

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

SUMY NATIONAL AGRARIAN UNIVERSITY

Faculty of Food Technology

Department of Food Technology and Safety

Syllabus of the educational component

of the Educational Component

OC7 FLAVOUR, AROMA AND COLOUR CHEMISTRY

(optional)

Implemented within the educational program

18 – Manufacturing and Technology

in specialty **181 – Food Technology**

at **the first (bachelor's)** level of higher education

Sumy – 2026

Developer:

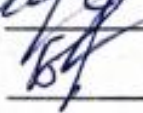


Tetiana SYNENKO,
PhD, Associate Professor of the Department of Food Technology and Safety

Reviewed, approved and approved on meetings departments Food Technology and Safety	protocol dated <u>19.05</u> 2026 No. <u>17</u>
	Manager departments <u></u> Maryna SAMILYK (signature)

Agreed:

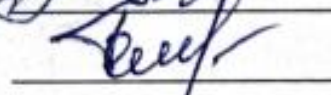
Guarantor of the educational program "Food Technologies"  Olena KOSHEL

Dean of the Faculty of Food Technology  Nataliia BOLHOVA

Review of the working program provided by:



Oksana MELNYK, Candidate of Technical Sciences, Associate Professor



Anna HELIKH, Candidate of Technical Sciences, Associate Professor

Methodist of the Education Quality,
Licensing and Accreditation Department


(signature)

N. Bananik
(first name, surname)

Registered in the electronic database: date: 18.06 2026

Information on Review of the Working Program (Syllabus)

Educational the year in which are introduced changes	Number of the appendix to the work program with a description of the changes	Changes reviewed and approved		
		Date and number minutes of the meeting departments	Head of the Department	Guarantor educational programs

1. GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT

Name of the educational component	OC7. Flavour, Aroma and Colour Chemistry					
Status of the educational component	Optional					
Faculty / Department	Faculty of Food Technology; Department of Food Technology and Safety					
Program / Specialty for which the component is included	Educational and Professional Program “Food Technologies” (2023); Specialty 181 Food Technologies					
NQF level	Level 6					
Semester and duration of study	Semester 8, weeks 1–15					
Number of ECTS credits	5.0					
Total workload and distribution of hours: 150	Contact work (classes)				Independent work	
	Lectures		Practical classes			
	Daily	Abroad.	Daily	Abroad.	Daily	Abroad.
	30	-	30	-	90	-
Language of instruction	Ukrainian, English					
Instructor / Coordinator of the educational component	Tetiana SYNENKO, PhD, Associate Professor of the Department of Food Technology and Safety					
Contact information	Room 317m; Tel.: +380684870521; E-mail: tatiana.synenko@snau.edu.ua					
General description of the educational component	The ‘Flavour, Aroma and Colour Chemistry’ module is designed to equip students with specialist knowledge of the chemical nature of the organoleptic properties of food products, in particular the taste, aroma and colour characteristics that determine the consumer appeal, gastronomic quality and uniqueness of food products. The course covers the sources, structure and functions of the main flavour and aroma compounds (organic acids, sugars, amino acids, esters, phenolic compounds, terpenoids, etc.), as well as the natural and synthetic colourants responsible for the colour palette of food products. Considerable attention is paid to changes in organoleptic properties under the influence of technological processes: heat treatment, fermentation, drying, smoking, ageing, etc. The course fosters the development of sensory culture and practical skills in working with organoleptic panels, as well as the application of modern laboratory methods for analysing taste, smell and colour. Students acquire the ability to assess the quality of raw materials and finished products, develop recipes taking into account the target flavour profile, and justify the choice of technological parameters to preserve and enhance sensory characteristics. The educational component is a vital part of training food technology specialists, as it enables the integration of a scientific approach to the analysis of sensory properties with the practical needs of gastronomic innovation, the creation of original products and the development of food production.					

