

Ministry of Education and Science of Ukraine
Sumy National Agrarian University Faculty of
Faculty of Food Technologies
Nutrition technology Department

Work program (syllabus) of the educational component

MC 21 Food Machinery and Equipment

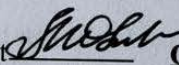
Specialty	181 "Food Technology"
Educational program	"Food Technologies"
Level of higher education	first (bachelor's)

Developer:



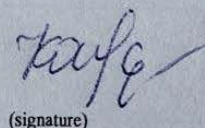
Maryna SAVCHENKO

Candidate of Technical Sciences, Associate Professor of the
Nutrition technology Department

Reviewed, approved and approved at the meeting of the Nutrition technology Department	Protocol No. 21 dated 02.06.26
	Head of the Department  Oksana MELNYK (signature) (surname, initials)

Agreed:

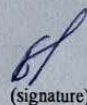
Educational guarantor programs


(signature)

Olena KOSHEL

(Full name)

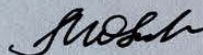
Dean of the Faculty,
where the educational program is
implemented


(signature)

Nataliia BOLHOVA

(Full name)

Review of the work program (attached):

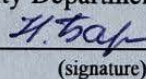


Oksana MELNYK



Nataliia BOLHOVA

Methodist of the Education Quality Department,
licensing and accreditation


(signature)

(N. Banayik)
(surname)

Registered in the electronic database: date: 18.06 2026.

Information about reviewing the work program (syllabus):

Academic year in which changes are made	Number annex to the work program with a description of the changes	Changes considered and approved		
		Date and the number of the department meeting minutes	Head of the Department	Educational program guarantor

GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT

1.	Full name EC	MC 21. Food Machinery and Equipment			
2.	Status EC	Mandatory			
3.	Educational program	Food technology			
4.	Unit implementing EC	Food technology/nutrition technology			
5.	Level NRC	Level 6			
6.	Semester of study	Fifth semester (third – for students) Study duration – 15 weeks			
7.	Volume EC	5 credits			
	Total number of hours and their distribution (full-time/part-time)	Contact work (classes)			Independent work
		Lectures	Practical/seminar	Laboratory	
		30		44/2	76/148
8.	Language of instruction	English			
9.	Limitation	Disciplines of economic direction and technological direction			
10.	Communication with other components	"Automation of Food and Restaurant Production Processes", "Processes and devices of food production", "Equipment of restaurant establishments", "Innovative Engineering"			
11.	Purpose of the educational component	Students acquire the necessary knowledge and skills related to the use of technological equipment at various stages of food production, namely: types and classification of technological equipment; principles of equipment operation; selection and operation of equipment - to train specialists who will work in food enterprises and deal with the organization, implementation and support of technological processes.			
12.	Prerequisites for study	The educational component is based on the previous study of the disciplines "Processes and devices of food production", "Engineering graphics", "Theoretical foundations of food production"			
13.	Academic Integrity Policy	If cheating is discovered during the exam, the student's work is canceled and the exam is retaken.			
14.	Keywords	Technological equipment, process, technological parameters, operating modes, components and parts, engineering and technological calculations			
15.	Course number on the Moodle platform	Moodle link: https://cdn.snau.edu.ua/moodle/course/view.php?id=6383 Savchenko Maryna Yuriivna			

