UNIVERSITATEA DE ŞTIINŢE AGRICOLE ŞI MEDICINĂ VETERINARĂ CLUJ-NAPOCA
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No._____of _____ **USAMV form 0701040109**

SUBJECT OUTLINE

1. Information on the programme

1.1. Higher education institution	University of Agricultural Sciences and Veterinary Medicine of Cluj-Napoca
1.2. Faculty	Food Science and Technology
1.3. Department	Food Engineering
1.4. Field of study	Food Engineering
1.5.Education level	Bachelor / Master
1.6.Specialization/ Study programme	Technology of Agricultural Products Processing
1.7. Form of education	Full time

2. Information on the discipline

2.1. Name of the discipline	Conditioning and storage of agri-foods products							
2.2. Course coordinator				Lecturer phD Maria Simona Chiș				
2.3. Seminar/ laboratory/ project coordinator				Lecturer PhD. Maria Simona Chiș				
2.4. Year of study	IV	2.5. Semester	VIII	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	3	of which: 3.2. course	2	3.3. seminar/ laboratory/ project	1
3.4. Total number of hours in the curriculum	56	of wich: 3.5.course	28	3.6.seminary/laboratory	28
Distribution of the time allotted					hours
3.4.1. Study based on book, textbook, bibliography and notes					10
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					10
3.4.4. Tutorials					6
3.4.5. Examinations					6
3.4.6. Other activities					4
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	Raw vegetable materials, Cold technology assignment, Food Chemestry, Microbiology
4.2. skills-related	The student should know the chemical composition and characteristics of the main groups of vegetable products (cereals, legumes, oilseeds, technical plants, medicinal plants, vegetables and fruits).

5. Conditions (if applicable)

5.1. for the lecture	The course is interactive, students can ask questions regarding the content of lecture. Academic discipline requires compliance with the start and end of the course. We do not allow any other activities during the lecture, mobile phones will be turned off.
5.2. for the seminar/ laboratory/ project	During practical works, each student will develop an individual activity with laboratory materials (made available in the book that describes the laboratory work). Academic discipline is imposed throughout the course of practical works.

6. Specific competences acquired

Professional competences	C3.2. Explanation and interpretation of the principles and methods used in the technological processes of storage and preservation of cereals and horticultural products, on the food chain. C1.4. Evaluation of the qualitative and quantitative characteristics, performances and limits of the processes specific to the agri-food chain from the point of view of the conservation of cereals and horticultural products.
Transversal competences	CT 1 Applying strategies of perseverance, seriousness, efficiency and work responsibility, punctuality and taking the responsibility for the results of personal activity, 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 field.

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

7.1. Overall course objective	Acquiring the most modern technologies for storing agri-food products in order to maintain the quality and viability of long-term storage.
7.2. Specific objectives	Knowing the criteria for assessing the physical and chemical properties of cereals; Description of the main constructions used for storing vegetable products; Knowledge of the storage characteristics of the main groups of plant products.

8. Content

8.1.LECTURE	Teaching methods	Notes
Number of hours –28		
The importance of preserving agricultural products for industrial processing. Short history. Worldwide organization in Romania as well. The physical properties of the seed mass and their importance in the conservation process. The physiological and biochemical processes that take place in the seed mass and their role in the conservation process. Seed respiration during storage.	Lecture, Heuristic Conversation, Explanation	2 lectures
Types of deposits; Horizontal deposits; Vertical deposits. Control of stored products. Seed conditioning. Equipment and installations for cleaning and sorting seeds. Compartmentation and storage of agricultural products.	Lecture, Heuristic Conversation, Explanation	2 lectures

Vegetable and fruit deposits - types. Preservation of onion bulbs. Preservation of potato tubers **Storage of by-products Peculiarities of conservation of the main agricultural species (**wheat, corn, barley, barley, grain legumes, oilseeds) Storage of potatoes, sugar beet, hops and medicinal plants.	Lecture, Heuristic Conversation, Explanation	2 lectures
Factors that influence the fresh storage of fruits and vegetables. Technological flow of capitalization of vegetables and fruits. Technology for storage and recovery of perishable vegetables.	Lecture, Heuristic Conversation, Explanation	1lecture
Apple storage and packaging technology. Keeping apples in cold storage with a normal atmosphere. Store apples in refrigerated warehouses with a controlled atmosphere.	Lecture, Heuristic Conversation, Explanation	1lecture
Storage of apples in refrigerated warehouses with controlled atmosphere.	Lecture, Heuristic Conversation, Explanation	1lecture
Storage of pears in refrigerated warehouses with controlled atmosphere. **Technology for storage and recovery of cherries and sour cherries.**	Lecture, Heuristic Conversation, Explanation	1lecture 1lecture
Technology for preserving and capitalizing on apricot plums, peaches.	Lecture, Heuristic Conversation, Explanation	
Technology for storage and recovery of table grapes, hazelnuts, walnuts.	Lecture, Heuristic Conversation, Explanation versation,	1lecture
Keeping bananas, oranges, lemons.	Lecture, Heuristic Conversation, Explanation	1lecture
Conditioning of fruits and vegetables. Control of freshly marketed vegetables and fruits. Packing fresh vegetables and fruits.		1lecture

