

General Information	
Academic subject	Agricultural Biochemistry
Degree course	Agricultural Sciences and Technology
Curriculum	Crop production and crop protection
ECTS credits	6
Compulsory attendance	No
Language	Italian

Subject teacher	Name Surname	Mail address	SSD
	Valeria D'Orazio	valeria.dorazio@uniba.it	AGR/13

ECTS credits details			
Basic teaching activities	Lectures	Laboratory and field classes	

Class schedule	
Period	Second semester
Year	Second year
Type of class	Lecture- workshops

Time management	
Hours	150
In-class study hours	60
Out-of-class study hours	90

Academic calendar	
Class begins	5th March, 2018
Class ends	22nd June, 2018

Syllabus	
Prerequisites/requirements	Recommended background: - Inorganic and organic chemistry. - Principles of plant biology.
Expected learning outcomes (according to Dublin Descriptors) (it is recommended that they are congruent with the learning outcomes contained in A4a, A4b, A4c tables of the SUA-CdS)	<p><i>Knowledge and understanding</i> Students will acquire knowledge of the main chemical and structural characteristics of biomolecules in relation to their role in cell metabolism; they will analyze the properties and functions of enzymes and their regulation, bioenergetics and trans-membrane transport, the metabolic pathways and their regulation,</p> <p><i>Applying knowledge and understanding</i> The skills acquired through the course are the bases necessary for understanding the chemical changes that organic matter undergoes in living organisms and the relationships between these changes and the qualitative, quantitative and technological aspects of agricultural production.</p> <p><i>Making informed judgements and choices</i> Students will be able to evaluate independently the importance of the chemical characteristics of biomolecules for the functioning of the main metabolic processes in living organisms.</p>

	<p><i>Communicating knowledge and understanding</i> Ability to communicate with entrepreneurs and production technicians, with responsible for public and private agencies, encourage coordination between technical areas of production; present the results of projects and works developed independently and/or in group activity, by means of technical reports. <i>Capacities to continue learning</i> Expected learning results, in terms of knowledge and skill, are reported in the Attachment A of the Learning Regulation of the Bachelor's Degree in Agricultural Sciences and Technology (stated by the European descriptors of the educational qualification; field of agricultural sciences)</p>
Contents	<ul style="list-style-type: none"> • Study of essential elements for plant life: biomolecules, membranes, energy, metabolism. Primary sources: atmosphere, water and soil, closely linked in the vital processes of the plant.
Course program	<p>Biological macromolecules: carbohydrates, lipids, proteins, nucleic acids. Carbohydrates, proteins, and nucleic acids models. Electrophoresis.</p> <p>Electron transporters: pyridine nucleotides, flavin nucleotides, iron-sulfur proteins, cytochromes, ubiquinone and plastoquinone.</p> <p>Principles of bioenergetics. Energy transfer in biological systems. High Energy molecule and phosphorylation processes.</p> <p>Enzyme catalysis. Enzymatic mechanisms and kinetics. Equation of Michaelis-Menten. Inhibition and regulation. Enzymatic assays.</p> <p>Photosynthesis. Light absorption. Plastids and chloroplasts. Photosynthetic pigments. Excitation and deexcitation processes. Photosystems. Electron transport pathways in chloroplast membranes and photophosphorylation. Photosynthesis in C₃, C₄ and CAM plant types.</p> <p>Primary metabolism of carbon. Glycolysis. Oxidative piruvate decarbossilation. The citric acid cycle. Gliossilate cycle. Electron-transport chain and oxidative phosphorylation. Lipids metabolism. β-oxidation of fatty acids.</p> <p>Nitrogen metabolism. Nitrogen cycle. Symbiotic nitrogen fixation. Root infection and nod genes. Degradation of amino acids. Urea Cycle.</p>
Bibliography	<p>D. L. Nelson, M. M. Cox, Introduzione alla biochimica di Lehninger, Zanichelli, 2015.</p> <p>Buchanan, B.B., Gruissem, W., Jones, R.L., Biochimica e Biologia molecolare delle piante. American Society of Plant Physiologists. 2007.</p>
Notes	
Teaching methods	<p>Lectures will be presented through PC assisted tools (Powerpoint, Adobe Acrobat, etc.).</p>
Assessment methods (indicate at least the type written, oral, other)	<p>The evaluation of the student skill is based on pre-defined parameters, as reported in the Attachment A of the Learning Regulation of the Bachelor's degree in Agricultural Sciences and Technology. The exam consists of an oral test with questions related to the programme, as reported on the Learning Regulation of the Bachelor's degree in Agricultural Sciences and Technology and on the study plan (Attachment</p>

	<p>A). A discretionary mid term oral test, valid throughout the entire year, providing only the admission to the final exam, is scheduled for all students attending the regular year's course. The evaluation of the final exam will take into account the performance of the mid term test and will be expressed in thirtieths.</p> <p>Foreign students follow the same rules but their exam can be given in English language.</p>
<p>Evaluation criteria (Explain for each expected learning outcome what a student has to know, or is able to do, and how many levels of achievement there are.</p>	<p><i>Knowledge and understanding</i> The student will have to know the main chemical and structural characteristics of biomolecules in relation to their role in cell metabolism; the properties and functions of enzymes and their regulation, bioenergetics and trans-membrane transport, the metabolic pathways and their regulation,</p> <p><i>Applying knowledge and understanding</i> The student will have to know the chemical changes that organic matter undergoes in living organisms and the relationships between these changes and the qualitative, quantitative and technological aspects of agricultural production.</p> <p><i>Making informed judgements and choices</i> The student must be able to evaluate independently the importance of the chemical characteristics of biomolecules for the functioning of the main metabolic processes in living organisms.</p> <p><i>Communicating knowledge and understanding</i> The student must be able to communicate with entrepreneurs and production technicians, with responsible for public and private agencies; to encourage coordination between technical areas of production; to present the results of projects and works developed independently and/or in group activity, by means of technical reports.</p> <p><i>Capacities to continue learning</i> The student must demonstrate that he has learned, in terms of knowledge and skill, what has been reported in the Attachment A of the Learning Regulation of the Bachelor's Degree in Agricultural Sciences and Technology (stated by the European descriptors of the educational qualification; field of agricultural sciences)</p>
<p>Further information</p>	