No._____of _____ **USAMV form 0702030116**

SUBJECT OUTLINE

1. Information on the programme

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 Engineering**
1.4. Field of study	**Food Engineering**
1.5.Cycle of study[1]	**Bachelor**
1.6.Specialization/ Study programme	**Control and expertise of food products**
1.7. Form of education	**IF**

2. Information on the discipline

2.1. Name of the discipline	**General technologies of plant products 4**							
2.2. Course coordinator				**Vlad Mureșan, PhD, habil., Associate Professor**				
2.3. Seminar/ laboratory/ project coordinator				**Georgiana Smaranda Marțiș, PhD, Assistant Professor**				
2.4. Year of study	**III**	2.5. Semester	**VI**	2.6. Type of evaluation	Continuous	2.7. Discipline status	Content[2]	DD
							Compulsoriness[3]	DI

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					8
3.4.2. Additional documentation in the library, specialized electronic platforms and field					4
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					5
3.4.4.Tutorials					2
3.4.5.Examinations					3
3.4.6. Other activities					
3.7. Total hours of individual study	22				
3.8. Total hours per semester	50				
3.9. Number of credits[4]	2				

4. Prerequisites (if applicable)

4.1. curriculum-related	Food chemistry; Food biochemistry; Transfer Phenomena; Biophysics
4.2. skills-related	The student must know the physical and chemical properties of carbohydrates. It should also be able to identify, describe and use specific science concepts adequate for food

5. Conditions (if applicable)

5.1. for the lecture	Room with projector and internet connection. The course is interactive; students can ask questions regarding the content of the statement. Academic discipline requires compliance of starting time and end of the course. There are not allowed any other activities during the lecture, mobile phones to be closed.
5.2. for the seminar/ laboratory/	For practical works each student will carry out an application / technological

project	computation / chemical analysis specific to Lipid technology. Academic discipline is imposed for the duration of works. Specially designed laboratory (equipped with specific glassware, sink, drying oven, balance, refractometer, oil press);

6. Specific competences acquired

Professional competences	C3.2. Explaining and interpreting the principles and methods used in technological processes in the food chain 2- C2.3. Application of basic engineering principles and methods for solving technological problems in the agri-food chain
Transversal competences	Apply strategies for perseverance, rigor , efficiency and responsibility in work , punctuality and personal accountability for its performance , creativity, common sense, analytical and critical thinking , problem solving, etc., based on principles, norms and values code of professional ethics from food industry;

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

7.1. Overall course objective	Acquiring knowledge on raw materials, production technologies and the quality of plant oil, as well as machinery and plants involved in technological processes for obtaining them.
7.2. Specific objectives	Knowledge of quality indicators of raw materials and finished products (sunflower oil); Interpretation of analytical results of raw materials, intermediate products and finished oil and margarine industry.

8. Content

8.1.LECTURE **Number of hours – 14**	Teaching methods	Notes
1. Structure and composition of oils and fats 1.1 Structures - simple lipids, complex derivatives 1.2 Physical properties. Chemical properties.	Lecture, explanation, conversation, debate	1 Lecture
2. Raw materials for oil production. Morphological structure of sunflower. Chemical composition. 3. General technological scheme for obtaining oil from sunflower seeds		
4. Preparing oilseeds for crushing. Pre-cleaning. The drying. Storage. Cleaning. Dehulling. Obtaining industrial kernel	Lecture, explanation, conversation, debate	1 Lectures
5. Crushing of oilseeds. Aim. Milling methods. Grinding rolls. **6. Roasting. The purpose of roasting. Optimal conditions for roasting. Physico-chemical changes during roasting. Roasting equipment. Features of roasted kernels.** **7. Pressing. Aim. Conditions. Methods and apparatus. .**	Lecture, explanation, conversation, debate	2 Lectures
8. Extraction. Extraction theory. Solvents for vegetable oils. Extractive Schemes. 8.1. Broken preparation for extraction.	Lecture, explanation, conversation, debate	1 Lectures

8.2. The extraction. DeSmet extractor. 8.3. Micella distillation. 8.4. Recovery of solvents from the meal. De-solvent and drying the meal. **9. Refining of crude oils. Neutralization schemes** 9.1. Degumming 9.2. Neutralization. 9.3. Washing. 9.4. Drying. 9.5. Decoloration. 9.6. Dewaxing. 9.7. Deodorizing	Lecture, explanation, conversation, debate	2 Lectures