8.2. PRACTICAL WORK **Number of hours – 14**	Theoretical presentation of practical works	1 lab work (2 hours / work)

Protection of laboratory work. Terms used in seed control. Collection and formation of samples necessary to verify the quality of cereal, legume, oilseeds intended for food consumption or industrialization.	Heuristic Conversation, Explanation	1 lab work
Elementary test, composite test, laboratory test, counter-test. Formation of the composite sample and the laboratory sample, packaging, marking and storage of samples; apparatus and utensils for taking laboratory samples Analysis sample formation	Experiment, heuristic conversation, explanation	1 lab work
Subjective analysis. Organoleptic examination. Objective analysis. Determination of purity (wheat). Peculiarities of determining the physical purity of some cultivated plants.	Experiment, heuristic conversation, explanation	1 lab work
Determination of the weight characteristics of the seeds: relative mass of 1000 grains, absolute mass, specific mass Determination of hectoliter mass.	Experiment, heuristic conversation, explanation	1 lab work
Determination of the glassiness of cereal seeds, of the pharynx with the help of the pharynotome.		1 lab work
Determination of seed germination: materials, equipment and method of determination. Germination determination technique, Particularities of germination faculty and germination energy.	Experiment, heuristic conversation, explanation	1 lab work
Calculations and technological applications related to seed conditioning (pre-cleaning, cleaning, drying, sizing of seed deposits).	Experiment, heuristic conversation, explanation	1 lab work
Calculations and technological applications related to the sizing of seed deposits.	Experiment, Debate, Explanation	1 lab work
Case study: storage of horticultural products (apples) - Visit to the apple warehouses of a private company	Experiment, Debate, Explanation	1 lab work
The influence of storage on fruit texture. Determining the texture of apples.	Experiment, Debate, Explanation	1 lab work
Biochemical changes in apple storage. Starch hydrolysis - Iodine index test.	Experiment, Debate, Explanation	1 lab work

Presentation and discussion of case studies conducted by students based on pre-established topics.	Experiment, Debate, Explanation	1 lab work
Presentation and discussion of case studies conducted by students based on pre-established topics.	Experiment, Debate, Explanation	1 lab work
Knowledge test		1 lab work

Compulsory bibliography:

1. Brad Segal, Constanţa Balind, 1982 Procedee de îmbunătăţirea calităţii şi stabilităţii produselor alimentare, Ed. Tehnica, Bucureşti, 1982
2. Burzo, I., 1986 Fiziologia şi tehnologia păstrării produselor horticole, Editura Tehnică, Bucureşti
3. Burzo, I., Klaus, M., Ciobanu, R., 1984 Îndrumător tehnic pentru dirijarea factorilor de păstrare în depozitele de legume şi fructe. Editura Tehnică, Bucureşti.
4. Burzo, I., 1986 Fiziologia şi tehnologia păstrării produselor horticole, Editura Tehnică, Bucureşti.

Optional bibliography:

1. Burzo, I., 1986 Fiziologia şi tehnologia păstrării produselor horticole, Editura Tehnică, Bucureşti.
2. Gherghi, A., 1994 Tehnologia valorificarii produselor horticole, vol. I
3. Gherghi, A., 1994 Tehnologia valorificarii produselor horticole, vol. II
4. Marca Ghe., Tehnologia produselor horticole, Editura Risoprint, Cluj-Napoca 2000

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

In order to identify ways to modernize and continuously improve teaching and course content, with the latest topics and practical issues, teachers participate in conferences, scientific symposia but also in international meetings and fairs where they interact with the private sector / potential employers of graduates.

10. Assessment

Type of activity	10.1. Assessment criteria	10.2. Assessment methods	10.3. Percentage of the final grade
10.4. Lecture	Knowledge of the importance of preserving agricultural products for industrial processing; Knowledge of the physical, physiological and biochemical properties of the seed mass; Knowledge of the types of deposits; Peculiarities of keeping fresh fruits and vegetables; Knowledge of seed storage methods.	Exam	70%
10.5. Seminar/Laboratory	Description of a method of analysis specific to the storage of plant products;	Test	30%
10.6. Minimum performance standards			
Mastery of scientific information transmitted through lectures and practical work at an acceptable level.			

[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 hours of study (didactical and individual study).

Course coordinator
Lecturer PhD. Maria Simona Chiș

Laboratory work/seminar coordinator
Lecturer PhD. Maria Simona Chiș

Filled in on
06.09.2021

Subject coordinator
Prof. PhD. Sevastița Muste

Approved by the Department on
22.09.2021

Head of the Department
Prof. PhD. Sevastița Muste

Approved by the Faculty Council on
28.09.2021

Dean
Prof. PhD. Elena Mudura