

DISCIPLINE DESCRIPTION

1. Information on the study programme

1.1 Academic institution	UNIVERSITY OF ORADEA
1.2 Faculty	FACULTY OF ENVIRONMENTAL PROTECTION
1.3 Department	AGRICULTURE-HORTICULTURE
1.4 Field of study	HORTICULTURE
1.5 Cycle of study	BACHELOR
1.6 Study programme/Qualification	HORTICULTURE

2. Information on the discipline

2.1 Name of discipline	BIOCHEMISTRY						
2.2 Course holder	Simona Ioana VICAS						
2.3 Seminar/Laboratory/Project holder	Raluca Popovici						
2.4 Year of study	I	2.5 Semester	I	2.6 Type of evaluation	Ex	2.7 Regime of discipline	C

(C) Compulsory; (O) Optional; (E) Elective

3. Total estimate time (hours per semester of didactic activities)

3.1 Number of hours per week	4	out of which: 3.2 course	2	out of which 3.3 seminar/laboratory/project	2
3.4 Total hours in the curriculum	56	out of which: 3.5 course	28	out of which 3.6 seminar/laboratory/project	28
Time allotment					hours
Study assisted by manual, course support, bibliography and notes					20
Additional documentation in the library/ on specialised electronic platforms and in the field					25
Preparation of seminars/laboratories/ topics/reports, portfolios and essays					11
Tutorship					
Examinations					13
Other activities.....					
3.7 Total hours of individual study	69				
3.9 Total hours per semester	125				
3.10 Number of credits	5				

4. Prerequisites (where appropriate)

4.1 curriculum	Knowledge of organic chemistry from high school
4.2 competences	Write chemical formulas, knowledge and handling of glassware, measuring volumes, calculate the concentration of solutions

5. Conditions (where appropriate)

5.1. related to course	A classroom, equipped with laptop, projector and appropriate software
5.2. related to seminar/laboratory/ project	A laboratory, equipped with laboratory equipment, reagents, solutions, glassware, equipment, projector, interactive chemistry lessons on CD

6. Specific competences acquired	
Professional competences	<p>Description of basic sciences, theoretical and practical application of technologies underpinning sustainable horticulture/agriculture production</p> <ul style="list-style-type: none"> • Acquisition and use of specific biochemistry terminology, in the context of agricultural applications. • The ability to solve theoretical and practical problems, formulating conclusions based on the information provided or from documentary sources. • Carrying out some experiments to highlight some properties and/or recognize some biomolecules.
Transversal competences	<p>Develop a program of work and achieve its tasks with professionalism and rigor.</p> <p>Applying effective communication techniques in specific activities teamwork; assuming a role within the team and the principles of labor division.</p>

7. Objectives of discipline (coming from the specific competences acquired)

7.1 General objective	The major objective of Biochemistry is the complete understanding of all the chemical processes associated with living cells at the molecular level. The objectives of this course are both informative aiming to give students an overview of the main classes of biochemical compounds and major metabolism pathways and formative, aiming to develop students' creative thinking and systemic.
7.2 Specific objectives	Familiarize students with the theoretical notions about the chemical structure and properties of biomolecules (carbohydrates, lipids, proteins, enzymes, nucleic acids, vitamins, byproducts of metabolism). Understanding, learning and deepening of metabolism biomolecules in the cell plant. The ability of students to achieve an observation based on experimental results obtained to carry out graphs and charts based on experimental data obtained.

8. Content*/

8.1 LECTURES	Metode de predare	Nr. Ore / Observații
1. Overview of biochemistry	Exposure, discussion, PowerPoint presentations	1

2. Hydrocarbons. Monosaccharides	Exposure, discussion, PowerPoint presentations	2
3. Oligosaccharides 2.3. Polisaccharides	Exposure, discussion, PowerPoint presentations	2
4. Lipids. 3.1.Fatty acids. Alcohols. Simple Lipids. Complex Lipids.	Exposure, discussion, PowerPoint presentations	2
5. Amino acids. Peptides. Proteins.	Exposure, discussion, PowerPoint presentations	2
6. Enzymes Classification and Common and Systematic Names. Catalytic power. Co-enzymes. Co-factors. Specificity. Enzyme kinetics.	Exposure, discussion, PowerPoint presentations	2
7. Nucleic acids (components of a mononucleotide). ADN.ARN.	Exposure, discussion, PowerPoint presentations	1
8. 8. Phytohormones (auxins, gibberellins, cytokinins, abscisic acid, ethylene) and plant pigments (carotenoids, chlorophyll a and b, flavonoids, anthocyanins)	Exposure, discussion, PowerPoint presentations	2
9. Plant carbohydrates metabolism. Photosynthesis	Exposure, discussion, PowerPoint presentations	2
10. Carbohydrate catabolism (glycolysis)	Exposure, discussion, PowerPoint presentations	2
11. Carbohydrate catabolism (Krebs cycle , pentose phosphate cycle)	Exposure, discussion, PowerPoint presentations	2
12. Lipid metabolism. Biosynthesis of glycerides. Catabolism of glycerides.	Exposure, discussion, PowerPoint presentations	2
13. Plant protein metabolism. Anabolism and catabolism of proteins.	Exposure, discussion, PowerPoint presentations	2
14. Mineral metabolism.	Exposure, discussion, PowerPoint presentations	2
References		
1. Campbell P.N. și A.D. Smith, <i>Biochimie ilustrată</i> , Ed. Academiei Române, București, 2004 . 2. Dinischiotu A., Marieta Costache – <i>Biochimia glucidelor</i> - Editura Protransilvania București, 1998 . 3. Garban Z. – <i>Biochimie. Tratat comprehensiv</i> , volum I , Editura Didactică și Pedagogică, București, 1999 . 4. Irimie D. – <i>Elemente de biochimie I</i> – Cluj Napoca, 1998 . 5. Lehninger A.L. - <i>Biochimie- vol I</i> , Ed. Tehnică, București, 1987 . 6. Neamțu G., G. Cîmpeanu, Carmen Socaci – <i>Biochimie vegetală (partea structurală)</i> , Ed. Didactică și Pedagogică, București, 1993 . 7. Neamțu G., Cîmpeanu G., Socaci C., <i>Biochimie vegetală (partea dinamică)</i> , Ed. Didactică și		

