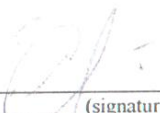


Ministry of Education and Science of Ukraine
Sumy National Agrarian University
Faculty of Food Technology
Department of Technology of Nutrition

Syllabus of an educational component

**SC INNOVATIVE INGREDIENTS IN FOOD
TECHNOLOGY**

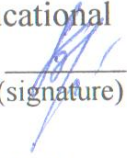
Specialty	G13 Food technology
Educational program	Food technology
Level of higher education	First (Bachelor)

Developer:  Tetiana STEPANOVA PhD, Associate Professor
(signature)

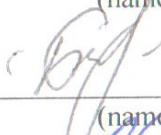
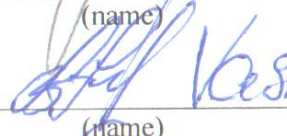
Reviewed, approved and ratified at the meeting of the Department of Food Technology	Protocol № 23 by «04» June 2025
	Head of the Department <u></u> Oksana MELNYK (signature)

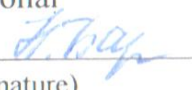
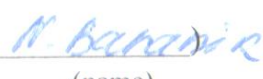
Approved:

Guarantor of educational program  Maryna SAMILYK
(signature) (name)

Dean of the faculty, where the educational
program is implemented  Natalya BOLHOVA
(signature) (name)

Review of the work program (attached) provided:

 Serhii BOKOVET
(signature) (name)
 Vasil Tishchenko
(signature) (name)

Methodologist of the Department of Educational
Quality, Licensing and Accreditation  ()
(signature) (name)

Registered in the electronic database: date: 04.06. 2025

Information on reviewing the work program (syllabus):

Academic year in which changes are made	The number of the appendix to the work program with a description of the changes	The changes have been reviewed and approved		
		Date and number of the Protocol of the meeting of the department	Head of Department	Guarantor of the educational program

1. GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT

1.	Name of educational component	SC INNOVATIVE INGREDIENTS IN FOOD TECHNOLOGY									
2.	Faculty/Department	Food technology/ Technology of Nutrition									
3.	Status of EP	Selective									
4.	EK can be offered for (filled for selective EK))										
5.	Level NQF	Educational and professional program Food Technology specialty G13 Food Technology									
6.	Semester and duration of study	6 level									
7.	Credits ECTS	5 semester, 1-15 week									
8.	The total volume of hours and their distribution	5									
9.		Contact work (classes)							Independent work		
		Lecture		Practise/Seminars		Lab					
		Full-time	External	Full-time	External	Full-time	External	Full-time	External		
		30				30		90			
10.	Language of education	English									
11.	Teacher / Coordinator of the educational component	Stepanova Tetiana									
12.	Contacts	Name: Stepanova Tetiana Position: Associate Professor, Department of Food Technology Working place: Room 314, Mechanization Building E-mail: tetiana.stepanova@snaeu.edu.ua Consultation hours: every Monday from 1:00 PM to 2:00 PM									
13.	General description of the educational component	The educational component includes sections on the current state and prospects for the development of the food industry in terms of scientific justification for the use of innovative food ingredients. The content of the discipline is adapted to the specialty. The subject of this course is the body of knowledge about food ingredients and their application in the design of innovative functional food products. The emphasis is on the main types of modern food raw materials in order to effectively implement them in the creation of innovative food products.									
13.	The aim of education component	to ensure a sufficient theoretical and practical level of students' knowledge regarding the application of technological solutions aimed at preserving and increasing the nutritional value of finished products, reducing their cost, and implementing waste-free technologies.									
14.	Prerequisites for studying EK, connection with other educational components of EP	The educational component is based on knowledge of craft technologies (knowledge of the features of the production of craft dishes and culinary products by means of restaurant enterprises), standardization, certification and quality management of food products and restaurant services (knowledge of the main regulatory documents regulating the activities of restaurant enterprises).									
15.	Academic Integrity	Compliance with academic integrity for higher education applicants involves:									