8.2. PRACTICAL WORK **Number of hours – 14**		
1. Presentation of the safety rules to be respected during the practical works. Training for pilot plant oil press and laboratory oven. Sampling for quality control. Packaging, labelling, shipping and storage of the laboratory samples. Technical assessment of the quality of raw materials used to produce vegetable oils. Organoleptic examination. Determination of impurities in oilseeds. Methods for analysis of oil crops.	Experiment , conversation, explanation	1 Practical work
2. Samples conditioning for laboratory analysis. Determination of water and volatile substances content (moisture content) of oil crops, of broken and meal. Determination of test weight.	Experiment , conversation, explanation	1 Practical work
3. Obtaining industrial crude oil by pressing sunflower seeds (oil press pilot station). Calculation, total material balance, partly material balance, losses, efficiency.	Experiment , conversation, explanation	1 Practical work
4. Control analysis of the pressing operation. The determination of the fat content of sunflower seeds and broken (Soxhlet method).	Experiment , conversation, explanation	1 Practical work
5. Quality analysis of the crude and refined fats and oils: a comparison. Measurement of free fatty acid. Determination of peroxide value.	Experiment , conversation, explanation	1 Practical work
6. Quality analysis of refined fats and oils on the technological flow. Determination of the dissolved soap content. Determination of saponification index of fats.	Experiment , conversation, explanation	1 Practical work
7. Knowledge checking.	Debate, questioning, explanation	1 Practical work

Compulsory bibliography:

1. Racolța Emil, 2014. Tehnologia uleiurilor vegetale și a margarinei. Editura AcademicPres, Cluj-Napoca
2. Vintila Iuliana: Tehnologia si controlul calitatii uleiurilor si grasimilor vegetale, Vol.I. Materii oleaginoase si materii auxiliare. 2001, Ed. Fundatiei Universitatii "Dunarea de jos", Galati.
3. Morar, M.V.: Controlul calităţii uleiurilor si grăsimilor vegetale. Îndrumător de laborator, Ed. Todesco, Cluj, 2003
4. Ing.Gh.Boeru, Ing.D. Puzdrea: Fabricarea uleiurilor vegetale, EDT, Buc, 1980.
5. Marec Singer, Dumitru Puzdrea: Tehnologii în industria alimentară extractivă. Tehnologia uleiurilor vegetale., EDP, Bucureşti, 1978.
6. Sorin Stănilă: USAMV Cluj-Napoca, Utilaje în industria alimentară. Curs de zi, USAMV Cluj-Napoca.
7. Colecţia de standarde de stat.

Optional bibliography:
1. Banu, C., Manualul inginerului din industria alimentara, Ed.Tehnică, Bucureşti, 1999

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

Course content is consistent with the demands of specific national professional associations; the teaching staff regularly attend international fairs and undertake field visits on food industry specific establishments (sunflower oil and halva factories)

10. Assessment

Type of activity	10.1. Assessment criteria	10.2. Assessment methods	10.3. Percentage of the final grade
10.4. Lecture	Knowledge acquired; level of understanding; Solving specific problems related to sugar technology.	Continuous assessment	75%
10.5. Seminar/Laboratory	Description of specific analytical methods specific to oil industry.	Continuous assessment of skills for realizing analytical methods specific to oil technology.	25%
10.6. Minimum performance standards			
Elaboration of a process or equipment project specific to the food industry, using basic concepts, theories and methods in the field. Obtaining the passing grade for the ongoing checks is a condition of passability.			

[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 07.09.2021

Course coordinator
Vlad Mureșan, PhD, habil., Associate Professor

Laboratory work/seminar coordinator
Georgiana Smaranda Marțiș, PhD, Assistant Professor

Subject coordinator
Vlad Mureșan, PhD, habil., Associate Professor

Approved by the Department on 22.09.2021

Head of the Department
Sevastița Muste, PhD, habil., Professor

Approved by the Faculty

Council on
28.09.2021

Dean
Elena Mudura, PhD, habil., Professor