UNIVERSITATEA DE ŞTIINŢE AGRICOLE ŞI MEDICINĂ VETERINARĂ CLUJ-NAPOCA
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No._____of _____ **USAMV form 0703020106**

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 products 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	Full time

2. Information on the discipline

2.1. Name of the discipline	**Principles and methods of food preservation 2**							
2.2. Course coordinator				Lecturer PhD Anamaria Pop				
2.3. Seminar/ laboratory/ project coordinator				Lecturer PhD Anamaria Pop				
2.4. Year of study	II	2.5. Semester	III	2.6. Type of evaluation	summative	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	3	out of which: 3.2. lecture	2	3.3. seminar/ laboratory/ project	1
3.4.Total number of hours in the curriculum	42	Out of which: 3.5.lecture	28	3.6.seminar/laboratory	14
Distribution of the time allotted					hours
3.4.1. Study based on book, textbook, bibliography and notes					16
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					5
3.4.5.Examinations					3
3.4.6. Other activities					
3.7. Total hours of individual study	33				
3.8. Total hours per semester	75				
3.9. Number of credits[4]	3				

4. Prerequisites (is applicable)

4.1. curriculum-related	Knowledge of: Food chemistry; Packaging, labeling and design in the food industry
4.2. skills-related	The student must have basic knowledge on Biochemistry and Principles and methods of food preservation 1

5. Conditions (if applicable)

5.1. for the lecture	The course is interactive, students can ask questions regarding the content of the exposure. Academic discipline enforce Time start and end of the course. We do not allow any other activities during the lecture, mobile phones are closed. *Spaces and facilities:* Lecture room equipped with: blackboard, projector and computer. *Obligations of students:* Compulsory attendance at least 50% of the total number of courses. (RC 40 of the Veterinary Medicine Cluj-Napoca Carta) We do not allow any other activities during the lecture, mobile phones to be closed.
5.2. for the seminar/ laboratory/	*Space and facilities:*

project	• Laboratory analysis of plant products . *Obligations of students :* • Compliance with the rules and guidelines for the protection of laboratory work • Use personal protective equipment • Mandatory presence of at least 80 % of all practical work . It supports a maximum of 20 % unmotivated absence of practical activities provided full recovery of their fee before checking form • A student who has accumulated more than 40 % absences practical activities and / or more than 50 % absences course can not be present at the examination forms and a fee will restore discipline in the next academic year if the year passed on credits and points accumulated (RC 40 of the Charter Veterinary Medicine Cluj- Napoca) • The practical work each student will develop an individual activity with laboratory materials provided. • Each student will complete and present , on the basis of preset themes , a case study on the principle and method of preservation of a vegetable . Academic discipline is imposed for the duration of works .

6. Specific competences acquired

Professional competences	C1.1. Describe and use the concepts, theories and methods that underlie the preservation of plant foods involved in the food industry C1.3. Apply the basic principles and methods of preservation of plant products, to solve engineering and technological problems, including those related to food safety C2.3. To apply the basic engineering principles and methods for solving technological problems in the agri-food chain.
Transversal competence	CT2 Applying interrelationship techniques within a team; amplifying and refining the empathic capacities of interpersonal communication and assuming specific attributions in carrying out the group activity in order to treat / resolve individual / group conflicts, as well as the optimal time management.

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

7.1. Overall course objective	Preserving vegetable products, is to acquire the most modern technology to preserve plant products in order to maintain unaltered the quality and sustainability of products for long-term preservation.
7.2. Specific objectives	Knowledge the conservation particularities of the main groups of vegetable raw materials.. Correlation with other specific disciplines of specialization; A clear expression, correct; Explain and exemplify the notions; Fostering active participation of students.

8. Content

8.1. COURSE	Teaching methods	Notes
Introductory course - The biological principles underlying the conservation of plant products (Anabiosis, Cenoanabiosis, Abiosis)	Participatory lecture, debate, exemplification	1 lecture
Basic harvest and post-harvest handling consideration of grains and grains legumes for conservation purposes. Types of silos.		2 lecture
Basic harvest and post-harvest handling consideration for fresh fruits and vegetables for conservation purposes. Diseases that occur in fruits and vegetables during storage		2 lecturers
Combined methods of preserving fresh fruits and vegetables. Waste reduction and quality improvement of fruits and vegetables by ultrasonic humidification sistem		1 lecture
Irradiation of plant products as a method of preservation		1 lecture
Preservation by removal of moisture on vegetable matrices: equipment, procedures, precautions. Defects in dried foods.		2 lecture
Preservation by high temperature on vegetable matrices: Canning – unit operations and their significance.		1 lecture
Preservation by low temperature on vegetable matrices: Distinction between refrigeration and freezing.		1 lecture
Preservation of Fruits by Waxing (Washing and Waxing		1 lecture

