study topics addressed during the lessons.</i></p>
Additional information	