.	Policy	independent completion of educational tasks, tasks of current and final control of learning outcomes; references to sources of information when using ideas, statements, and information; compliance with the norms of copyright legislation; provision of reliable information about the results of one's own educational or scientific activities. Violations of academic integrity when studying for the OC are considered: academic plagiarism, academic fraud (copying, cheating, passing off someone else's work as your own), use of electronic devices during the final knowledge control For violations of academic integrity, students may be held academically liable: Academic plagiarism - score 0, re-performance of the task. Academic fraud - cancellation of points received; re-taking the assessment; re-performance of work not completed independently; Use of electronic devices during the final knowledge control - suspension from performing the work, score 0, re-passing the final control
16	Link to the course in the system Moodle	https://cdn.snau.edu.ua/moodle/course/view.php?id=2113
17	Keywords	Food ingredients, nutrients, functional food ingredients, technological food additives

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

Learning results for EK: After studying the educational component, the student will be able to...	Program learning outcomes that are directed to EK (indicate the number according to the number given in OP)			As the LOE is estimated
	PLO 8	PLO28	PLO 30	
DLO 1. Know the basics of designing food product compositions using modern food ingredients, through the development and improvement of food production technology	+			Multiple selection and compliance tests; solving situational problems
DLO 2. Possess the skills to use innovative food ingredients by implementing modern technologies for semi-finished and finished products		+	+	Multiple selection and compliance tests; solving situational problems
DLO 3. Be able to develop and improve food production technologies by applying technological solutions aimed at preserving and increasing the nutritional value of finished products, reducing the cost of products, and implementing waste-free technologies.	+		+	Multiple selection and compliance tests; solving situational problems
DLO 4. Be able to independently acquire modern knowledge and effectively establish communication when performing team tasks	+		+	Presentation with a report, differential assessment

3. CONTENT OF THE EDUCATIONAL COMPONENT (PROGRAM OF THE COURSE)

Topic. List of issues to be addressed within the topic	Distribution within the general budget of time			Recomended literature ¹
	Class work		Indep. work	
	Lc	Lb		
	Full	Full	Full	
Module 1				
Topic 1. Ingredient components of food products Lecture 1. Proteins as macronutrients in food products. Part 1 Characteristics of proteins as macronutrients in food products. The role of proteins in human nutrition. Protein consumption norms. Nutritional and biological value of proteins.	2			1, 2, 5, 12, 15
Laboratory lesson 1. Study of proteins as macronutrients in food products. Study of the characteristics of proteins as macronutrients in food products. Study of the role of proteins in human nutrition. Study of protein consumption norms. Study of the nutritional and biological value of proteins. Study of the functional properties of proteins. Study of protein ingredients of food raw materials: cereals, legumes, oilseeds, milk. meat, eggs, fish. Study of new forms of protein food		4		
Questions for self-study. Protein deficiency and its consequences			6	
Lecture 2. Proteins as macronutrients in food products. Part 2 Functional properties of proteins. Protein ingredients of food raw materials: cereals, legumes, oilseeds, milk. meat, eggs, fish. New forms of protein food.	2			2, 4, 6, 10, 11
Questions for self-study. Alternative protein ingredients			6	
Lecture 3. Carbohydrates as macronutrients in foods. Part 1 Characteristics of carbohydrates as macronutrients in food products. Classification of carbohydrates. Carbohydrates in food products. Physiological significance of carbohydrates. Functions of carbohydrates in food products.	2			2, 3, 5, 8, 12, 14, 15
Laboratory lesson 2. Study of carbohydrates as macronutrients in food products Study of the characteristics of carbohydrates as macronutrients in food products. Study of the classification of carbohydrates. Study of carbohydrates in food products. Study of the physiological significance of carbohydrates. Study of the functions of carbohydrates in food products. Study of the classification of dietary fibers. Study of the structural properties of individual polysaccharides. Study of the functional properties of individual polysaccharides.		4		
Questions for self-study. Consumption rates of digestible and indigestible carbohydrates.			6	
Lecture 4. Carbohydrates as macronutrients in foods. Part 2 Classification of dietary fibers. Structural and functional properties of individual polysaccharide representatives.	2			1, 2, 3, 4, 7, 9, 11

