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

Work program (syllabus) of the educational component

MODERN ACHIEVEMENTS IN FOOD SCIENCE

Specialty	181 Food technology
Educational and scientific program	Food technology
Level of higher education	Third (Doctor of Philosophy)

Sumy - 2023

Developer: Tetiana Stepanova PhD, Associate Professor

(signature)

Reviewed, approved and ratified at the meeting of the Department of Technology of Nutrition	protocol № 25 by «26» June 2023 .
	Head of Department _____ (signature) Oksana Melnyk

Agreed:

Guarantor of the educational and scientific program _____ (signature) Oksana Melnyk (Name)

Dean of the faculty where the educational program is implemented _____ (signature) Nataliia Bolhova (Name)

Review of the work program (attached) provided: _____ (Name) Olga Sereda

_____ (Name) Elena Koshel

Methodologist of the Department of Educational Quality, Licensing and Accreditation _____ (signature) (Hanna DAHNIK) (Name)

Registered in the electronic database: Date: 20.06. 2023

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

<table>
<tr><td>1.</td><td>Name of educational component</td><td colspan="8">MODERN ACHIEVEMENTS IN FOOD SCIENCE</td></tr>
<tr><td>2.</td><td>Faculty/Department</td><td colspan="8">Food technology/ technology of nutrition</td></tr>
<tr><td>3.</td><td>Status of EP</td><td colspan="8">Mandatory</td></tr>
<tr><td>4.</td><td>Program/Specialty (programs) of which the MC for (to be filled in for mandatory MCs) is a component</td><td colspan="8">Educational and scientific program "Food Technology"
in specialty 181 "Food Technology"</td></tr>
<tr><td>5.</td><td>The MC can be offered for (filled in for selective OKs)</td><td colspan="8"></td></tr>
<tr><td>6.</td><td>Level NQF</td><td colspan="8">8 level</td></tr>
<tr><td>7.</td><td>Semester and duration of study</td><td colspan="8">1 semester, 1-15 weeks</td></tr>
<tr><td>8.</td><td>Credits ECTS</td><td colspan="8">3</td></tr>
<tr><td>9.</td><td rowspan="4">The total volume of hours and their distribution</td><td colspan="8">90</td></tr>
<tr><td rowspan="3">10.</td><td colspan="6">Contact work (classes)</td><td colspan="2" rowspan="2">Independent work</td></tr>
<tr><td colspan="2">Lecture</td><td colspan="2">Practise/Seminars</td><td colspan="2">Lab</td></tr>
<tr><td>Full-time</td><td>External</td><td>Full-time</td><td>External</td><td>Full-time</td><td>External</td><td>Full-time</td><td>External</td></tr>
<tr><td>24</td><td>-</td><td>24</td><td>-</td><td></td><td>-</td><td>42</td><td>-</td></tr>
<tr><td>11.</td><td>Language of education</td><td colspan="8">English</td></tr>
<tr><td>12.</td><td>Teacher / Coordinator of the educational component</td><td colspan="8">Stepanova Tetiana</td></tr>
<tr><td>12.</td><td>Contacts</td><td colspan="8">Name: Stepanova Tetiana
Position: Associate Professor, Department of Food Technology
Working place: Room 314, Mechanization Building
E-mail: tetiana.stepanova@snau.edu.ua
Consultation hours: every Monday from 1:00 PM to 2:00 PM</td></tr>
<tr><td>13.</td><td>General description of the educational component</td><td colspan="8">The educational component includes sections on the current state and prospects for the development of food science in terms of the unique achievements of domestic and foreign scientists. The content of the discipline is adapted to the specialty. The subject of this course is the body of knowledge on the use of food ingredients in the design of innovative 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.</td></tr>
<tr><td>14.</td><td>Purpose of the educational component</td><td colspan="8">To ensure a sufficient theoretical and practical level of knowledge of students regarding the application of knowledge and technological solutions aimed at the rational use of raw materials, in order to preserve and increase the nutritional value of finished products, and reduce their cost.</td></tr>
<tr><td>15.</td><td>Prerequisites for studying EC, connection with other educational components of EP</td><td colspan="8">1. 1. The educational component is based on knowledge of food technology (knowledge of the features of the production of 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).
2. The educational component is the basis for writing a literature review of the dissertation work</td></tr>
<tr><td>16</td><td>Academic Integrity</td><td colspan="8">Compliance with academic integrity for higher education applicants</td></tr>
</table>