Purpose of the educational component	to equip higher education students with a fundamental understanding of the chemical nature of the taste, smell and colour of foodstuffs, and an understanding of the chemical and biological reactions involved in the formation of the taste, smell and colour of foodstuffs during processing; to develop practical skills in analysing the organoleptic characteristics of food ingredients and finished products.
Prerequisites and links with other EPP educational components	1. The educational component is based on prior study of the following subjects: 'Theoretical Foundations of Food Production', 'Food Microbiology', 'Food Control Methods', 'Fundamentals of Physiology and Nutrition Hygiene', and 'Processes and Equipment in Food Production' 2. The educational component forms the basis for the writing of the dissertation
Academic integrity policy	The study of the discipline is based on academic integrity principles and compliance with the requirements specified in the Regulation on Academic Integrity of Sumy National Agrarian University.
Course link	https://cdn.snau.edu.ua/moodle/course/view.php?id=6375
Keywords	food processing plant, manufacturing, design, project, construction

2. LEARNING OUTCOMES OF THE EDUCATIONAL COMPONENT AND THEIR RELATION TO PROGRAM LEARNING OUTCOMES

After completing the educational component, the student is expected to be able to:

Code	Course Learning Outcome «After studying the educational component, the student is expected to be able to... »	Program Learning Outcome(s) addressed			Assessment methods
		PLO 12	PLO 13	PLO 23	
CLO1	Be able to design new facilities and modernise existing plants, workshops and production areas using computer-aided design systems and modern software.	x			Modular assessments (online tests on Moodle); presentation of laboratory assignments; peer review of other students' work.
CLO2	Select modern equipment for the technical fitting-out of new or refurbished facilities (workshops), understand how it works and the operating procedures, and draw up process flow diagrams for the production of food products within the planned range.		x		
CLO3	Have the skills to organise the work of individual production units within the company and coordinate their activities.			x	

Competencies Improved / Acquired through Non-formal Education

Non-formal education course	Competencies	Evidence of learning outcomes
Basics of architectural drawing and rules for the use of symbols	General: the ability to learn and acquire up-to-date knowledge; the ability to show initiative and resourcefulness; skills in using information and communication technologies. Professional: ability to distinguish the most common conventional graphic symbols on construction drawings; ability to read various types of construction drawings; ability to follow the instructions specified on the drawings.	Form of confirmation of learning outcomes: A certificate of successful completion of the course, stating the number of hours. The authenticity of the certificate can be verified via the link provided on it.
REVIT. Basic	General: the ability to learn and acquire up-to-date knowledge; the ability to show initiative and resourcefulness; skills in using information and communication technologies. Professional: creating and modifying graphic elements using basic tools; modelling and configuring structural elements, interior and exterior components; designing, editing and producing drawings	

3. CONTENT OF THE EDUCATIONAL COMPONENT (PROGRAM ACADEMIC DISCIPLINE)

Topic. List of issues to be addressed within the topic	Lecture hours (Daily /Abroad.)	Practical or independent-study hours (Daily /Abroad.)	Recommended literature
MODULE 1			
Lecture 1. Introduction to the design of food processing plants 1. Types of food processing plants 2. Key considerations in the design of food processing plants	2/0		1–13
Laboratory Session 1 Analysis of case studies of existing food businesses		4/0	1–13
Independent study: Concepts, classification and current trends in food production		10/18	1–13
Lecture 2. Regulatory framework and technical regulations 1. Key regulatory documents: DBN, SanPiN, ISO, HACCP 2. Design requirements for food production facilities: hygiene, safety, environmental protection 3. Legislative aspects of launching production in Ukraine 4. Fundamentals of product licensing and certification	2/2		1–13
Laboratory Session 2 Choosing a theme and concept for a future food business		4/2	1–13
Laboratory Session 3 Elements of a food company's marketing strategy		4/0	1–13
Independent study: Legal requirements for setting up food businesses in Ukraine		10/18	1–13
Lecture 3. Selection of raw materials and product range development 1. Main types of raw materials for food production 2. Seasonality, local sourcing, and organic production 3. Development of a product range policy	2/2		1–4
Laboratory Session 4 Selection of raw materials and development of the product range		4/2	1–4