¹Specific source from the main or additionally recommended literature

Questions for self-study. Non-traditional sources of dietary fiber.			6	
Lecture 5. Fats as macronutrients in food products. The role of fats as macronutrients in human nutrition. Functions of fats in the human body. Classification and characteristics of fats in food products: animal, vegetable and combined. Nutritional value of fats	2			2, 3, 4, 5, 9, 13
Questions for self-study. Fat consumption norms.			6	
Lecture 6. Vitamins as micronutrients in food products. Vitamins as micronutrients in food products. Classification of vitamins. Biological role of vitamins. Daily requirement, sources. Vitamin-like substances.	2			1, 2, 6, 7, 8, 12
Laboratory lesson 4. Study of vitamins and minerals as micronutrients in food products. Study of vitamins as micronutrients in food products. Study of the classification of vitamins. Study of the biological role of vitamins. Study of the daily requirement for vitamins and their sources. Study of vitamin-like substances. Study of macroelements, characteristics, content in raw materials and basic food products. Study of the biological functions of macroelements. Study of the daily requirement for macroelements. Study of microelements, characteristics, content in raw materials and basic food products. Study of the biological function of microelements. Study of the daily requirement for microelements.		4		
Questions for self-study. Vitaminization of food products.			6	
Lecture 7. Minerals as micronutrients in food products. Macroelements, characteristics, content in raw materials and basic food products, biological functions, daily requirement. Microelements, characteristics, content in raw materials and basic food products, biological functions, daily requirement.	2			1, 2, 3, 5, 11
Questions for self-study. Violations of mineral metabolism. Microelementosis.			6	
Topic 2. Functional food ingredients				
Lecture 8. Functional food ingredients. The concept of functional food ingredients. Classification and properties of functional food products. Scientific principles of creating functional food products.	2			1, 2, 3, 10, 12, 14, 15
Laboratory lesson 5. Study of functional food ingredients. Study of the concept of functional food ingredients. Study of the classification and properties of functional food products. Study of the scientific principles of creating functional food products.		4		
Questions for self-study. Non-traditional sources of functional food ingredients			6	
Lecture 9. Functional food ingredients of animal origin. Meat products as a source of functional food ingredients. Products from aquatic organisms as a source of functional food ingredients. Milk and dairy products as a source of functional food ingredients. Eggs and egg products as a source of functional food ingredients. Bee products as a source of functional food ingredients.	2			1, 2, 4, 6, 8, 10, 11
Questions for self-study. Features of the use of functional food ingredients of animal origin			6	
Lecture 10. Functional food ingredients of plant origin	2			1, 2, 5, 7, 10, 11