.	Policy	involves: independent completion of educational tasks, tasks of current and final control of learning results. Violations of academic integrity when studying for the EC are considered: academic plagiarism, academic fraud (copying, cheating, passing off someone else's work as their own), use of electronic devices during the final control of knowledge
17	Link to the course in the system Moodle	https://cdn.snau.edu.ua/moodle/course/view.php?id=5890
18	Keywords	

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 EP)						As the LOE is estimated
	PLO 1	PLO 6	PLO7	PLO8	PLO 9	PLO 11	
LOE 1. Know the features of the current state of domestic and foreign food science, ways to improve food production technology	+	+	+	+			Multiple choice and matching tests; presentation with a report, preparation of a publication
LOE 2. Possess the skills to implement modern technologies for semi-finished and finished products through the use of innovative food raw materials		+			+	+	Multiple choice and matching tests; conversation
LOE 3. Be able to develop and improve food production technologies, taking into account the scientific achievements of domestic and foreign scientists		+			+	+	Multiple choice and matching tests; oral interview
LOE 4. Be able to independently interpret the acquired knowledge in review articles, as well as effectively establish communications when performing team tasks	+		+	+			presentation with a report, preparation of a publication, exam

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			Recommended literature[1]
	Class work		Indep. work	
	Lc	Lb		
	Full/Cor	Full/ Cor	Full/ Cor	
Lc **Topic 1. Current state and prospects of food science in Ukraine and abroad** Features of the formation of food science in Ukraine. The concept of sustainable development and its goals. Ways of introducing scientific achievements into food production in accordance with the goals of sustainable development. Prospects of domestic and foreign food science in accordance with the goals of sustainable development Pc. Study of the current state of domestic food science ISW. Prospects of foreign food science	4	4	8	1, 2, 3, 7, 10, 12
Lc **Topic 2. Functional Food Technology** The concept of functional products. Scientific principles of creating functional food products. Modern technologies of functional products. Practical application of domestic and foreign developments of functional food products. Pc. Study of domestic and foreign experience in creating functional products ISW. The main stages of developing functional food products.	4	4	8	2, 4, 5, 7, 9, 11
Lc **Topic 3. Modern innovative technologies for food production.** Non-traditional approaches to primary processing of raw materials. Technologies of "soft" processing.	6	6	8	1, 2

[1]Specific source from the main or additionally recommended literature

Use of vacuum packages for the production of semi-finished products and finished products. Biotechnology in the food industry. Pc. Study of modern innovative technologies for food production ISW. Advantages and disadvantages of technology, safety of vacuum processing of raw materials				,7,8,11,12
Lc **Topic 4. Features of new food production technologies according to the principles of resource conservation and environmental safety.** Scientific foundations of resource conservation and environmental safety in food technologies. Resource efficiency in the technological process. Eco-design of technological lines and production systems. Development of new types of food products taking into account the principles of environmental friendliness. Use of local raw materials and alternative protein sources. Environmental aspects of formula formation and ingredient composition. Innovative packaging technologies: active and "smart" packaging; biodegradable and compostable materials Pc. Study of features of new food production technologies according to the principles of environmental safety. ISW. Technology of fine powders and pastes of quick freezing and cryogenic grinding.	6	6	8	1,2,5,6,7,9
Lc **Topic 5. Features of the use of food ingredients in domestic and foreign food technologies** Latest trends in the use of food ingredients. Use of “upcycled ingredients” ingredients from secondary processing products. Ingredients for plant analogues of meat and dairy products. Biotechnological ingredients: postbiotics, recombinant proteins, fermented ingredients. Features of the use of food ingredients of plant origin. Features of the use of food ingredients of animal origin. The trend towards clean-label: minimization of synthetic additives. Pc. Study of the features of the use of food ingredients in domestic and foreign food technologies ISW. Restrictions on the use of certain food ingredients	4	4	10	1,2,5,7,11,12
Totaly	**24**	**24**	**42**	