Pedagogică, București, 1995 . 8. Vicaș S. , <i>Biochimie: structura și funcțiile bioconstituenților vegetali</i> , Ed. AcademicPres, Cluj-Napoca, 2008 . The courses are uploaded to the e-learning platform of the University of Oradea, which can be accessed at https://e.uoradea.ro		
8.3 Laboratory	Metode de predare	Nr. Ore / Observații
1. General rules on work protection in biochemistry laboratory	Exposure, discussion	1
2. Solution. The concentration of solution. The preparation of solution with the certain concentration. Checking the solubility of substances. Exercises..	Explanations, exemplification	1
3. Presentation of glassware and laboratory equipment. Laboratory operations specific to biochemistry works.	Explanations, exemplification	1
4. The main constituents of plant organisms. Highlighting water and mineral salts. Determination of humidity. Determination of raw ash.	Students performing the experimental section with the professor's assistance.	1
5. pH. General considerations. Definition of pH. pH indicators. Experimental determination of pH. Anthocyanins - acid-base pH indicators.	Students performing the experimental section with the professor's assistance.	1
6. Carbohydrates. Qualitative determination of carbohydrates (Color reactions of monoglycerides and polyglycerides).	Students performing the experimental section with the professor's assistance.	2
7. Carbohydrates. Inversion of sucrose. Hydrolysis of starch.	Students performing the experimental section with the professor's assistance.	2
8. Lipids. Color reactions and lipid solubilization.	Students performing the experimental section with the professor's assistance.	2
9. Protides. General identification reactions for amino acids and proteins. Protein precipitation reactions.	Students performing the experimental section with the professor's assistance.	2
10. Enzymes (invertase, catalase).	Students performing the experimental section with the professor's assistance.	2
11. Hydrolysis of nucleoproteins. Qualitative determinations of nucleobases, pentoses and the phosphoric radical.	Students performing the experimental section with the professor's assistance.	2
12. Assimilatory pigments. Separation of green pigments by thin layer chromatography.	Students performing the experimental section with the professor's assistance.	2
13. Separation of anthocyanins by thin layer chromatography	Students performing the experimental section with the professor's assistance.	2
Laboratory test		2
References Vicaș S. , <i>Chimie organică și biochimie –lucrări practice</i> , Ed. AcademicPres, Cluj-Napoca, 2008 Vicaș S. , <i>Biochimie vegetala</i> , caiet de lucrari practice, 2014 The laboratories are uploaded to the e-learning platform of the University of Oradea, which can be accessed at https://e.uoradea.ro .		

* The content, respectively the number of hours allocated to each course / seminar / laboratory / project will be detailed during the 14 weeks of each semester of the academic year.

9. Corroboration of discipline content with the expectations of the epistemic community, professional associations and representative employers from the field corresponding to the study programme

<ul style="list-style-type: none"> ▪ The content of the "Biochemistry" discipline is consistent with what is done in other university centers in the country, in the agronomy profile, and covers fundamental and applied topics that ensure the accommodation of students with the specific issues of the discipline (theories, ideas, hypotheses, laws, principles and methods, research, critical analysis, innovative). ▪ The contents of the discipline are approached from an inter-, intra-, trans- and/or multidisciplinary point of view in such a way as to stimulate initiative, independence in thinking, critical and creative analysis that are the basis of training students in the skills necessary for scientific research in the field. ▪ By learning the theoretical concepts and approaching the practical aspects included in the discipline, the students acquire a consistent body of knowledge, in accordance with the skills required for the possible occupations provided in the Grid - RNCIS
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10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the final grade
10.4 Course	The exam is written and take maximum two hours, consisting of ten topics, including the whole range of information provided during the course. Scoring is performed from 1 to 10 for each topic discussed, their average represent the final exam score. For 5 grade is necessary knowledge according to minimum scale adopted and for 10 the knowledge for the maximum rate adopted. During the course will be given tests on whose average is 20% of the final grade.	Written test	70%
10.5 Seminar			
10.6 Laboratory	The efforts of each student in laboratory practical work during the semester are recorded during all regular meetings to which are added laboratory test (oral). Oral presentation of a report in the form of PowerPoint. For 5 grade is necessary knowledge according to minimum scale adopted and for 10 the knowledge for the maximum rate adopted.	Laboratory test	30%
10.7 Project			
10.8 Minimum standard of performance			
The student will be familiarized with basic notions of biochemistry. The student has the ability to perform specific qualitative and quantitative determinations of biochemistry. The student has the ability to display the results in the form of comments, graphs, charts or tables. Correctly interpret test results obtained.			

Date of completion

Signature of course holder**

Signature of seminar
laboratory/project holder **

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Lecturer dr. Raluca Popovici
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Date of approval in the department

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Signature of the Head of Department

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Assoc. Prof. dr. eng. Ioana Borza,

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Assoc. Prof. dr. ing. Cristina Maerescu