UNIVERSITATEA DE ŞTIINŢE AGRICOLE ŞI MEDICINĂ VETERINARĂ CLUJ-NAPOCA
Calea Mănăştur 3-5, 400372, Cluj-Napoca
Tel: 0264-596.384, Fax: 0264-593.792
www.usamvcluj.ro

No._____of _____ **USAMV form CN-702030219**

SUBJECT OUTLINE

1. Information on the programme

1.1. Higher education institution	University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca
1.2. Faculty	Food Science and Technology
1.3. Department	Food Science
1.4. Field of study	Food Engineering
1.5.Education level	Bachelor
1.6.Specialization/ Study programme	**Control and expertise of food products**
1.7. Form of education	Full time

2. Information on the discipline

2.1. Name of the discipline	Enzymatic and immunologic techniques							
2.2. Course coordinator				Prof PhD, Ramona Suharoschi				
2.3. Seminar/ laboratory/ project coordinator				Lecturer PhD, Oana Lelia Pop				
2.4. Year of study	III	2.5. Semester	**VI**	2.6. Type of evaluation	continuous	2.7. Discipline status	Content[2]	DS
							Compulsoriness[3]	DO

3. Total estimated time (teaching hours per semester)

3.1. Hours per week – full time programme	2	out of which: 3.2. lecture	1	3.3. seminar/ laboratory/ project	1
3.4.Total number of hours in the curriculum	28	Out of which: 3.5.lecture	14	3.6.seminar/laboratory	14
Distribution of the time allotted					hours
3.4.1. Study based on book, textbook, bibliography and notes					10
3.4.2. Additional documentation in the library, specialized electronic platforms and field					3
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					5
3.4.4.Tutorials					2
3.4.5.Examinations					2
3.4.6. Other activities					0
3.7. Total hours of individual study	22				
3.8. Total hours per semester	50				
3.9. Number of credits[4]	2				

4. Prerequisites (is applicable)

4.1. curriculum-related	Organic Chemistry, Food Chemistry, Bio Chemistry, Mathematics and Statistics
4.2. skills-related	. The student must have knowledge of the chemical and biochemical characteristics of compounds specific to living matter; operating IT; office use (xls); Internet browsing; qualities of individual work and participation in professional development

5. Conditions (if applicable)

5.1. for the lecture	The course is interactive; students can ask questions regarding the content of

	lecture. Academic discipline requires compliance with the start and end of the course. We do not allow any other activities during the lecture, mobile phones will be turned off.
5.2. for the seminar/ laboratory/ project	During practical works, each student will develop an individual activity with laboratory materials (made available in the book that describes the laboratory work). Academic discipline is imposed throughout the course of practical works.

6. Specific competences acquired

Professional competences	C1.1. Description and use of basic concepts, theories and methods in food science (defined in multidisciplinary terms). C3 -Supervision, management, analysis and design of enzymatic and immunologic techniques applicyed in food science study.
Transversal competences	CT2. - Applying interrelationship techniques within a team; amplifying and refining the empathic capacities of interpersonal communication and assuming specific attributions in carrying out group activities in order to resolve individual / group conflicts, as well as optimal time management.

7. Course objectives (based on the list of competences acquired)

7.1. Overall course objective	To know the basic principles of enzymatic and immunologic techniques applied in food science
7.2. Specific objectives	To be able to interpret and discuss the results of adequate studies in a critical thinking approach

8. Content

8.1. LECTURE **Number of hours – 14**	Teaching methods Lecture	Notes
Enzyme: definition, enzyme sources, assessment of enzyme activity	Blended learning lectures: mix of active learning techniques and group dsicussions	1 h
Using enzyme in analytical assessment; importance of enzymes in food science	Blended learning lectures: mix of active learning techniques and group dsicussions	1 h
ATP determination by bioluminiscence	Blended learning lectures: mix of active learning techniques and group dsicussions	1 h
Applications	Blended learning lectures: mix of active learning techniques and group dsicussions	1 h
Biosensors	Blended learning lectures: mix of active learning techniques and group dsicussions	1 h
Immunosensors	Blended learning lectures: mix of active learning techniques and group dsicussions	1 h
Imunologic Technology	Blended learning lectures: mix of active learning techniques and group dsicussions	1 h

Serologic methods to identify pathogenic microorganisms	Blended learning lectures: mix of active learning techniques and group dsicussions	1 h
RIA, IRMA, ELISA methods	Blended learning lectures: mix of active learning techniques and group dsicussions	2 h
Food science applications	Blended learning lectures: mix of active learning techniques and group dsicussions	2 h
Method validation	Blended learning lectures: mix of active learning techniques and group dsicussions	2 h