4. TEACHING AND LEARNING METHODS

LOE	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
LOE 1. Know the features of the current state of domestic and foreign food science, ways to improve food production technology taking into account the principles of resource conservation and environmental friendliness	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.	30	work with textbooks, manuals, materials of the Internet; , illustration, demonstration, performance of independent works, etc.	60
LOE 2. Possess the skills to implement modern technologies for semi-finished and finished products through the use of innovative food raw materials	Partial search methods: problem-dialogue, modeling, case method, etc. Using the MOODLE, ZOOM platform during blended learning.		independent search for educational information,	
LOE 3. Be able to develop and improve food production technologies, taking into account the scientific achievements of domestic and foreign scientists	Problem-solving methods when performing laboratory work Using the MOODLE, ZOOM platform during blended learning.		Study of literature and regulatory documentation on the topic, on the Moodle platform	
LOE 4. Be able to independently interpret the acquired knowledge in review articles, as well as effectively establish communications when performing team tasks	Problematic - discussions and discussions on the studied material. Lecture-press conference. Using the MOODLE, ZOOM platforms during blended learning.		Study of literature and regulatory documentation on the topic, on the Moodle platform	

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 (35 points)			
1.	Intermediate computer-based testing	15 points / 15%	By the end of week 7
2.	Performing and defending laboratory work	20 points / 20%	1-7 week
Module 2 (35 points)			
3.	Intermediate testing	15 points / 15%	By the end of week 14
4.	Performing and defending laboratory work	15 points / 15%	8-14 week
5.	Completion of an individual assignment/course (non-formal education)	5 points / 5 %	8-14 week
6.	Exams	30 points / 30 %	Exam week

5.2.2 Evaluation criteria

Component	Unsatisfactorily	Satisfactorily	Good	Exellent
Interview	<3 points	3-5	6-8 points	9-10 points
	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 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, the situational task is solved completely, the report is made	All requirements of the 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. Bocharova O.V. Developing a HACCP system for the catering industry using a "horizontal" approach: a textbook / O.V. Bocharove. – Odesa : Atlant, 2024. – P. 140 .
2. Ladyka V.I., Shilman L.Z., & Pertsevoi F.V. (2022). Modern advances of food science. Oldi+. 352 c.
3. Melnyk O.Yu., Savchenko-Pererva M.Yu., Stepanova T.M. Food Technologies. P. 1. Innovations in the food industry, Oldi+, 2024, 136
4. Modern advances of food science: tutorial / I.V. Syrokhman, O.I. Hirka, M.-M. B. Calimon. – Lviv: Rastr-7, 2018. – 507 c.
5. Chauhan O.P. (2022). Advances in food chemistry. https://doi.org/10.1007/978-981-19-4796-4
6. Corporation, I.F. (2020). Food safety handbook: A Practical Guide for Building a Robust Food Safety Management System. World Bank Publications.
7. Detwiler, D. (2020). Food safety: Past, Present, and Predictions. Academic Press.
8. Haijuan N., Stepanova T.M., Li Bo, Kondratjuk N.V. Modern achievements of food science in aspects of cultivated mushrooms application in food technology: monograph. Odesa : Oldi+, 2022. - 96 p.
9. Lavelle, C., This, H., Kelly, A.L. & Burke, R. (2021). Handbook of Molecular Gastronomy: Scientific Foundations, Educational Practices, and Culinary Applications. CRC Press
10. 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

11 Nan, H., Stepanova, T. M., Kondratiuk, N. V., Nie, Y., & Li, B. (2022). Effects of agaricus bisporus on gel properties of chicken myofibrillar protein. International Journal of Food Science and Technology, 57(8), 5532-5541. doi:10.1111/ijfs.15898

12. Nan H., Stepanova, T., Li, B. (2024): Application of Water Extract from Honey-Suckle (*Lonicera Japonica Thunb*) Leaves and Its Effect on the Quality of Fresh Chicken Meat. Scientia Agriculturae Bohemica, 55, 79-87. DOI: 10.7160/sab.2024.550308

13. Nan, H., Zhou, H., Li, B., Stepanova, T., & Kondratiuk, N. (2022). Effects of agaricus bisporus alone or in combination with soybean oil or water as fat substitutes on gel properties, rheology, water distribution, and microstructure of chicken batters. Food Science and Technology (Brazil), 42 doi:10.1590/fst.116121

14. Nan, H., Stepanova, T., Li, B., & Kondratiuk, N. (2021). Effect of Agaricus Bisporus on Gel Properties and Microstructure of Chicken Batters. Journal of Hygienic Engineering and Design, 36, 170-178.

Software

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