



No. _____ of _____

USAMV–CN-0705010106

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	Faculty of Food Science and Technology
1.3. Department	Food Engineering
1.4. Field of study	Food Engineering
1.5. Education level	Master
1.6. Specialization/ Study programme	Processing Systems and Food Quality Control
1.7. Form of education	Full time

2. Information on the discipline

2.1. Name of the discipline	Modern processing principles of food products 3							
2.2. Course coordinator	Prof. PhD. Elena Mudura							
2.3. Seminar/ laboratory/ project coordinator	Lecturer PhD. Teodora Emilia Coldea							
2.4. Year of study	I	2.5. Semester	II	2.6. Type of evaluation	Summative	2.7. Discipline status	Content ²	DS
							Compulsoriness ³	CD

3. Total estimated time (teaching hours per semester)

3.1. Hours per week – full time programme	4	out of which: 3.2. lecture	2	3.3. seminar/ laboratory/ project	2
3.4. Total number of hours in the curriculum	56	Out of which: 3.5. lecture	28	3.6. seminar/ laboratory	28
Distribution of the time allotted					hours
3.4.1. Study based on book, textbook, bibliography and notes					80
3.4.2. Additional documentation in the library, specialized electronic platforms and field					15
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					15
3.4.4. Tutorials					5
3.4.5. Examinations					4
3.4.6. Other activities					
3.7. Total hours of individual study	119				
3.8. Total hours per semester	175				
3.9. Number of credits ⁴	7				

4. Prerequisites (is applicable)

4.1. curriculum-related	Food biochemistry. Food biotechnology. Microbiology.
4.2. skills-related	Bachelor diploma or equivalent Certificate of language competence (English)

5. Conditions (if applicable)

5.1. for the lecture	Classroom equipped with video projector
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5.2. for the seminar/ laboratory/ project	Seminar room equipped with projector; food technologies pilot plants Safety and secure rules for laboratory/ pilot plants must be respected. The access is not allowed without safety equipment.
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6. Specific competences acquired

Professional competences	<p>C1.1 Identification the principles and methods of elaboration of technical specifications for processes and products in the food industry</p> <p>C1.2 Explanation and interpretation of methods for evaluating processes specific to agro-food production</p> <p>C1.3 Integrated use of concepts and methodologies for planning and coordinating technological activities</p> <p>C1.4 Use of high-performance criteria and methods for the periodic evaluation of the quality of processes and products</p> <p>C1.5 Elaboration of projects regarding the monitoring, evaluation and elaboration of studies for the optimization of the technological flows in order to reduce the specific consumptions</p>
Transversal competences	<p>CT1 Conducting complex, inter-disciplinary, individual projects</p> <p>CT2 Conducting complex, inter-disciplinary projects by coordinating a team</p> <p>CT3 Conducting complex inter-disciplinary scientific papers</p>

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

7.1. Overall course objective	Design and implementation of advanced methods and technologies applicable in the fermentative food industry, as well as knowledge, understanding and proper use of discipline-specific terminology, processes and theoretical and practical content of the discipline.
7.2. Specific objectives	<ol style="list-style-type: none"> 1. In-depth knowledge of a specialized area and, within it, of the theoretical, methodological and practical development specific to the program: appropriate use of specific language in communication with different professional environments 2. The use of specialized knowledge for explaining and interpreting new situations, in broader contexts associated with the field 3. Integrated use of the conceptual and methodological apparatus, in conditions of incomplete information, to solve new theoretical and practical problems 4. The nuanced and pertinent use of evaluation criteria and methods to form value judgements and elaborate constructive decisions 5. Development of professional and / or research project, innovatively using a wide range of quantitative and qualitative methods 6. Minimum performance standards for competence assessment: development of a technological project. 7. Execution of complex professional tasks, in conditions of autonomy and professional independence 8. Assuming roles / functions of leading the activity of professional groups or institutions 9. Self-control of the learning process, diagnosis of training needs, reflective analysis of one's professional activity

8. Content

8.1.COURSE Number of hours – 28	Methods of teaching	Observations 1 lecture = 2 hours
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Characterization of the main types of fermentation processes	Lecture	2 lectures (4 hours)
Microorganisms used in fermentation processes. Microorganisms of interest in alcoholic, malolactic and acetic fermentations. The impact of microflora on the sensory and volatile profiles of fermentative products.	Lecture	3 lectures (6 hours)
Advanced technologies applied in the fermentation industry. Computerized process monitoring. Use of enzymatic preparations in the fermentative industry. New methods of maturation and ageing of alcoholic and alcohol free beverages. Equipment and installations for aerobic and anaerobic fermentation.	Lecture	3 lectures (6 hours)
Development of new products in the fermentation industry. Fermentation processes for obtaining innovative products starting from traditional or conventional recipes	Lecture	3 lectures (6 hours)
Sustainability in the fermentation industry. Applying the principles of sustainability. Strategies, solutions.	Lecture	3 lectures (6 hours)