Topic. List of issues to be addressed within the topic	Lecture hours (Daily /Abroad.)	Practical or independent- study hours (Daily /Abroad.)	Recommended literature
Independent study: Innovative technologies in food production. Development of a product range matrix.		10/18	1–4
MODULE 2			
Lecture 4. Principles and stages of food processing plant design 1. The design process: from concept to commissioning 2. Process, structural and economic design 3. Determining capacity and calculating production volumes 4. The concepts of flow, zoning and production rhythm	2		1–13
Laboratory Session 5 Determining the production programme		4/2	1–13
Laboratory Session 6 Drawing up a production flow chart		4/0	1–13
Independent study: Global experience of business development in the food industry		10/18	1–13
Lecture 5. Selection and Layout of Process Equipment 1. Types of equipment for the main product groups 2. Equipment requirements (capacity, energy efficiency, reliability) 3. Principles of process line layout 4. Equipment layout taking into account health and safety requirements	2/2		1–13
Laboratory Session 7 Selection and technical and economic justification of key equipment		4/2	1–13
Laboratory Session 8 Placement of equipment in the production area		4/0	1–13
Independent study: Main types of equipment for food production facilities		10/18	1–13

Topic. List of issues to be addressed within the topic	Lecture hours (Daily /Abroad.)	Practical or independent- study hours (Daily /Abroad.)	Recommended literature
Lecture 6. Planning of production and ancillary premises 1. Principles of architectural planning for food production facilities 2. Zoning: production, storage, and sanitary and welfare areas 3. Movement of staff and raw materials: avoiding cross-flows 4. Calculation of floor areas, ventilation and lighting	2/2		1–13
Laboratory Session 9 Design of production and ancillary premises, and infrastructure		4/2	1–13
Laboratory Session 10 Logistics Planning (Internal and External)		4/0	1–13
Independent study: Turnkey mini-production facilities		10/18	1–13
Lecture 7. Innovation and sustainable development in design 1. Innovative solutions in food production 2. Energy and resource conservation 3. Principles of waste-free production 4. Implementation of environmental practices: zero waste, circular economy 5. Examples of modern food production facilities	2/0		1–13
Laboratory Session 11 Calculation of energy resources (water, electricity, ventilation)		4/2	1–13
Laboratory Session 12 Implementing HACCP principles in a project		4/2	1–13
Laboratory Session 13 Environmental aspects and zero-waste solutions		4/2	1–13
Laboratory Session 14 Architectural and Construction Drawing in the Context of Food Industry Facility Design		8/0	1–13
Independent study: Fundamentals of Environmental Design for Food Processing Plants		6/18	1–13

Topic. List of issues to be addressed within the topic	Lecture hours (Daily /Abroad.)	Practical or independent-study hours (Daily /Abroad.)	Recommended literature
Non-formal education: The basics of architectural drawing and the rules for applying standard graphic symbols		12	https://profosvita.online/courses/course-v1:Profosvita+CM-R013-EDUFI+2023/about
Non-formal education: Revit. Basic		76	https://www.builtlab.org/revit-basic
Total for the course	14/8	practical: 60/16; independent study: 76/126	

4. TEACHING AND LEARNING METHODS

CLO	Teaching methods	Hours	Learning methods	Hours
CLO1– CLO3	Lectures featuring examples of real-world objects and visual aids; Practical sessions on developing drawings, block diagrams and calculations; Familiarisation with regulatory documents and technical catalogues; Working with 2D/3D design software; Analysis of case studies from open sources (grant platforms, agri-tech start-ups)	74/24	Carrying out individual engineering calculation tasks; Independent study of specialist literature and regulatory documents; Online course (non-formal education)	76/126

5. ASSESSMENT FOR THE EDUCATIONAL COMPONENT

5.1. Summative Assessment

The following methods are used to assess expected learning outcomes:

No.	Summative assessment method	Points / weight in the final grade	Deadline
Module 1 (35 points)			
1	Defense of practical works (4 works × 3 points)	12 points / 12%	Within 5 days after the class
2	Testing (multiple-choice test)	23 points / 23%	Week 7
Module 2 (35 points)			
3	Defense of practical works (10 works × 2 points)	20 points / 20%	Within 5 days after the class
4	Testing (multiple-choice test)	15 points / 15%	Week 15
5	Non-formal education (additional/bonus)	10 bonus points	Week 15
6	Exam	30 points / 30%	as per the schedule