Apples) and edible plant membranes.		
Combined methods for preservation of fruits and vegetables: a preservation concept		1 lecture
Maintaining the quality of preserved products on the technical circuit producer - consumer		1 lecture

8.2. PRACTICAL WORK **Number of hours – 14**		
1. Safety rules in laboratory. Presentation of laboratory utensils and equipment		1 lab work (2 hours / work)
2. The effect of preservation by refrigeration - Biological principle: PHYSIANABABOSIS; PSYCHROANABIOSIS preservation procedure; Preservation method: COOLING OF FRUIT AND VEGETABLES; 2.1. Evaluation of the physical and sensory properties of fruits and vegetables at reception and during storage in different refrigeration conditions. 2.2. Determination of fruit firmness using analog penetrometer.		1 lab work (2 hours / work)
3. Effect of preservation by freezing (slow freezing and fast freezing). Biological principle: PHYSIOANABIOSIS; CRIOANABIOSIS conservation procedure; Preservation method: FREEZING OF FRUIT AND VEGETABLES; 3.1.Determination of cell juice losses from fruits and vegetables on thawing influenced by the freezing mode (slow freezing and fast freezing). 3.2.Assessment of the quality of thawed fruits studied under sensory aspect		1 lab work (2 hours / work)
4. The effect of drying preservation (different drying methods) on the quality of dry products. Biological principle: PHYSIOANABIOSIS; Conservation procedure XEROANABIOSIS; Preservation method: DEHYDRATION OF PLANT PRODUCTS; 4.1. The influence of microwave drying on the sensory characteristics of green leafy vegetables 4.2. Influence of drying temperature and time on mass loss and sensory characteristics of fruits and vegetables		1 lab work (2 hours / work)
5. The effect of preservation by artificial acidification on the quality of preserved products. Biological principle: CHEMIOANABIOSIS; Conservation procedure ACIDOANABIOSIS; Preservation method: PRESERVATION WITH VINEGAR; 5.1.Determination of the acetic acid content of vinegar and of semi-preserves in vinegar 5.2.Determination of the level of NaCl by the Mohr method from semi-canned mushrooms in vinegar		1 lab work (2 hours / work)
6. Theme of the paper: The effect of preservation by lactic fermentation on the quality of canned products. Biological principle: CHEMIOCENOANABIOSIS; Preservation procedure: ACIDOCENOANABIOSIS; Conservation method: CONSERVATION BY NATURAL ACIDIFICATION; 6.1. Determination of lactic acid in cucumber semi-preserves obtained by lactic fermentation.		1 lab work (2 hours / work)
7. Establishing the quality of cereals according to physical methods in order to maintain the quality of		1 lab work (2 hours / work)

seeds in the long run 7.1. Determination of the physical properties of cereals at reception for long-term storage 7.2. Preparation of the reception form for long-term storage 7.3. Determining long-term storage losses through technological calculations		

Bibliografie Obligatorie:

1. C., Săhleanu, E., 2004, *Principiile conservării produselor alimentare*, Editura Agir, Bucureşti;
2. Lungu, C., 2002, *Principii generale de conservare a produselor alimentare,* Universitatea „Dunărea de Jos" IDD, Galaţi.

Bibliografie Facultativă:

1. M. Shafiur Rahman, 2007, Handbook of Food Preservation Second Edition, ISBN-10: 1-57444-606-1 (alk. paper). http://www.crcpress.com
2. Roman Gheorghe Valentin, Matei Marcel Duda, Florin Imbrea, Gheorghe Matei, Adrian Vasile Timar, 2012, Conditionarea si pastrarea produselor agricole, Editura Universitară

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

In order to identify ways of modernization and continuous improvement of teaching and course content with the current issues and practical problems teachers participate in conferences, scientific symposia and meetings and fairs which interacts with the private / prospective employers graduates. The content of the discipline is in accordance with what is practiced in other university centres in the country and abroad.

10. Assessment

Type of activity	10.1. Assessment criteria	10.2. Assessment methods	10.3. Percentage of the final grade
10.4. Lecture	Logical, correct and consistent application of the acquired notions	oral examination	60%
10.5. Seminar/Laboratory	Understanding the effects of preservation on the quality of the product obtained after keeping it fresh or preserved.	Colloquy	40%
10.6. Minimum performance standards			
Mastering the scientific information conveyed through lectures and practical work at an acceptable level.			

[1] Education levels- 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 25-30 hours of study (teaching activities and individual study).

[5 / *] Disciplines: AK- Advanced knowledge, CT- Complementary Training, S- Synthesis

Filled in on
10.09.2021

Course coordinator
Lecturer PhD Anamaria Pop

Laboratory work/seminar coordinator
Lecturer PhD Anamaria Pop

Subject coordinator
Prof dr. Muste Sevastița

Approved by the Department on
22.09.2021

Head of the Department
Prof dr. Muste Sevastița

Approved by the Faculty Council on
28.09.2021

Dean
Prof dr. Mudura Elena