8.2. PRACTICAL WORK	Methods of teaching	Observations
Number of hours – 28		1 lab work = 2 hours
Anaerobic and aerobic fermentation of a substrate. Identification of metabolic products.	Case study	4 lab works (8 hours)
Valorizing the food industry by-products.	Case study	4 lab works (8 hours)
New ingredients and food obtained through fermentative processes	Case study	2 lab works (4 hours)
Modeling and automatic management of fermentation processes in the UASVM Cluj-Napoca pilot plant	Case study	2 lab works (4 hours)
Enzymes of interest selection in technological processes by using specific data bases	Case study	2 lab works (4 hours)
Compulsory bibliography <ol style="list-style-type: none"> 1. Anita R. Linnemann, Catharina G.P.H. Schroën and Martinus A.J.S. van Boekel, 2011. Food product design. An integrated approach. Wageningen Academic Publishers. ISBN: 978-90-8686-173-6. 2. Anca Sipos, Vasile Mircea Cristea, Elena Mudura, Arpad Imre-Lucaci, Dorina Braftalean, 2013. Modelarea, simularea și conducerea avansată a bioproceselor fermentative, vol. I și vol. II. Editura Universității Lucian Blaga din Sibiu, Romania. 3. Rainer Stark, Günther Seliger, Jérémy Bonvoisin, 2017. Sustainable Manufacturing - Challenges, Solutions and Implementation Perspectives, Springer Open. 4. Ronald S. Jackson, 2008. Wine Science, Principles and Applications, 3rd Edition. Academic Press. San Diego, California, USA. 5. Alan J. Buglass, 2011. Handbook of Alcoholic Beverages, vol I și vol. II. John Wiley & Sons. 6. Banu C., Progrese tehnice, tehnologice și științifice în industria alimentară, Ed. Tehnică, București, 1993 7. Banu, C., - Manualul inginerului de industrie alimentară, vol.I, II. Editura Tehnică, București, 1998, 1999 8. Banu, C., - Tratat de știința și tehnologia malțului și berii, Editura AGIR, București, 2000/2001 9. Kunze, W.- Technology brewing and Malting, VLB, Berlin, 1999 10. Aurel I Popa, Ștefan C. Teodorescu- Microbiologia vinului. București, Editura Ceres, 1990 11. Pomohaci N., Stoian V., Gheorghita M., Sirghi C., Cotea V.V., Nămoșanu I., 2000. Oenologie. vol. I, Prelucrarea strugurilor și producerea vinurilor, Editura Ceres, București. 		



Optional bibliography:

1. Briggs, D.E, Hough, Js, Stevens, R., Young, Tw., (1982) Malting and Brewing Science – Volume 1 – Malt and Sweet Wort. Chapman and Hall, New York
2. Briggs, D.E., Boulton, C.A., Brookes, P.A., Stevens, R., (2004), Brewing Science and Practice, Woodhead Publishing Limited and CRC Press, Cambridge, England.

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

It meets the training requirements for a competent specialist through the high degree of applicability (modern systems applied in the fermentation industry) and the topicality of the content of the discipline (identification and solution of quality problems in a food industry unit).

10. Assessment

Type of activity	10.1. Assessment criteria	10.2. Assessment methods	10.3. Percentage of the final grade
10.1. Lecture	Use of basic knowledge to explain and interpret various types of concepts, situations, processes, projects associated with fermentation technologies	Exam (E)	20%
10.2. Seminar/Laboratory	Using the knowledge, basic skills to document, develop, conduct a study	Colocvium (C)	80%
10.3. Minimum performance standards			
Lecture: Minimum standard (E) grade 5. Laborator: Presentation of a written project. Minimum standard (C) grade 5. In case projects are submitted exclusively on Microsoft Word format (digital format) or printed, without being presented by a Power Point presentation, followed by debates, will be graded with 5. Final grade = = 20% E+ 80% C			

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
08.09.2021

Course coordinator
Prof. PhD. Elena Mudura

Laboratory work/seminar coordinator
Lecturer PhD. Teodora Emilia Coldea

Subject coordinator
Prof. PhD. Elena Mudura

Head of the Department

Approved by the
Department on
22.09.2021

Prof. PhD. Sevastița Muste



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Approved by the Faculty
Council on
28.09.2021

Dean

Prof. PhD. Elena Mudura