No._____from _____ **Form code USAMV–CN 0703030115**

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
1.7. Form of education	Regular studies

2. Information on the discipline

2.1. Name of the course	**General technologies in the dairy industry 1**							
2.2. Course leader	**Associate professor PhD. Dorin Ţibulcă**							
2.3. Seminar/ laboratory/ project coordinator	**Assist. PhD. Delia Michiu**							
2.4. Year of study	III	2.5. Semester	VI	2.6 Type of evaluation	summative	2.7. Discipline status	Content[2]	AP
							Compulsoriness[3]	CD

3. Total estimated time teaching hours per semester)

3.1. Hours per week – full time programme	4	Of which: 3.2.course	2	3.3. laboratory	2
3.4. Total number of hours in the curriculum	56	Of which: 3.5.course	28	3.6. Laboratory	28

Distribution of time allotted	Hours
3.4.1. Study based on book, textbook, bibliography and notes	18
3.4.2. Additional documentation in the library, specialized electronic platforms and field	8
3.4.3. Preparing seminars/ laboratories/ projects, subjects, reports, portfolios and essays	8
3.4.4. Tutorials	3
3.4.5. Examinations	7
3.4.6. Other activities	0

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 Chemistry, Unit Operation in Food Industry, Food Industry Equipment, Animal raw materials, Transfer Phenomena, Food Microbiology
4.2. skills-related	General knowledge of food engineering, communication in Romanian, digital competences

5. Conditions

5.1. for the lecture	The course is interactive, students can ask questions about the content of the presentation. Academic discipline requires compliance with the start and end of the course. Classroom equipped with PC unit, video projector, projection screen, blackboard. No other activities are tolerated during the lecture, mobile phones are switched off. Attendance required at the course: minimum 50%. In the case of carrying out didactic activities online, the teaching methods will be adapted
5.2. for the seminar/ laboratory/	For practical work, it is mandatory to consult the practical guide. Each student will

project	participate in the practical work. Academic discipline is required throughout the work. The outfit must be appropriate (white robe, cap, disposable cover dispensers, gloves). Pilot station equipped with PC unit, video projector, projection screen, blackboard, equipment, machinery, utensils, raw materials, auxiliaries, materials. Visits to food industry units Presence required: 100% (absences must be recovered). In the case of carrying out didactic activities online, the teaching methods will be adapted

6. Specific competences acquired

Professional competences	C3.1. Description and use of concepts, basic methods and theories regarding technologies of dairy industry C3.2. Explanation and interpretation of the principles and methods used in technological processes of dairy industry C2.3. To apply principles and scientific methods of packaging and labelling to help solution technological problems in the agro-food chain. C2.4. Critical analysis, evaluation of characteristics, performances and limits of some technological processes and equipment in the field of milk and dairy products industry.
Transversal competence	**CT1.** Application of strategies of perseverance, rigor, efficiency and responsibility in work, punctuality and assuming responsibility for the results of personal activities, creativity, common sense, analytical and critical thinking, problem solving etc., based on the principles, norms and values of the code of professional ethics in the food industry.

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

7.1. Overall course objective	Development of general practical skills Acquisition of knowledge on dairy manufacturing technology
7.2. Specific objectives	Acquisition of knowledge on the chemical composition and properties of milk, primary treatment, transport and sanitization procedures of milk Acquisition of knowledge on technologies for obtaining drinking milk, acidic dairy products, sour cream, butter, ice cream, concentrated dairy products Notions regarding the implementation of the HACCP system in the manufacture of dairy products Characterization of final products The understanding of the role and importance of technology in relation to other disciplines and the correlation of the knowledge from the disciplines that concern the general specialty training

8. Contents

8.1. COURSE hours - 28	Teaching methods	Notes
The composition and properties of raw milk.	Lecture, heuristic conversation, explanation	1 lecture = 2 hours
The composition and properties of milk of other species	Lecture, heuristic conversation, explanation	1 lecture = 2 hours
Milk preservation processes. Sanitization of milk	Lecture, heuristic conversation, explanation	2 lectures = 4 hours
Technology for obtaining drinking milk Reception, cleaning, cooling, standardization, homogenization, pasteurization, deodorization, temporary storage and packaging of drinking milk Implementation of the HACCP system for the technology of drinking milk	Lecture, heuristic conversation, explanation	1 lecture = 2 hours
Technology of dietary dairy (Yogurt, Sana, buttermilk, acidophilic milk, Chefir) Implementation of the HACCP system for the technology of dietary dairy	Lecture, heuristic conversation, explanation	2 lectures = 4 hours

