UNIVERSITY OF AGRICULTURAL SCIENCE AND VETERINARY MEDICINE CLUJ-NAPOCA
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No._____/ _____ **Form code USAMV 0702020107**

SUBJECT OUTLINE

1. General data

1.1. Higher education institution	University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca
1.2. Faculty	Food Science and Technology
1.3. Department	Food Sciences
1.4. Domain of study	Food Engineering
1.5. Level of study[1)]	Bachelor of Science
1.6. Specialization	Food Control and Expertise
1.7. Form of education	IF

2. Date despre disciplină

2.1. Name of the course	Biochemistry							
2.2. Course coordinator				Prof.dr. Andreea Stănilă				
2.3. Coordinator of the laboratory/seminar activity				Lecturer.dr. Zorita Diaconeasa				
2.4. Year of study	II	2.5. Semester	**III**	2.6. Type of evaluation	Continuous Summative	2.7. Course regime	Content[2]	DF
							Compulsory level[3]	DI

3. Total estimated time (hours/semester for the teaching activities)

3.1. Number of hours/week– full time form	4	out of which: 3.2. course	2	3.3. seminar/ laboratory/ project	2
3.4. Total hours in the teaching curricula	56	out of which: 3.5. course	28	3.6. seminar/laboratory	28
Distribution of time					hrs.
3.4.1. Study based on hand book, notes, bibliography					14
3.4.2. Extra documentation in library, on specific electronic platforms and on field					10
3.4.3. Preparation of seminars / laboratories / projects, essays, reports, portfolios					4
3.4.4. Tutorial					10
3.4.5. Examination					6
3.4.6. Other activities					
3.7. Total hours of individual study	44				
3.8. Total hours on semester	100				
3.9. Number of credits [4]	4				

4. Pre-conditions (where relevant)

4.1. for curriculum	Organic Chemistry
4.2. for competences	The student must have knowledge regarding general chemisty and organic chemistry from highschool order to understand important food chemistry principles

5. Conditions (where relevant)

5.1. for course	The course is interactive; students can ask questions regarding the content of the exposure. Academic discipline enforces time start and end of the course. Any other activities are forbidden during course, the mobile phones must be switched off.
5.2. for seminar/laboratory/project	In the laboratory students must consult the practical guide, every student will perform individual activity using the laboratory equipment which is described in the practical guide. During the practical activities the academic discipline must be maintainted.

6. Specific competences acquired

Competențe profesionale	-Description and use of concepts, theories and basic methods used in quality control of food products; the concepts are refering to the chemical compounds that assure the product quality, their transformation during processing, transportation and storage, the equipment and the quantification methods used for determining these compounds -Description and use of concepts, theories and methods of basic Food science (defined in multidisciplinary terms), on the structure, properties and transformations of food compounds and contaminants throughout the food chain -Explanation and interpretation of concepts, processes, models and methods of food science, using basic knowledge on the composition, structure, properties and transformations of food compounds and their interaction with other systems throughout the food chain
Competențe transversale	- Applying strategies like perseverance, rigor, efficiency and responsibility in work, punctuality and personal assumption of responsibility for business results, creativity, common sense, analytical and critical thinking, problem solving and so on, based on principles, norms and code values applied for ethics in food. - Applying networking techniques within a team; amplification and shaping of empathic capacities of interpersonal communication and ownership of specific tasks in this activity group for treatment / conflict solving individual / group, and optimal management of time.

7. Objectives of the course (as a result of the specific competences acquired)

7.1. . General objectives	Assimilation of fundamental concepts of biochemistry required for engineers in the food industry in order to understand and learn other disciplines (nutrition, toxicology, food control, etc.); knowledge of organic compounds involved in the proper functioning of plant and animal organisms.
7.2. Specific objectives	Food Biochemistry course aims to prepare sudents for senior years, help them to achieve an understanding of the chemical changes that take place with food components during processing and storage. The study of biochemistry is necessary for arming students with the knowledge and practical skills on the handling of laboratory tools, identification or determination of chemical compounds based on its content.

8. Content

8.1. COURSE **Number of hours – 28**	Teaching methods	Observation
1. **Protide:** 1.1. Introduction; 1.2. Aminoacids (properties, classification, representatives) 1.3.Peptide 1.4.Proteins (properties, structure) globular and fibrillar proteins; 1.5.Proteide (properties, representatives) Nucleoproteide (structure and significance) .	Lectures	3 Lectures
2. **Nucleic acids;** 2.1. General characterisation and biological role; 2.2. Pyrimidine and purine nitrogenous bases; 2.3. Nucleosides and nucleotides; 2.4. Deoxyribonucleic acid (DNA) -structure, properties, role, 2.5. Ribonucleic acid (RNA)-types, structure	Lectures	1 Lectures
3**. Carbohydrates**, nomenclature, classification, properties, uses in the food industry. 3.1. Monosaccharides. Structure, properties, role, 3.2. Disaccharides. Structure, properties, role, 3.3.Polysaccharides: structure, properties, role	Lectures	2 Lectures
4. Lipids; 4.1. General characterisation 4.2. Fatty acids and alcohols components; 4.3. Simple Lipids: Glycerides, cerides, turosterides: structure, physical and chemical properties, uses in industry, role, 4.4. Complex lipids :gliceroloipids, glycerophospholipids, sulfolipids: structure, physical and chemical properties, role	Lectures	3 Lectures
	Lectures	1 Lectures

