UNIVERSITATEA DE ŞTIINŢE AGRICOLE ŞI MEDICINĂ VETERINARĂ CLUJ-NAPOCA
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No_____from _____ **Form code USAMV–CN-0705020103**

COURSE DESCRIPTION

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. Study field	**Food Engineering**
1.5. Level field[1)]	**Master**
1.6. Specialization/ Study Program	**System processing and food quality control**
1.7. Form of education	IF

2. Information on the discipline

2.1. Name of the course	**Advanced Technology For Food Processing 4**							
2.2. Course leader				**Prof. dr. Emil RACOLŢA**				
2.3. Coordinator of seminary/laboratory activity/project				**Prof. dr. Emil RACOLŢA**				
2.4. Year of study	**II**	2.5. Semester	**I**	2.6. Type of evaluation	summative	2.7. Course regime	Content [2]	DS
							Level of compulsory [3]	DI

3. Total estimated time (teaching hours per semester)

3.1. Number of hours/week – frequency form	4	of which : 3.2. course	2	3.3. seminary/ laboratory/ project	2
3.4. Total hours in the curricula	56	of which: 3.5.course	28	3.6.seminary/laboratory	28

Distribution of time	Hours
3.4.1.. Study based on handbook, notes, bibliography	19
3.4.2. Extra documentation in the library, on specific electronic platforms and on field	45
3.4.3. Preparation of seminaries/ laboratories/ projects, themes, papers, portfolies and essays	40
3.4.4.Tutorial	10
3.4.5. Examination	5
3.4.6. Other activities	

3.7. Total hours of individual study	119
3.8. Total hours per semester	175
3.9. Number of ECTS[4]	7

4. Prerequisites (if applicable)

4.1. of curriculum	Extractive technologies - sugar. Extractive technologies – oil. Operations in the food industry; Food industry equipment; Transfer phenomena; Food chemistry; Food biochemistry; Refrigerators and air conditioning; Methods of food preservation;
4.2. of competences	

5. Conditions (if applicable)

5.1. of course development	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. of seminary/laboratory/ project development	Academic discipline is imposed throughout the practical works. Specially designed laboratory (equipped with specific glassware, oven, balance, refractometer, polarimeter), Confectionery Pilot Plant (vertical mixer, blender, fondant making equipment, various moulds of chocolate, jellies moulds, etc).

6. Specific competences acquired

Professional competences	Identify, describe and use appropriate specific notions on confectionery, oil, sugar and starch technology subject. Lead specific engineering processes, operation of facilities and equipment used in Extractive technology (oil, sugar and starch technology, confectionery). Know the physical and chemical properties of raw and auxiliary materials used in Extractive technology (oil, sugar and starch technology, confectionery). Know the quality indices of main extractive products (oil, sugar, starch). Understand the operation of specific machines for manufacturing of Confectionery and Extractive products (oil, sugar and starch). Be able to perform technological calculations for correct sizing of specific equipment and design specific products accordingly with current trends of development on Confectionery and Extractive products industry.
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; Apply techniques of inter - relationships within a team; Amplify and refine the empathic capacities of inter-personal communication and assume specific roles in the activity of the group in order to treat / resolve individual / group conflicts, as well as an optimal management of time ; Be able of scientific thinking regarding the wheat, potatoes and maize processing in order to obtain of starch; Demonstrate concern regarding professional development to improve the extraction yield and efficiency of the starch extraction process; To participate in research activities specific to confectionery and starch technology subject.

7. Subject objectives (as a result of the specific acquired competences)

7.1. Subject general objectives	Is the knowledge of the needed information on technological developments and trends related to sugar technology, sugar confectionery, oils and novelties on equipment's and facilities involved in carrying out these processes.
7.2. Specific objectives	Knowledge of quality parameters of starch and vegetable raw materials used for starch, oil and sugar extraction; Knowledge of quality parameters of raw and auxiliary materials used in confectionery; Knowledge of operations and operating principles of the equipment used in confectionery and starch, oil, sugar technology; Using and understanding the methods, analysis techniques, applications and technological computations from confectionery and starch, oil, sugar technology; Interpretation of results obtained by analysing the raw materials, intermediate and finished products from confectionery and starch, oil, sugar technology industry.

8. Contents

8.1.COURSE **Number of hours – 28**	Methods of teaching	Observations
1. The comparative study on the conventional technology of producing sugar and the technology used to SC Tereos Ludus	Lecture, explanation, conversation, debate	2 Lectures
2. 2. Sugar and alternative ingredients: 2.1. Sugar, honey, glucose, fructose and other syrups	Lecture, explanation, conversation, debate	2 Lectures

2.2. Polyols. Isomalt, Maltitol, Mannitol, Xylitol, Sorbitol. 2.3. Synthetic sweeteners. Aspartame, cyclamate, saccharin		
3. Presentation of confectionery industry trends through the exhibition at Cologne / Machine, Equipment, presentations booklets	Lecture, explanation, conversation, debate	1 Lecture
4. Lolipop candy history; Jelly filled with liquid, the most advanced technology on jellies range. Comparative study jellies classic / Wine Gum;	Lecture, explanation, conversation, debate	1 Lecture
5. Technological advances and manufacturing trends at the exhibition IBA 2018 Munich - The World's Leading Trade Fair for Bakery, Confectionery And Snacks	Lecture, explanation, conversation, debate	2 Lecture
6. Technologies for cold pressing of various types of oil seeds	Lecture, explanation, conversation, debate	1 Lecture
7. Technological advances and manufacturing trends at the exhibition Euro Fed Lipid Congress and EXPO 2018, Belfast, UK.	Lecture, explanation, conversation, debate	1 Lecture
8. Oleogelification / Structuring of edible oil: presentation and recent updates	Lecture, explanation, conversation, debate	2 Lecture
9. 3D printing technologies applied in food design, development and production: Status and perspectives	Lecture, explanation, conversation, debate	2 Lecture