Technology of cream consumption Technological scheme Cream of milk and the factors that influence creaming. Normalization and pasteurization of cream. Cooling pasteurized cream. Cream maturation: physical maturation and biochemical maturation. Cream packaging and storage. Types of cream. Implementation of the HACCP system for the manufacture of cream for consumption	Lecture, heuristic conversation, explanation	1 lecture = 2 hours
Technology of butter. Technological scheme. Normalization and pasteurization of cream. Cream maturation. Maturation processes. Whipping the cream. Processing of raw butter. Packaging and storage of butter. Processes for making butter: by agglomeration: batch and continuous; by concentration; by combination. Types of butter: sweet cream butter, whey butter, melted butter. Implementation of the HACCP system for butter manufacturing	Lecture, heuristic conversation, explanation	2 lectures = 4 hours
Technology of ice cream Raw and additive materials used in the manufacture of ice cream. Reception of raw materials, auxiliaries and materials Preparation, pasteurization, pre-cooling, homogenization, cooling, maturation and freezing of the mix Portioning-packing, hardening and storage of ice cream Types of ice cream. Implementation of the HACCP system in ice cream manufacturing	Lecture, heuristic conversation, explanation	3 lectures = 6 hours
Concentrated dairy technology	Lecture, heuristic conversation, explanation	1 lecture = 2 hours

8.2. PRACTICAL WORKS **HOURS -28**		
Primary milk reception and processing (cleaning, cooling, temporary storage). Quality indices of collected milk.	Observation	2 hours
Normalization of milk. Technological calculations.	Exercise	2 hours
Behaviour of milk proteins to external factors.	Practical demonstration, observation	2 hours
Manufacture of yoghurt	Practical demonstration, observation	4 hours
Buttermilk and Sana manufacture	Practical demonstration, observation, exercise	4 hours
Butter manufacture	Practical demonstration, observation, exercise	4 hours
Ice cream manufacture.	Practical demonstration, observation, exercise	4 hours
Technological calculation to obtain cream and concentrated dairy products	Observation Exercise	4 hours
Colloquy	Checking accumulated knowledge	2 hours
Compulsory bibliography: *1. Ţibulcă, D şi Jimborean, Mirela Anamaria, 2005, Tehnologia laptelui şi a produselor lactate – îndrumător de lucrări practice, Ed.*		

Risoprint, Cluj-Napoca.
2. *Ţibulcă, D. şi Jimborean, Mirela Anamaria, 2008, Tehnologia de obţinere a produselor lactate, Ed. Risoprint, Cluj-Napoca.*
3. *Mirela Anamaria Jimborean şi Dorin Ţibulcă, 2013, Tehnologia produselor lactate – îndrumător de lucrări practice, Editura Risoprint, Cluj-Napoca*
4. *Ţibulcă, D. şi Jimborean, Mirela Anamaria, 2015, Procesarea laptelui, partea I, Ed. Risoprint, Cluj-Napoca.*

Optional bibliography:
1. *Banu, C. şi Vizireanu Camelia, 1998, Procesarea industrială a laptelui, Ed. Tehnică, Bucureşti.*
2. *Costin, G.M. şi colab., 2005, Produse lactate fermentate, Ed. Academica, Galaţi.*
3. *Ţibulcă, D. şi Mirela Jimborean, 2003, Fabricarea produselor lactate şi a brânzeturilor, Editura AcademicPres, Cluj-Napoca.*

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

The content of the discipline is in accordance with the requests of specific national professional associations

10. Assessment

Type of activity	10.1. Assessment criteria	10.2. Assessment methods	10.3. Percentage of the final grade
10.4. Course	Logical and correct application of the acquired notions Assimilation of knowledge	Exam	70%
10.5. Seminar/Laboratory	Applying knowledge of dairy technology	Colloquy	30%
10.6. Minimum performance standards			
Understanding, describing and interpreting the basics in dairy technology; Ability to apply the knowledge gained by solving at least 50% of the theoretical topics.			

[1] Cycle of studies- 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 hours of study (teaching activities and individual study).

Filled in on
09.09.2021

Course coordinator
Assoc. Prof. PhD. Dorin Ţibulcă

Laboratory work/seminar coordinator
Assist. PhD. Delia Michiu

Subject coordinator
Assoc. Prof. PhD. Dorin Ţibulcă

Approved by the Department on
22.09.2021

Head of the Department
Prof. PhD. Sevastiţa Muste

Dean
Prof. PhD. Elena Mudura

Approved by the Faculty Council on
28.09.2021