UNIVERSITATEA DE ŞTIINŢE AGRICOLE ŞI MEDICINĂ VETERINARĂ CLUJ-NAPOCA
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No._____of _____ **USAMV–CN-0701030107**

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	Bachelor
1.6.Specialization/ Study programme	Technology of Agricultural Products Processing
1.7. Form of education	Full time

2. Information on the discipline

2.1. Name of the discipline	Fermentative technologies 1							
2.2. Course coordinator				Lecturer PhD. Teodora Emilia Coldea				
2.3. Seminar/ laboratory/ project coordinator				Lecturer PhD. Teodora Emilia Coldea				
2.4. Year of study	III	2.5. Semester	**V**	2.6. Type of evaluation	Summative	2.7. Discipline status	Content[2]	DS
							Compulsoriness [3]	DI

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					20
3.4.2. Additional documentation in the library, specialized electronic platforms and field					5
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					10
3.4.4.Tutorials					5
3.4.5.Examinations					4
3.4.6. Other activities					
3.7. Total hours of individual study	44				
3.8. Total hours per semester	100				
3.9. Number of credits[4]	4				

4. Prerequisites (is applicable)

4.1. curriculum-related	Food biochemistry. Food microbiology.
4.2. skills-related	The student must gain knowledge referring to fermented and distilled alcoholic beverages.

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. In the case of the didactic activity carried out online, the teaching methods will be adapted.
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. In the case of the didactic activity carried out online, the teaching methods will be adapted.

6. Specific competences acquired

Professional competences	Knowledge: C3.1 Description and use of basic concepts, theories and methods on agro-food technologies Abilities: C1.3. Application of basic principles and methods in food science to solve engineering and technological problems, including those related to food safety C3.3. Monitoring and control of technological processes in the food industry, identifying abnormal situations and proposing solutions C2.4. Critical analysis, evaluation of the characteristics, performances and limits of some technological processes and equipment in the field of the agro-food industry C3.5. Elaboration of projects related to technologies and products specific to the agro-food industry
Transversal competences	CT1 – Applying strategies of perseverance, rigor, efficiency and responsibility at work, punctuality and taking responsibility for the results of personal activity, creativity, common sense, analytical and critical thinking, problem solving, etc., based on the principles, norms and values of the code professional ethics in the food field.

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

7.1. Overall course objective	To acquire knowledge referred to the utilization and application of obtaining technologies, process control, design in the wine and distilled beverages fields
7.2. Specific objectives	To understand the flow operations distribution in wine and distilled beverages technologies To be able to interpret the physico-chemical parameters of wine and distilled beverages technologies To know the factors influencing the wine and distilled beverages quality To identify solutions to technical issues in wine and distilled beverages technologies

8. Content

8.1.LECTURE **Number of hours – 28**	Teaching methods Lecture	Notes 1 lecture = 2 hours
Wine technology **Introduction.** Romanian viticulture and vinification in the national and international context Romanian wine grape cultivars Romanian wines classification Wine consumer profile and consumption habits	Lecture	2 lectures

Grapes – raw material for the wine industry Uvological characteristics of grapes and their implications in wine technology Chemical composition of grapes Wine grapes maturation Wine grapes harvesting.		
Antiseptics and antioxidants used in vinification Regulation applied for the using of food additives in vinification The role and addition moment of SO2. SO2 materials used in vinification		
Grapes processing for obtaining graoe must **Prelucrarea strugurilor în vederea obţinerii mustului de struguri** Transport, reception and grape-unloading. Grapes crushing and peeling Treatments applied to must White wine vinification. Red wine vinification. Characteristics. Machinery and equipments for wine industry	Lecture	2 lectures
Grape must Chemical composition of grape must Treatments applied to grape must		
Grape must processing Assembling and must blending **Cold settling** Prefermentative treatments applied to grape must Applied corrections in vinification.		
Fermentative processes and maceration in wine technology Wine microflora Alcoholic fermentation Grape must fermentation biochemistry Fermentation stages Wine malo-lactic fermentation White wine maceration Red wine maceration-fermentation Machinery and equipments used in the grape must fermentation	Lecture	1 lecture
Chemical composition of wine		
Conditioning and stabilization of wine **Vessels filling** **Wine yeast removal** Homogenization and wine blending Wine clarification Wine stabilization. Chemical and thermal processes. Wine filtering	Lecture	2 lectures
Wine ageing **Wine ageing in barrels** Unconventional technologies for wine ageing		