2. LEARNING OUTCOMES BY EDUCATIONAL COMPONENT AND THEIR RELATIONSHIP WITH PROGRAM LEARNING OUTCOMES

Learning outcomes for OK: After studying the educational component, the student is expected to be able to...	Program learning outcomes that the OC aims to achieve (indicate the number according to the numbering given in the OP) ¹							The result of learning the discipline is evaluated
	PLO 1	PLO 3	PLO 4	PLO 7	PLO 13	PLO 16	PLO 28	
DLO 1. Know the technical problems of production and ways to solve them.	x							Performing and defending laboratory work, test/certificate of completion of non-formal education courses, exam
DLO 2. Know the main design features of technological equipment, understand the principle of its operation for conducting applied research.		x						
DLO 3. Analyze scientific and technical information on the choice of equipment, according to the presented technological requirements and production features.			x					
DLO 4. Analyze the technical and economic indicators of equipment operation. Know how to organize, control and manage technological processes using technical means.				x				
DLO 5. Be able to choose modern equipment for technical equipment of enterprises.					x			
DLO 6. Know how to ensure technical maintenance and effective use of equipment. Perform material and thermal calculations of devices. Know the rules of safe operation, observe working conditions.						x		
DLO 7. Know measures to increase the efficiency of equipment use. Analyze equipment operating modes for the purpose of their optimization and automation.							x	

¹Must comply with the Matrix of ensuring program learning outcomes by the relevant components of the educational program, indicated for mandatory educational components of EP I and II levels, for all (mandatory and selective EC) EP III

3. CONTENT OF THE EDUCATIONAL COMPONENT (COURSE PROGRAM)

Topic. List of issues to be addressed within the topic	Distribution within the overall time budget		Recommended reading ²
	Classroom work	Independent work	
	Lc	Lb	
Topic 1. Technological equipment for preparing grain for processing into flour and cereals. Production processes at grain processing enterprises. Requirements for grain processing machines. Machines for removing impurities from main crop grains. Machines for removing impurities that differ from main crop grains in width and thickness. Machines for removing impurities that differ from main crop grains in aerodynamic properties. Machines for removing impurities that differ from main crop grains in a combination of different physical properties	4	6/2	12/24
Topic 2. Technological equipment for the production of bread, pasta, confectionery and food concentrates. Equipment for dough preparation. Equipment for dough division. Equipment for forming dough blanks, proofing and stacking. Equipment for the production of special types of bread products. Equipment for kneading and forming pasta. Equipment for drying, stabilizing, cutting pasta. Equipment for packaging dry pasta. Technological equipment for the production of confectionery products.	6	8	14/24
Topic 3. Technological equipment for storing fruits and vegetables Basic properties of potatoes and vegetables as a storage object. Basic methods of storing potatoes and vegetables. Basic types of storage facilities for potatoes and vegetables. Methods of loading and unloading potatoes and vegetables in storage facilities. Technological processes and operations in vegetable storage facilities, their classification. Machines and equipment for working in vegetable storage facilities. Classification of machines and equipment. Basic requirements for machines and equipment for working in vegetable storage facilities. Conditions of their operation.	6	6	12/24
Topic 4. Equipment for sugar production. Equipment for preparing root crops for processing, principle of operation and operating rules. Hydraulic conveyor, beet washing machine, beet cutting machine, elevators - purpose and operating principle. Purpose, structure and operation of diffusion batteries. Equipment for saturation, principle of operation and operating rules.	4	8	12/24
Topic 5. Equipment for fermentation production - malt, beer, alcohol, spirits.	6	8/2	12/24

²Specific source from the main or additionally recommended literature

Malt production equipment, operating principle and operating rules. Beer production equipment, operating principle, operating principle and operating rules. Equipment for the production of alcohol and spirits, operating principle and operating rules.				
Topic 6. Equipment for the production of fats and fat substitutes. Technological equipment, its characteristics, operating principle, safety requirements, modern equipment for performing various production processes of fat production. Heat exchangers and equipment for creating low vacuum, classification, technical characteristics. Equipment for transporting liquid, gaseous, solid and bulk media. Pumps, pipelines, valves, conveyors, classification, types and main technical characteristics. Equipment for refining fats. Equipment for alkaline refining, deodorization, hydrogenation. Operating principle, technical parameters.	4	8	14/28	[1-3,14, 56-65]
Total	30	44/2	76/148	

