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 0703030113**

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	**Food Engineering (IPA)**
1.7. Form of education	**Full time**

2. Information on the discipline

2.1. Name of the discipline	**Confectionery technology**							
2.2. Course coordinator	**Vlad Mureșan, PhD, habil., Associate Professor**							
2.3. Seminar/ laboratory/ project coordinator	**Vlad Mureșan, PhD, habil., Associate Professor** **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]	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					13
3.4.2. Additional documentation in the library, specialized electronic platforms and field					10
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays					12
3.4.4.Tutorials					4
3.4.5.Examinations					5
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	Extractive Technology 1 – Sugar; Operations and equipment in the food industry; Transfer phenomena; Food chemistry; Food biochemistry.
4.2. skills-related	The student should have knowledge of Food Industry unit operations and equipment, as well as knowing the physical and chemical properties of sugars.

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/ project	For practical works each student will carry out an application / technological computation / chemical analysis specific to confectionery and starch technology. Academic discipline is imposed for the duration of works. Specially designed laboratory (equipped with specific glassware, oven, balance, sink, refractometer, polarimeter); Confectionery Pilot Plant (vertical mixer, blender, fondant making equipment, moulds for jellies, Turkish delight and chocolate).

6. Specific competences acquired

Professional competences	C3.2. Explaining and interpreting the principles and methods used in technological processes in the food chain C2.3. Application of basic engineering principles and methods for solving technological problems in the agri-food chain
Transversal competences	CT1 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	To acquire the knowledge concerning the raw materials, production technologies, equipment and facilities involved in confectionery and starch technology.
7.2. Specific objectives	Knowledge of quality parameters of starch and vegetable raw material used for starch 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 technology; Using and understanding the methods, analysis techniques, applications and technological computations from confectionery and starch technology; Interpretation of results obtained by analysing the raw materials, intermediate and finished products from confectionery and starch industry.

8. Content

8.1.LECTURE **Number of hours – 28**	Teaching methods	Notes
Ch. I Raw materials 1.1. Raw materials in confectionery industry. General. Sugar. Glucose. Cocoa beans, kernels of seeds. Fruit. Milk. Starch. Honey. Other substances.	Lecture, explanation, conversation, debate	1 Lecture
Ch. II The technological process of manufacturing of candy products. 2.1. Preparation of candy syrup. 2.2. Obtaining the caramel mass 2.3. Processing caramel mass. 2.4. Candy Mass processing 2.5. Cooling and packaging of candy	Lecture, explanation, conversation, debate	3 Lectures
Ch III. The technological process of manufacturing dragees 3.1. Definition and classification; 3.2. Syrup Preparation 3.3. Obtain different nuclei; 3.4. Coating and drying; 3.5. Dragees polishing; 3.6. Cooling and packaging.	Lecture, explanation, conversation, debate	1 Lecture
Ch. IV. The process for obtaining special fondant products 4.1. Fondant based products technology 4.1.1. Technological scheme for obtaining fondant based products 4.1.2. Obtaining sorbet; 4.1.3. Obtaining fondant based candies; 4.1.4. Obtaining fondant based candies “salon” type; 4.1.5. Preparation of marzipan and pralines. 4.2. Gelled Products 4.2.1. The process of making jellies; 4.2.2. The technological process for manufacturing Turkish delight.	Lecture, explanation, conversation, debate	3 Lectures
Ch. V. The technological process of manufacturing chocolate and cocoa powder 5.1. Obtaining cocoa liquor; 5.2. Obtaining cocoa powder; 5.3. Preparation of chocolate mass; 5.4. Chocolate mass processing; 5.5. Cooling and packaging of chocolate.	Lecture, explanation, conversation, debate	3 Lectures
Ch. VI. The technological process of manufacturing halva 6.1. Preparing sunflower seeds for processing; 6.2. The operation of unhulling sunflower seeds and hulls separation; obtaining the sunflower kernel; 6.3. Industrial kernel cleaning wet or dry; 6.4. Roasting kernel; 6.5. Grinding roasted kernel; 6.6. Tahani obtaining by hammer milling; 6.7. Obtaining the nougat; 6.8. Tahini kneading; 6.9. Dosing, cooling and packaging halva.	Lecture, explanation, conversation, debate	3 Lectures

8.2. PRACTICAL WORK **Number of hours – 28**		

Manufacture of pectin jellies. Analysis on manufacturing flow. Determination of reducing sugar / Analysis of the textural profile of pectin / gelatin-based jellies - comparison.	Experiment, conversation, explanation	2 Practical works
Manufacture of laboratory products (fondant, marzipan, shit). Manufacturing flow analysis. Qualitative comparison of fondant and marzipan.	Experiment, conversation, explanation	2 Practical works
Case study: Manufacturing of confectionery (halva, expanded cereals, jelly, Turkish delight, glucose) in S.C. AMYLON S.A. Sibiu	Experiment, conversation, explanation	1 Practical work
Processing chocolate mass and mass-type "compound". The manually chocolate tempering, moulding, cooling, unmolding. Compare tablets made from chocolate mass and "compound" mass type	Experiment, conversation, explanation	1 Practical work
Knowledge checking	Debate, questioning, explanation	1 Practical work
Project 1. Presentation of project content themes and references; 2. The material balance; 3. Calculation of machinery for the operation of diffusion; 4. Calculation of machinery for purifying operation; 5. Calculation of machinery for the evaporation operation; 6. Calculation of machinery for the crystallization operation; 7. The calculation of machines centrifuge operation; 8. Confectionery machines Calculation.		6 Practical works
Projects Defense		1 Practical work

Compulsory bibliography:

1. Mureşan Vlad, *Tehnologia amidonului – produse zaharoase (Manual didactic)*, Editura Mega 2018;
2. Racolţa Emil, Marta Hodrea, Teodora Şchiop, "*Îndrumător de lucrări practice pentru produse zaharoase"*, Ed.Risoprint, 2008;
3. Berechet Gabriela, (2018). Cartea cofetarului patiser. Editura Imprima, Bucureşti.

Racolţa Emil, *"Tehnologii generale în industria alimentară*", " *Aplicatii si calcule tehnologi*ce" Ed.Risoprint, 2007;

Optional bibliography:

1. Banu C, "*Manualul inginerului de industria alimentara*", Ed. Tehnica Bucuresti, 2002;

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 national professional associations specific applications; teachers regularly attend international fairs in the field of food industry and undertake visits to specific units (starch manufacturing, glucose, jellies, candy products, halva, chocolate, expanded cereals)

10. Assessment

Type of activity	10.1. Assessment criteria	10.2. Assessment methods	10.3. Percentage of the final grade
10.4. Lecture	Degree of understanding the Knowledge acquired; Solving specific problems for starch and sugar confectionery	Continuous assessment	50%

10.5. Seminar/Laboratory	Description of a specific analysis for starch and sugar confectionery / a technological process for obtaining confectionery product Making a technology applications specific of sugar; Calculations of specific operations for sugar technology / confectionery by applying the equations of material balance total or partial.	Continuous assessment of skills for making applications and analytical methods specific to confectionery technology Project Defense	20% 30%
10.6. Minimum performance standards			
Knowledge of qualitative indices of raw materials and the finished products of the starch industry and glucose. Knowledge of general technological scheme for obtaining starch from potatoes, wheat and corn. Knowledge of general technological scheme for obtaining main confectionery products (candy products, dragees, chocolate, halva, fondant)			

[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).

Project / Laboratory work coordinator
Conf. dr. Vlad Mureșan

Filled in on
07.09.2021

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

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