General characteristics of plant raw materials as a potential source of functional ingredients. Cereals and legumes as a source of functional food ingredients. Mushroom raw materials as a source of functional food ingredients. Fruit and berry raw materials as a source of functional food ingredients. Vegetable raw materials as a source of functional food ingredients.				
Questions for self-study. Wild raw materials as non-traditional sources of functional ingredients.			6	
Topic 3. Technological food ingredients.				1, 2, 3, 5, 9, 13
Lecture 11. Functional and technological characteristics and the impact on the quality of technological food ingredients. Functional and technological characteristics of preservatives. Functional and technological characteristics of antioxidants and their impact on the quality of food products. Functional and technological characteristics of emulsifiers. Functional and technological characteristics of consistency regulators.	2			
Laboratory lesson 5. Study of functional and technological characteristics and impact on product quality of technological food ingredients Study of functional and technological characteristics of preservatives. Study of functional and technological characteristics of antioxidants and their impact on food quality. Study of functional and technological characteristics of emulsifiers. Study of functional and technological characteristics of consistency regulators.		4		
Questions for self-study. Preservatives of plant origin.			6	
Module 2				
Topic 4. Physiological ingredients of natural origin				
Lecture 12. Features of the use of physiological ingredients of natural origin. Physiological ingredients of natural origin: classification, biological role and application in food technologies. Natural physiologically active ingredients: mechanisms of action and impact on human health. Substances with barrier protection functions. Lipotropic compounds. Bioactive substances of natural origin in food systems.	2			1, 2, 5, 10, 11, 15
Questions for self-study. Anti-atherosclerotic substances.			6	
Lecture 13. Wellness food ingredients. Classification, properties and mechanisms of action of wellness food ingredients. Biologically active wellness ingredients in food products. The role of wellness ingredients in the formation of functional food products.	2			1, 2, 3, 7, 9, 10, 12, 14
Laboratory lesson 6. Study of wellness food ingredients Study of the classification, properties and mechanisms of action of food ingredients for health purposes. Study of biologically active ingredients for health purposes in food products. Study of the role of health ingredients in the formation of functional food products.		4		
Questions for self-study. Non-traditional sources of wellness food ingredients			6	
Lecture 14. Dietary supplements as an additional source of essential biologically active ingredients. Essential biologically active ingredients in dietary supplements: classification, properties and health significance. The role of dietary supplements in providing the body with	2			2, 3, 4, 5, 9, 12, 13

essential nutrients and bioactive substances. Bioavailability of essential ingredients in dietary supplements.				
Laboratory lesson 7. Study of the use of dietary supplements as an additional source of essential biologically active ingredients. Study of essential biologically active ingredients in dietary supplements: classification, properties and importance for health. Study of the role of dietary supplements in providing the body with essential nutrients and bioactive substances. Study of the bioavailability of essential ingredients in dietary supplements.		4		
Questions for self-study. The use of essential biologically active ingredients in food products			6	
Topic 5. Application of food ingredients.				
Lecture 15. Application of food ingredients of plant and animal origin. The importance of ingredients of plant origin in the formation of the quality and functional properties of food products. The importance of ingredients of animal origin in the formation of the quality and functional properties of food products. Ecological and economic aspects of the application of ingredients of plant and animal origin. New sources of plant and animal ingredients in food products.	2			1, 2, 5, 12, 14, 15
Laboratory lesson 8. Study of the use of food ingredients of plant and animal origin. Study of the importance of ingredients of plant origin in the formation of the quality and functional properties of food products. Study of the importance of ingredients of animal origin in the formation of the quality and functional properties of food products. Study of the ecological and economic aspects of the use of ingredients of plant and animal origin. Study of new sources of plant and animal ingredients in food products.		2		
Questions for self-study. Restrictions on the use of certain food ingredients			6	
Totally	30	30	90	

4. TEACHING AND LEARNING METHODS

DLO	Teaching methods (work to be done by the teacher during classes, consultations)	Number of hours	Teaching methods (what types of educational activities the student must perform independently)	Number of hours
DLO 1. Know the basics of designing food product compositions using modern food ingredients, through the development and improvement of food production technology	Explanatory-reproductive methods: lecture, story-explanation, aimed at highlighting the value-oriented content of educational material (in the context of professional tasks) Use of the MOODLE, ZOOM platform during the mixed form of training.	25	work with textbooks, manuals, materials of the Internet; , illustration, demonstration, performance of independent works, etc.	25
DLO 2. Possess the skills to use innovative food ingredients by implementing modern technologies for semi-	Partial search methods: problem-dialogue, modeling, case method, etc. Use of the MOODLE, ZOOM platform during the mixed	20	independent search of educational information	20

finished and finished products	form of training.			
DLO 3. Be able to develop and improve food production technologies by applying technological solutions aimed at preserving and increasing the nutritional value of finished products, reducing the cost of products, and implementing waste-free technologies.	Partial search methods: problem-dialogue, modeling, case method, etc. Use of the MOODLE, ZOOM platform during the mixed form of training.	25	Literature review and regulatory documentation on the topic, on the Moodle platform	25
DLO 4. Be able to independently acquire modern knowledge and effectively establish communication when performing team tasks	Problematic - discussions and debates on the studied material. Lecture-press conference. Use of the MOODLE, ZOOM platform during the mixed form of training.	20	Literature review and regulatory documentation on the topic, on the Moodle platform	20