5.1.2. Assessment Criteria

Component	Criteria
Defense of a practical work	0 points: the student completed the practical work but did not defend it. 1 point: most requirements are met, but some elements are missing. 2 points: all task requirements are met. 3 points: all task requirements are met; thoughtful work is demonstrated and an original solution to the problem is proposed.
Testing (multiple-choice test)	The test includes 23 questions in Module 1 and 15 questions in Module 2. Each correct answer is worth 1 point.
Non-formal education	Successful completion of an online course confirmed by a named certificate is evaluated as 10 bonus points.
Exam	The exam paper comprises: 20 questions, each worth 1 points, 2 essay questions, each worth 10 points

5.2. Formative Assessment

The following elements are used to assess current learning progress and identify areas for further improvement:

No.	Formative assessment element	Date
1	Oral questioning after studying course topics	Within 5 days after the class
2	Oral feedback from the instructor and students during practical classes	During the semester
3	Feedback through discussion of intermediate and final testing	Weeks 7 and 15
4	Feedback through discussion of the non-formal education course, conference report, article or scientific work	Before and after completing the course, participating in the conference/competition, or publishing the work

The form of the final assessment is an examination. The final mark for the module (maximum 100 marks per semester) is determined as the sum of the marks awarded for the student's work throughout the semester.

A student will not be admitted to the final assessment for the subject if they have missed and not made up more than 20% of the classes, have failed to pass the modular assessment stages, have not completed the compulsory list of types of work and tasks (laboratory work and certain individual tasks), as stipulated in the working curriculum for this educational component, or has an unsatisfactory rating at the end of the semester (0–41 marks).

6. EDUCATIONAL RESOURCES (LITERATURE)

Main Sources

1. Design of Food Processing Plants: a series of lectures for students on the 'Food Technology' vocational education programme leading to a Bachelor's degree / compiled by T.P. Sinenko. Sumy: SNAU, 2025. p.

2. Design of Food Enterprises: Methodological Guidelines for Laboratory Work for students of the 'Food Technology' vocational education programme leading to a Bachelor's degree / compiled by T.P. Sinenko. Sumy: SNAU, 2025. p.

3. Design of Food Enterprises. Methodological guidelines for independent study for students of the 'Food Technology' vocational education programme leading to a Bachelor's degree / compiled by T.P. Sinenko. Sumy: SNAU, 2025, pp.

4. Design of Food Enterprises and Catering Establishments: a textbook / T.P. Sinenko, M.M. Samilik, E.V. Demidova, S.O. Guba. Sumy: SNAU, 2026. 464 pp.

Additional Sources

5. VNTP 21-92. Standards for the technological design of confectionery industry enterprises
6. VNTP 40-91. Standards for the technological design of soft drinks plants (workshops)
7. VNTP 52-91. Sector-specific standards for the technological design of vegetable oil and fat storage facilities at oil and fat processing enterprises
8. VNTP 540/697-91. Standards for the technological design of enterprises in the meat industry
9. VNTP-APK-23.06. Enterprises for the slaughter of livestock, poultry and rabbits, and the processing of slaughter products
10. VNTP-APK-24.06. Milk processing enterprises
11. VNTP-SGiP-46-25.96. Design of enterprises in the fruit and vegetable canning industry (Parts I, II)
12. DBN A.2.2-3:2014. Composition and content of design documentation for construction
13. DBN A.2.2-3:2014. Composition and content of design documentation for construction. With Amendments No. 1 and No. 2

Electronic Resources

European Food Safety Authority (EFSA) [Online resource] – Available at: <https://www.efsa.europa.eu>

FAO – Food and Agriculture Organisation of the United Nations [Online resource] – Available at: <https://www.fao.org>

HACCP in Ukraine – Implementation of HACCP in small enterprises [Online resource] – Available at: <https://haccp.org.ua>

International Union of Food Science and Technology (IUFoST) [Online resource] – Available at: <https://www.iufost.org>

ProAgro Group – Agribusiness news and market analysis [Electronic resource] – Available at: <https://proagro.com.ua>

YouControl – Analysis of the Ukrainian food market [Electronic resource] – Available at: <https://youcontrol.com.ua>

Software

Design and modelling software: Archicad, AutoCAD, nanoCAD, A9CAD, CorelDRAW, Autodesk Revit, SketchUp, Adobe Substance 3D.