4. TEACHING AND LEARNING METHODS

DLO	Teaching methods(work that will be carried out by the teacher during classroom lessons, consultations)	Number of hours	Teaching methods(what types of learning activities should the student perform independently)	Number of hours
DLO 1. Know the technical problems of production and ways to solve them. DLO 2. Know the main design features of technological equipment, understand the principle of its operation for conducting applied research.	Showing examples of solving production problems using an interactive method during lectures and practical classes	18/2	Preparing for the lecture by familiarizing yourself with the lecture material. Studying the material for independent mastery.	19/38
DLO 3. Analyze scientific and technical information on the choice of equipment, according to the presented technological requirements and production features. DLO 4. Analyze the technical and economic indicators of equipment operation. Know how to organize, control and manage technological processes using technical means.	Providing examples and techniques interactively	20	Completing laboratory tasks, the implementation of which was started in the laboratory work.	19/38

DLO 5. Be able to choose modern equipment for technical equipment of enterprises. DLO 6. Know how to ensure technical maintenance and effective use of equipment. Perform material and thermal calculations of devices. Know the rules of safe operation, observe working conditions.	Showing examples of solving production problems using an interactive method during lectures and practical classes	18		19/38
DLO 7. Know measures to increase the efficiency of equipment use. Analyze equipment operating modes for the purpose of their optimization and automation.	Demonstration of work examples in applied software products	18		19/34

5. EVALUATION BY EDUCATIONAL COMPONENT

5.1. Summative assessment

5.1.1. To assess the expected learning outcomes, there are

No.	Summative methods evaluation	Points/ Percentage in the overall	Date of compilation
Module I			
1.	Written test paper on theoretical material/ certificate of completion of non-formal education courses	10 points / 10%	In the sixth week
2.	Performing and defending laboratory work	25 points / 25%	Until the next lab session
Module II			
3.	Written test on theoretical material/certificate of completion of non-formal education courses	10 points / 10%	At the fourteenth week
4.	Performing and defending laboratory work	25 points / 25%	Until the next lab session
5.	Exam– written response to the ticket	30 points / 30%	

5.1.2. Evaluation criteria

Component ³	Unsatisfactorily	Satisfactorily	Good	Perfectly ⁴
Written test on theoretical material	<2-4 points Task requirements not met	5-6points Answers to all questions are provided, but individual components of the answers are missing or insufficiently disclosed, there is no analysis of other	7-8 points The answers to all questions are given	9-10 points Answers to all questions are provided, creativity and thoughtfulness are demonstrated, and one's own solution to the problem is proposed.

³Specify the summative assessment component

⁴Indicate the distribution of points and the criteria that determine the level of assessment

		<i>approaches to the question.</i>		
<i>Performing and defending laboratory work</i>	<i><12 points</i>	<i>13-17points</i>	<i>18-23 points</i>	<i>24-25 points</i>
	<i>Task requirements not met</i>	<i>Answers to all questions are provided, but individual components of the answers are missing or insufficiently disclosed, there is no analysis of other approaches to the question.</i>	<i>The answers to all questions are given</i>	<i>Answers to all questions are provided, creativity and thoughtfulness are demonstrated, and one's own solution to the problem is proposed.</i>
<i>Exam</i>	<i><17 points</i>	<i>18-23 points</i>	<i>24-29 points</i>	<i>30 points</i>
	<i>Task requirements not met</i>	<i>Most requirements are met, but individual components are missing or insufficiently disclosed, there is no analysis of other approaches to the issue</i>	<i>All task requirements met</i>	<i>All task requirements have been met, and the solution and approach have been demonstrated.</i>

5.2 Formative assessment:

To assess current progress in learning and understand areas for further improvement,

<i>No.</i>	<i>Elements of formative assessment</i>	<i>Date</i>
<i>1.</i>	<i>Written survey after studying topics 1-3, 4-6</i>	<i>Week 7, Week 14</i>
<i>2.</i>	<i>Verbal feedback from the instructor while working on laboratory work</i>	<i>11 weeks</i>
<i>3.</i>	<i>Oral feedback from students to the teacher after writing a test paper</i>	<i>14 week</i>