5.5. ASSESSMENT BY EDUCATIONAL COMPONENT

5.1. Diagnostic assessment (indicated as necessary)

5.2. Summative assessment

5.2.1 For the assessment of expected learning outcomes, the following is provided:

№	Methods of summative assessment	Points / Weight in the overall score	Date of compilation
Module 1 (50 points)			
1.	Intermediate computer-based testing	20 points / 20%	Till the end of week 7
2.	Performing and defending laboratory work	30 points / 30%	1-7 week
Module 2 (50 points)			
3.	Intermediate testing	20 points / 20%	Till the end of week 14th
4.	Performing and defending laboratory work	20 points / 20%	8-14 weeks
5.	Completion of an individual assignment/course (non-formal education)	10 points / 10 %	8-14 weeks
6.	Differential credit	60-100 points	Till the end of week 15

5.2.2 Evaluation criteria

Component	Unsatisfactorily	Satisfactorily	Good	Excellent
	<3 points	3-5	6-8 points	9-10 points
Interview	Task requirements don't met	Most requirements are met, but some components are missing or insufficiently disclosed, there is no analysis of other approaches to the issue	All requirements of the task are fulfilled...	All requirements of the task are fulfilled, creativity, thoughtfulness is shown, own solution of a problem is offered
Solving of situational tasks	<3 points	3-5	6-8 points	9-10 points
	Task requirements	Most requirements are	All requirements	All requirements of the

	don't met	met, but some components are missing or insufficiently disclosed, there is no analysis of other approaches to the issue	of the task are fulfilled, the situational task is solved completely, the report is made	task are fulfilled, creativity, thoughtfulness is shown, own solution of a problem is offered
Presentation with a report	<3 points	3-5	6-8 points	9-10 points
	Task requirements don't met	The presentation is prepared, but the report is vague, not logical	All the requirements of the task are met, the report and presentation meet the requirements	All requirements of the task are fulfilled, creativity, thoughtfulness is shown, own solution is offered
Protocols of laboratory training	<5 points	5-10	11-15	16-20
	Task requirements don't met	Most of the requirements are met, but there are minor violations of the methods	The task is done correctly	All requirements of the task are fulfilled, creativity, thoughtfulness is shown, own solution is offered
Multiple choice tests	<2 points	2-9	10-13	14-15
	Less than 3 correct answers	3-7 correct answers	8-9 correct answers	All correct answers

Formative assessment:

№	Elements of formative assessment	Date
1.	Written survey after studying the topics with feedback from the teacher	15 minutes at the end of the lesson at the end of the study of the topic
2.	Oral feedback from the teacher while working on situational tasks during classes	next lesson after learning a new topic
3.	Oral feedback from the teacher and students after the presentation with the report	10-15 weeks
4.	Express survey with peer review by students	before the each laboratory trainings
5.	Final test control with feedback from the teacher	at the end of each topic

6. LEARNING RESOURCES (LITERATURE)

6.1 Main sources

1. Food additives and human health. (2020). In *Bentham Science Publishers eBooks*. doi.org/10.2174/97898114461391200101
2. Innovative food ingredients in food technology: lecture notes for students of specialty 181 "Food Technologies" of the "Master" OS of full-time and part-time forms of study / SNAU; compiled by T. M. Stepanova, 2020, 56 p.
3. Natural additives in foods. (2023). In *Springer eBooks*. doi.org/10.1007/978-3-031-17346-2
4. Moroz, I. A., Gulay, O. I., Shemet, V. Ya. (2022). Food Chemistry. Lutsk: IVV LNTU.
5. Food chemistry: textbook / Ya. P. Skorobogaty, A. V. Guziy, O. M. Zaverukha. Lviv. Novyi svit, 2020. 514 p.
6. Nabavi, S. M., Nabavi, S. F., Loizzo, M. R., Tundis, R., Devi, K. P., & Silva, A. S. (2020). *Food additives and human health*. Bentham Science Publishers.