8.2. PRACTICAL WORK **Number of hours – 28**	Theoretical presentation of practical works	lab work
Lab: GLP, SOP, basic lab techniques: pippeting, measuring, etc. **Lab safety guigeliness**	Blended learning application: active learning techniques/ presentation and discussion of the results	LL: 1 ore
Lab: databases (sequencing) (multiple and single alignment) (laptop) **Report 1**	Blended learning application: active learning techniques/ presentation and discussion of the results	LL:2 ore
Bioenzymatic assessment (food matrix: fruit beverages, wine, bear, dairy product; eggs; meat) **Report 2**	Blended learning application: active learning techniques/ presentation and discussion of the results	LL:2 ore
ELISA – food applications	Blended learning application: active learning techniques/ presentation and discussion of the results	LL:1 ore
GMO testing – ELISA assessment	Blended learning application: active learning techniques/ presentation and discussion of the results	LL: 2 ore

Mandatory References:
Nicolau, A., Georgescu, L., Bleoanca, I., Banu, I., Soptica, F., Moraru, D., 2007. Metode instrumentale, enzimatice si imunologice, Ed. Academica.
Lee Lerner K., Wilmoth B. (2003) World of microbiology and immunology , 1 , The Gale Group, Inc., USA, 187 – 190
Encyclopedia of Food Microbiology, 2000, Academic Press, London

Optional references:
Bernard PS and Wittwer CT, Real-time PCR technology for cancer diagnostics, Clin Chem 48, 1178–1185 (2002)
Bustin SA et al., Quantitative real-time RT-PCR—a perspective, J Mol Endrocrinology 34, 597–601 (2005)
Bustin SA and Mueller R, Real-time reverse transcription PCR (qRT-PCR) and its potential use in clinical diagnosis, Clin Sci (Lond) 109, 365–379 (2005)
Gibson NJ, The use of real-time PCR methods in DNA sequence variation analysis, Clin Chim Acta 363, 32–47 (2006)
Jiang Y et al., Genotyping Parkinson disease-associated mitochondrial polymorphisms, Clin Med Res 2, 99–106 (2004)
Kubista M et al., The real-time polymerase chain reaction. Mol Aspects Med 27, 95–125 (2006)
Leutenegger CM, The real-time TaqMan PCR and applications in veterinary medicine, Vet Sci Tomorrow 1, 1–15 (2001)
Mackay IM, Real-time PCR in the microbiology laboratory, Clin Microbiol Infect 10, 192–212 (2004)
Pray PA Consider the Cycler, Scientist 18, 34–37 (2004)
Saleh-Lakha S et al., Microbial gene expression in soil: methods, applications, and challenges, J Microbiol Methods 63, 1-19 (2005)
Stevens CD, Clinical Immunology and Serology: A Laboratory Perspective, 2nd Ed, FA Davis Company, Philadelphia, Pennsylvania (2003)
Templeton KE et al., Evaluation of real-time PCR for detection of and discrimination between *Bordetella pertussis*, *Borderella parapertussis*, and *Bordetella homesii* for clinical diagnosis, J Clin Microbiol 41, 4121–4126 (2003)
Watson DE and Li B, TaqMan applications in genetic and molecular toxicology, Int J Toxicol 24, 139–45. (2005) Wong ML and Medrano JF, Real-time PCR for mRNA quantification. BioTechniques 39, 75–85 (2005)

9. Corroborating the course content with the expectations of the epistemic community representatives, of the professional associations and of the relevant stakeholders in the corresponding field

The knowledge taught in the course is necessary to know and understand the role of factors influencing the choice of a

healthy diet based on the principles of a balanced diet in ensuring health and the role of the food industry specialist in developing safe, attractive and high nutritional value food products.

10. Assessment

Type of activity	10.1. Assessment criteria	10.2. Assessment methods	10.3. Percentage of the final grade
10.4. Lecture	periodic or partial tests	Verification along semester - a number of 4 verifications are scheduled	35%
	participation in scientific circles and / or professional competitions	Practical and theoretical skills	5%
10.5. Seminar/Laboratory	Evaluation during the semester	Assignments	20%
	Final evaluation (the scheduled assignments)	Written exam	40%
10.6. Minimum performance standards			
• Solving a concrete food science problem based on a given algorithm • Carrying out a literature study (nutrition and health).			

[1] Level of study- to be chosen one of the following - Bachelor/Post graduate/Doctoral
[2] Course regime (content) – for bachelor level it will be chosen one of the following - **DF** (fundamental subject), **DD** (subject in the domain), **DS** (specific subject), **DC** (complementary subject).
[3] Course regime (compulsory level) - to be chosen one of the following - **DI** (compulsory subject), **DO** (optional subject), **DFac** (facultative subject)
[4] One ECTS is equivalent with 25-30 de hours of study (didactical and individual study).

Filled in on
08.09.2021

Course coordinator
Prof PhD, SUHAROSCHI Ramona

Laboratory work/seminar coordinator
Lecturer. PhD, POP Oana Lelia

Subject coordinator
Prof PhD, SUHAROSCHI Ramona

Approved by the Department on
22.09.2021

Head of the Department
Prof PhD, SUHAROSCHI Ramona

Approved by the Faculty Council on
28.09.2021

Dean
Prof PhD, MUDURA Elena