5. Vitamins. General characterization, classification, role, 5.2. Fat-soluble vitamins (A, D, E, F) - structure, function, biochemical role; 5.3. Water soluble vitamins (B1, B3, B6, C, PP, pantothenic acid, folic and folinic) - structure, function, biochemical role.	Lectures	1 prelegere
6 Enzymes, 6.1. Definition, nomenclature, structure,6.2.Structure; 6.3. Mechanism of action; 6.4.Factors affecting enzyme activity	Prelegere	2 Lectures
7. **Hormones and vegetal pigments**, 7.1. Structure, properties, biochemical role; 7.2.Representative: auxins, gibberellins, cytokinins, abscisic acid, retardants,. 7.3.Carotenoids, quinones and flavonoids		
8. Vegetable materials of secondary origin, 8.1. Glycosides, 8.2. Lignins, 8.3.Tanins, oils, resins and balsams; 8.5. Phytochemical and vegetable insecticides; 8.5.Alcaloids	Lectures	1 Lectures

8.2. PRACTICAL WORK **Number of hours – 28**		
1. The main biochemical compounds with food industry utilisation	Practical work	1 Seminar
2. Chemical reaction for starch and glucose identification in food.	Practical work	1 Practical work
3. Polarimetric methods for starch and lactose quantification	Practical work	1 Practical work
4. Alchoolic fermentation of saccharides. Conversion glucose-fructose	Practical work	1 Practical work
5. Saccharides bioavailability. Starch and sucrose hydrolisis.	Practical work	1 Practical work
6 . Identification reactions for lipids. Fat solubility. Lethicins Identification and separation .	Practical work	1 Practical work
7. General properties of amino acids: solubility, colour reactions, precipitation reactions.	Practical work	1 Practical work
8. Obtaining of protein extracts from milk, flour. Protein		

clotting and denaturation. 9. Milk glue preparation 10. Enzymes utilisation in food industry 11. Analysis methods of starch, amylases and starch derivatives. 12. Identification reactions for lipo and hydrosoluble vitamins. 13. Extraction and quantification of pigments – quantification of antocyanins. 14. Laboratory Colloquium – practical examination	Practical work Practical work Practical work Practical work Practical work Practical work Examination	1 Practical work 1 Practical work 1 Practical work 1 Ppractical work 1 Practical work 1 Practical work Practical examination

Compulsory bibliography

1. G. Neamţu - "Biochimie Alimentara" - Edit. Ceres, Bucureşti, 1997
2. Andreea Stănilă, Carmen Socaciu, - „Biochimia alimentelor- Lucrări practice şi teste", Editura Academic Press, Cluj-Napoca, 2004
3. Andreea Stănilă – Analiza compusilor bioactivi din alimente; Ed.Academic Press Cluj-Napoca; 2013
4. . Andreea Stanila – Biochimie Structurala; Ed. AcademicPress Cluj-Napoca, 2013

Facultative bibliography:

1) L.Stryer –**"Biochemistry"**-fourth edition, W.H.Freeman & Co., New York, 1995
2) A.Lehninger, D.Nelson, M.M.Cox –**"Principles of Biochemistry"**, Worth Publ.N.Y.,1993

9. Corroboration of the subject content with the expectations of the epistemic community representatives, of the professional associations and representative employers in the domain

In order to identify ways of modernization and continuous improvement of teaching and course content, with the current issues and practical problems, teachers attend the annual meeting of the Association of Specialists in Food Industry of Romania as well as business meetings with members of food industry.

10. Evaluare

Type of activity	10.1. Evaluation criteria	10.2. Evaluation methods	10.3. Percent of the final grade
10.4. Course	Identify the main classes of bioactives compounds. Klowledge of specific reaction for biochimic compounds Knowing the properties of classes of organic compounds found in the food industry	Oral examination	75%
10.5. Seminar/Laboratory	Theoretical and practical knowledge of the methods of analysis used in the chemistry lab. Troubleshooting stoichiometric with practical applicability (concentration, purity, yield).	Periodic evaluation / colloquy	25%
10.6. Minimal standard of performance			

Mastering scientific information conveyed through lectures and practical work at an acceptable level. Obtaining the pass mark in continuous assessment is the condition of graduation.

[1] Education levels- choose of the three options: Bachelor/ * Master/Ph.D.

[2] Discipline status (content)- for the undergraduate level, choose one of the options:- **FD** (fundamental discipline), **BD** (basic discipline), **CS** (specific disciplines-clinical sciences), **AP** (specific disciplines-animal production), **FH** (specific disciplines-food hygiene), **UO** (disciplines based on the university's options).

[3]/ Discipline status (compulsoriness)- choose one of the options – **CD** (compulsory discipline) **OD** (optional discipline) **ED** (elective discipline).

[4] One credit is equivalent to 25-30 hours of study (teaching activities and individual study).

[5] / * Disciplines: AK- Advanced knowledge, CT- Complementary Training, S- Synthesis

Filled in on
6.09.2020

Course coordinator
Prof.dr. Andreea Stănilă

Laboratory work/seminar coordinator
Lecturer.dr. Zorița Diaconeasa

Subject coordinator
Prof.dr. Andreea Stănilă

Approved by the
Department on
22.09.2021

Head of the Department
Prof.dr. Ramona Suharoschi

Approved by the Faculty
Council on
28.09.2021

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Prof.dr. Elena Mudura