6.2 Additional sources

7. Microbes for natural food additives. (2022). doi.org/10.1007/978-981-19-5711-6
8. Natural food additives. (2022). In IntechOpen eBooks. doi.org/10.5772/intechopen.91548

9. Stepanova T.M. (2023) The Prospect of Using Non-Traditional Raw Materials for Fillings as a Component of Culinary Brands of Sumy Region. *TESS Res Econ Bus.* 2(1): 113
10. Shang, F., Kryzhska, T., Liu, Y., Duan, Z., Danylenko, S., Stepanova, T. & Koshel, O. (2022). Effects of Different Natural Food Coloring Additions on the Quality of Chicken Sausage. *Journal of Chemistry and Technologies*, 30(2), 265–274. doi.org/10.15421/jchemtech.v30i2.244538
11. Arshad, M. S., & Khalid, W. (2024). *Health risks of food additives: Recent Developments and Trends in Food Sector*. BoD – Books on Demand.
12. Egbuna, C., & Tupas, G. D. (2020). *Functional foods and nutraceuticals: Bioactive Components, Formulations and Innovations*. Springer Nature
13. Guo, M. (2024). *Functional foods: Principles and Technology*. Elsevier.
14. Temple, N. J. (2022). A rational definition for functional foods: A perspective. *Frontiers in Nutrition*, 9. <https://doi.org/10.3389/fnut.2022.957516>
15. Ghazanfar, S., Ali, G. M., Abid, R., Farid, A., Akhtar, N., Batool, N. A., Khalid, S., Okla, M. K., Al-Amri, S. S., Alwasel, Y. A., & Hameed, Y. (2022). An overview of functional food. In *IntechOpen eBooks*. <https://doi.org/10.5772/intechopen.103978>

Software

Software (to support distance learning (Moodle), online surveys (Kahoot, LearningApp), etc.

Review of the work program (syllabus) INNOVATIVE INGREDIENTS IN FOOD TECHNOLOGY

Developed by the lecturer of the department **Tetiana STEPANOVA**

(name) (full name)

Parameter by which the work program (syllabus) of the educational component is evaluated by the guarantor or a member of the project team	Yes	No	Comment
Learning outcomes for the educational component (LOE) correspond to the NQF			
The learning outcomes for the educational component (LOE) correspond to the stipulated PRE (for mandatory EC)			
Learning outcomes for the educational component make it possible to measure and assess the level of their achievement			

Project team member EP _____

(title)

(full name)

(signature)

Parameter by which the work program (syllabus) of the educational component is evaluated by the teacher of the relevant department	Yes	No	Comment
General information about the educational component is sufficient			
Learning outcomes for the educational component (LOE) correspond to the NQF			
Learning outcomes by educational component (LOE) provide an opportunity to measure and assess the level of their achievement			
Learning outcomes (LOE) relate to student competencies, not to the content of the discipline (contain knowledge, skills, abilities, and not to the topics of the discipline curriculum)			
The content of the EC is formed in accordance with the structural and logical scheme			
Learning activity (teaching and learning methods) enables students to achieve expected learning outcomes (LOE)			
The educational component involves learning through research that is appropriate and sufficient for the appropriate level of higher education.			
The assessment strategy within the educational component is in line with the University/Faculty policy			
The provided assessment methods allow assessing the degree of achievement of learning outcomes by educational component.			
The student workload is adequate to the volume of the educational component.			
The recommended learning resources are sufficient to achieve the learning outcomes (LOE)			
The literature is relevant			

Reviewer (lecturer of the department) _____

(title)

(position, full name)

(signature)