6. LEARNING RESOURCES (LITERATURE)

Main sources

1. Savchenko M.Yu. Technological equipment of food production: lecture notes for applicants of the 3rd year and 2nd year of the course of specialty G13 of the OPP "Food Technologies" of the degree of higher education "bachelor". - Sumy, 2025. - 118 p.
2. Savchenko M.Yu. Technological equipment of food production: methodological instructions for performing laboratory work for applicants of the 3rd year and 2nd year of the course of specialty G13 of the OPP "Food Technologies" of the degree of higher education "bachelor". - Sumy, 2025. - 116 p.
3. Savchenko M.Yu. Technological equipment of food production: methodological instructions for performing independent work for applicants of the 3rd year and 2nd year of the course of specialty G13 of the OPP "Food Technologies" of the degree of higher education "bachelor". - Sumy, 2025. - 104 p.
4. Equipment of restaurant establishments: lecture notes for applicants of the 3rd year and 2nd year of the course of specialty G13 of the OPP "Food Technologies" of full-time and part-time forms of obtaining a higher education degree "bachelor" / ed. M.Yu. Savchenko. – Sumy, 2025 –120 p.

5. Equipment of restaurant establishments: methodological instructions for performing laboratory work for applicants of the 3rd year and 2nd year of the course of specialty G13 of the OPP "Food Technologies" of full-time and part-time forms of obtaining a higher education degree "bachelor" / ed. M.Yu. Savchenko. – Sumy, 2025 –134 p.
6. Equipment of restaurant establishments: methodological instructions for performing independent work for applicants of the 3rd year and 2nd year of the specialty G13 OPP "Food Technologies" of the full-time and part-time form of obtaining education for the degree of higher education "bachelor" for applicants of the 3rd year of the educational program G13 "Food Technologies" of the full-time and part-time form of obtaining education for the degree of higher education "bachelor" / ed. M.Yu. Savchenko. – Sumy, 2025 –105 p.
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10. Manley D. Manley's Technology of Biscuits, Crackers and Cookies. – 5th ed. - Woodhead Publishing, 2022. - ISBN 978-0-12-804231-1.
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12. Asadi M. Sugar Processing and By-Products of the Sugar Industry. – 2nd ed. - CRC Press, 2023. - ISBN 978-1-032-12349-3.
13. Boulton C., Quain D. Brewing Science and Practice. - 3rd ed. - Woodhead Publishing, 2023. - ISBN 978-0-12-822729-9.
14. Gunstone FD, Dijkstra AJ Vegetable Oils in Food Technology: Composition, Properties and Uses. - 3rd ed. - Elsevier, 2023. - ISBN 978-0-323-98667-0.
15. James SJ, James C. Refrigeration technologies for fruit and vegetable storage: Energy efficiency and quality control // International Journal of Refrigeration. - 2023. - Vol. 149. – P. 112–125. DOI: 10.1016/j.ijrefrig.2023.01.015.
16. Campanella OH, et al. Emerging technologies in grain processing for sustainable food production // Trends in Food Science & Technology. - 2024. - Vol. 141. – 104179. DOI: 10.1016/j.tifs.2024.104179.

Additional sources

14. Adeyeye SAO, et al. Advances in grain cleaning and sorting technologies for enhanced flour and cereal production // Journal of Food Process Engineering. - 2023. - Vol. 46(4). – e14235. DOI: 10.1111/jfpe.14235.
15. Kumar D., Kalita P. Recent advances in grain processing technologies: A review // Food Reviews International. - 2022. - Vol. 38(5). – P. 1087–1105. DOI: 10.1080/87559129.2021.1906698.
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32. Ponomarenko S.V. Properties of potatoes as a storage object and requirements for storage facilities // Agricultural technology and technologies. – 2022. – No. 5. – P. 67–74.
33. Kovalchuk I.A. Modern equipment for vegetable storage: classification and requirements // Agro-industrial complex technologies. – 2024. – No. 3. – P. 41–49.
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Software

65. Specialized programs for calculating technological equipment: Mathcad, MS Excel.