Biochemical processes produced during wine ageing. Wood compounds influence to physico-chemical composition of wine. **Wine bottling** **Diseases and deffects of wines.**		
Effervescent wines.	Lecture	1 lecture
Other fruit based fermented beverages: apple cider, pear cider.	Lecture	1 lecture
Distilled beverages assortments recognized in Europe **Natural distillates** Natural distilled beverages produced in Romania Raw materials for palinca and traditional distilled beverages Microflora of the fruits used in the obtaining of distilled beverages Selected yeasts used for fruit distillates Chemical composition of fruits used in the obtaining of distillates **Traditional technologies for the palinca and traditional brandies** Fruits processing for the fermentation. Reception. Washing. Destemming. Fruits crushing. **Fermentation of fruit mashes.** Equipments used for the fruit mashes fermentation. Alcoholic fermentation biochemistry. Factors influencing the alcoholic fermentation of fruit mashes. Impact of secondary alcoholic fermentation products to fruit distillate quality. **Distillation of fermented fruit mashes** Traditional installation for distillation and re-distillation. Distillation technology of fermented fruit mashes. Chemical processes during distillation. Establishing of the ethanol yield. Fruit distillates. Chemical composition of fruit distillates. **Maturing and ageing of fruit distillates** Materials used for fruit distillates ageing Biochemical processes during fruit distillates ageing Chemical composition of fruit distillates **Natural distillates defects – prevention and treatment** **Fruit distillates bottling** **Sensory profile of fruit distillates**	Lecture	3 lectures
Ethanol of agricultural origin technology General consideration regarding ethanol. Characteristics. **Raw materials used for ethanol production.** Starch based raw materials. Sugar based raw materials - molasses	Lecture	2 lectures

Other raw materials.		
Ethanol technology based on starch raw materials Reception of the raw materials and conditioning Presaccharification operations, saccharification. Fermentation.		
Molasses ethanol production. Reception, conditioning, fermentation.		
Distillation Theretical aspects concerning distillation. Equipments and installation for ethanol distillation. Distillation management.		
Crude ethanol refining Chemical composition of the obtained ethanol Refining procedures		

8.2. PRACTICAL WORK **Number of hours – 28**	Theoretical presentation of practical works	1 lab work (2 hours / work)
Obtaining of grape must in the Winery pilot plant. Fermentation. Wine conditioning.	Case study	5 lab works
Quality characteristics determination of grape must and wine: ethanol content analysis, wine acidity analysis, sulphur dioxide analysis.	Case study	2 lab works
Wine colour analysis. Experimental models applied for wine ageing.	Case study	1 lab work
Technology calculation applied for wine technology.	Case study	1 lab work
Quality control of distilled beverages: ethanol analysis, acidity analysis, esters analysis.	Case study	2 lab works
Colour analysis of distilled beverages.	Case study	1 lab work
Technology calculation applied for distilled beverages technology.	Case study	1 lab work
Colocvium	Assessment	1 lab work

Compulsory bibliography:

1. Cotea V., 1985. Tratat de oenologie. Vol I. Vinificaţia şi biochimia vinului, Bucureşti:, EdituraCeres
2. Cotea V., Sauciuc I., 1988. Tratat de Oenologie. Vol II Limpezire, stabilizarea şi îmbutelierea vinului, Bucureşti, EdituraCeres
3. Cotea V., Pomohaci, N., Gheorghiţă M.,1982. Oenologie. Bucureşti, Editura didactică şi pedagogică
4. Coldea T.E., Mudura E. 2016. Tehnologii fermentative - Tehnologia vinului şi a bauturilor alcoolice distilate. Editura Mega, Cluj-Napoca. România.
5. Pomohaci N., Stoian V., Gheorghiţă M., Sîrghi C., Cotea V.V., Nămoloşanu I., 2000. Oenologie. vol. I., Prelucrarea strugurilor şi producerea vinurilor, Editura Ceres, Bucureşti.
6. Pomohaci N., Cotea V.V., Stoian V., Namoloşanu I., Popa A., Sîrghi C., Antoce Arina, 2001. Oenologie. vol. II, Îngrijirea, stabilizarea si îmbutelierea vinurilor. Construcţii si echipamente vinicole, Editura Ceres, Bucureşti.
7. Modoran, D., 2005. Procesarea industrială a alcoolui rafinat, Editura Academicpress, Cluj-Napoca

Optional bibliography:

1. Modoran, D.(2002), Tehnologii fermentative, Editura ICPIAF, Cluj-Napoca
2. Popa A.I., Teodorescu Ş.C. - Microbiologia vinului. Bucureşti:, Editura Ceres, 1990

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 qualification of a highly prepared specialist based on advanced and actual knowledge in the field of wine and spirit drinks technologies.

10. Assessment

Type of activity	10.1. Assessment criteria	10.2. Assessment methods	10.3. Percentage of the final grade
10.4. Lecture	Use of basic knowledge to explain and interpret various types of concepts, situations, processes, projects associated with wine and distilled beverages technologies.	Exam oral (E)	50 %
10.5. Seminar/Laboratory	Knowledge, use and application of methods and techniques for the manufacture of wine and distilled beverages. Use of standard methods for determining the control parameters of wine and distilled beverages.	Colloquium (C)	50 %
10.6. Minimum performance standards			
Course: Knowledge of the technological scheme for obtaining wine and distilled beverages. Characterization of the raw material and the finished product. Description of technological operations, process parameters and equipment for the manufacture of wine and distilled beverages. Minimum grade (E): 5. Lab work: Identification and analysis of quality parameters monitored on the technological flow of obtaining wine and distilled beverages. Minimum grade (C): 5. Final grade = 50% E + 50% C			

[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
Lecturer PhD. Teodora Emilia Coldea

Laboratory work/seminar coordinator
Lecturer PhD. Teodora Emilia Coldea

Subject coordinator
Prof. PhD. Elena Mudura

Approved by the
Department on
22.09.2021

Head of the Department
Prof. PhD. Sevastița Muste

Approved by the Faculty
Council on
28.09.2021

Dean
Prof. PhD. Elena Mudura