8.2. PRACTICAL WORK **Number of hours – 28**		
Process flow, operations and technological schemes - Definitions;	Experiment, explanation, working group	1 Practical Work
Applications software used to generate technological schemes	Experiment, explanation, working group	2 Practical Work .
Advanced analysis of diffusion juice: Determination of dry matter content (Brix, Refractometric dry matter); Polarizable sugar content; Purity of diffusion juice; Determination of acidity; Determination of pH;	Experiment, explanation, working group	2 Practical Work
Determination of microbial activity. Technological applications.	Experiment, explanation, working group	1 Practical Work
Tempering the chocolate mass. Processing chocolate mass and chocolate compound and obtaining the tablets there of.	Experiment, explanation, working group	2 Practical Work
Oleogelification - Alternative technology without hydrogenated or interesterified fats to obtain margarine type products	Experiment, explanation, working group	2 Practical Work 2 Practical Work
Case studies - virtual tours IBA 2018 Munich - The World's Leading Trade Fair for Bakery, Confectionery	Explanation, conversation, debate	

And Snacks; Koln; Euro Fed Lipid Congress and EXPO 2018, Belfast, UK. Material balance for pressing operation. Comparative study on the extraction yield based on the production parameters and raw materials Process for processing food by adding successive layers - 3D printed food 3D printing of food Practical works exam	Explanation, debate Explanation, conversation, debate	1 Practical Work 1 Practical Work

Compulsory Bibliography:

1. Racolţa Emil," Tehnologia amidonului şi a produselor zaharoase:, Ed. Risoprint 2008;
2. Patel AR, Dewettinck K. Edible oil structuring: an overview and recent updates. Food & function 7(1):20-9, 2016
3. Racolţa Emil, "Tehnologii generale în industria alimentară", Ed.Risoprint, 2007;
4. Racolţa Emil, "Tehnologii generale în industria alimentară – Aplicaţii şi calcule în industria alimentară", Ed. Risoprint, 2006;
5. Banu C., Progrese tehnice, tehnologice şi ştiinţifice în industria alimentară, Ed. Tehnică, Bucureşti, 1993.
6. Banu C-tin şi colab., Manualul inginerului de industria alimentara, Ed. Tehnica Bucuresti, 2002
7. Dominica Culache, Vasile Platon, "Tehnologia zahărului", Ed. Tehnică, Bucureşti, 1987;
8. Maria Virginia Morar, Tehnologia obţinerii uleiurilor şi a grăsimilor vegetale , Ed. AcademicPres, 2008
9.Adriana-Paula David, Racolta E., 2010, Utilajul si tehnologia de obtinere a zaharului.
10. Racolţa Emil, Marta Hodrea, Teodora Şchiop, "Îndrumător de lucrări practice pentru produse zaharoase", Ed.Risoprint, 2008;
11. Godoi FC, Prakash S, Bhandari BR. 3d printing technologies applied for food design: Status and prospects. Journal of Food Engineering;179:44-54.2016

Facultative Bibliography:

1. FATS, OILS AND LIPIDs: Science, Technology and Nutrition in a changing World. Book Of Abtracts, 16th Euro Fed Lipid Congress and Expo, 2018 Belfast, UK. https://veranstaltungen.gdch.de/tms/frontend/index.cfm?l=7660&sp_id=2
2. Răşenescu Ion, Îndrumar pentru industria alimentară, Lexicon, Ed. Tehnică Bucureşti, 1987.
3. Asadi M., Beet-Sugar Handbook, John Wiley & Sons, Inc., Hoboken, New Jersey, 2007.
4. Beckett ST (2008) The Science of Chocolate, 2nd edn. The Royal Society of Chemistry, Cambridge

9. Correlations between the subject against the expectations of the epistemic community representatives, of the professional associations and employers' representatives in the domain

Course content is consistent with the demands of specific national professional associations; teachers regularly attend international fairs and undertake field visits on food industry plants (manufacturing of starch, glucose, jellies, candies products, halva, chocolate, expanded cereals)

10. Evaluation

Type of activity	10.1. Evaluation criteria	10.2. Evaluation methods	10.3. Percent of the final grade
10.4. Course	Knowledge acquired; level of understanding; Solving specific problems on starch, oil, sugar and confectionery technologies	Project defense on technology of starch / sugar / vegetable oils	70%
10.5. Seminary/Laboratory	Description of a technological process Making a specific application on starch, oil and / or sugar technology;	Continuous assessment	30%
10.6. Minimal standard of performance			
Knowledge of quality indices of raw materials and the finished products of starch industry, sugar and vegetable oils. Knowledge of general technological scheme for obtaining starch, sugar and vegetable oils.			

Knowledge of general technological scheme for obtaining major confectionery products (candies, chocolate, halva, fondant based products, jellies)

[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
7.09.2021

Course coordinator
Prof. dr. Emil RACOLŢA

Laboratory work/seminar coordinator
Prof. dr. Emil RACOLŢA

Subject coordinator
Prof. dr. Emil RACOLŢA

Approved by the Department on
22.09.2021

Head of the Department
Prof.dr. Sevastita MUSTE

Approved by the Faculty Council on
28.09.2021

Dean
Prof.dr. Elena MUDURA