Ministry education and sciences Ukraine
Sumy National Agrarian UniversityFaculty of
Food Technology
Department of Nutrition Technology

Syllabus educational component

MC 10 Modeling and planning a scientific experiment

Mandatory

(name and status (required/optional)

Under implementation in within the educational programs
"Food Technologies"
by specialty **181 "Food Technologies"**

HED Doctor of Philosophy

Sumy – 2024

Developer Mazurenko I.K. , Professor of the Department of Food Technology, Doctor of Technical Sciences.

Considered, approved and approved on from the chair of the department Food technologies (name departments)	protocol dated May 31 , 202 4 .№ 19
	Manager departments _____ (signature) Oksana Melnyk (name, initials)

Agreed:

Guarantor educational programs_ Oksana Melnyk
(signature) (full name)

Dean faculty,

where is being implemented educational program _____ Natalya Bolhova
(signature) (full name)

Review on working program (attached) provided by: Sereda Olga

(Full name)

Elena 's wallet _____
(Full name)

Methodist department qualities education,

licensing and accreditations _____ (Barannik N.M. _____)

(signature) (full name)

Registered in electronic base: date: _____202 4 river

Information about revision working programs (syllabus):

Educational year, in to whom are introduced changes	Application number to work program withdescription of changes	Changes considered and approved		
		Date and number protocol meeting departments	Manager departments	Guarantor educational programs

1. GENERAL INFORMATION ABOUT EDUCATIONAL COMPONENT

<table>
<tr><td>1.</td><td>Name MC</td><td colspan="8">Modeling and planning a scientific experiment</td></tr>
<tr><td>2.</td><td>Faculty/department</td><td colspan="8">FHT/ Department of Food Technology</td></tr>
<tr><td>3.</td><td>Status MC</td><td colspan="8">Mandatory</td></tr>
<tr><td>4.</td><td>Program/Specialty (programs), component which are MC for</td><td colspan="8">Educational and scientific program: Food technologies/ specialty: 181 "Food technologies"</td></tr>
<tr><td>5.</td><td>MC maybe be proposed for</td><td colspan="8">EP Food Technologies HED Master's degree specialty 181 Food Technologies</td></tr>
<tr><td>6.</td><td>Level NRC</td><td colspan="8">Level 8</td></tr>
<tr><td>7.</td><td>Semester and duration Study</td><td colspan="8">Second semester
Duration of study – 1 semester</td></tr>
<tr><td>8.</td><td>Number loans ECTS</td><td colspan="8">3 credits and</td></tr>
<tr><td rowspan="3">9.</td><td rowspan="3">Total hoursand their distribution</td><td colspan="6">Contact work (occupation)</td><td colspan="2">Independent work</td></tr>
<tr><td colspan="2">Lectures</td><td colspan="2">Practical /seminar</td><td colspan="2">Laboratory</td><td colspan="2"></td></tr>
<tr><td>Daily</td><td>Correspondence.</td><td>Daily</td><td>Correspondence.</td><td>Daily</td><td>Correspondence.</td><td>Daily</td><td>Correspondence.</td></tr>
<tr><td></td><td>20</td><td></td><td>20</td><td>-</td><td>-</td><td></td><td>50</td><td></td></tr>
<tr><td>10.</td><td>Language teaching</td><td colspan="8">Ukrainian /English</td></tr>
<tr><td>11.</td><td>Teacher / Coordinator educational component</td><td colspan="8">Mazurenko Igor Kostiantynovych</td></tr>
<tr><td>11.1</td><td>Contact information</td><td colspan="8">Department auditorium 112m, building №4. Tel. 06 7 - 706 - 76 - 6 2, E-mail: 0487222489@ukr.net</td></tr>
<tr><td>12.</td><td>General description educational component</td><td colspan="8">To acquaint postgraduates with science as a system of knowledge, forms of its organization and management, the system of training scientific personnel in Ukraine; to give an idea of the methodology of scientific research as a toolkit and as a science of the methods and areas of their application in scientific activity; to reveal the meaning and essence of information support for scientific activity; to introduce the organizational principles of scientific research; to give an idea of the stages of organizational and methodological preparation of scientific research; to introduce the methodology of experimental research and mathematical planning of the experiment; to reveal the role and principles of scientific organization of work in scientific activity.</td></tr>
<tr><td>13.</td><td>Goal educational component</td><td colspan="8">Formation of a scientific worldview in postgraduate students, a holistic understanding of the methodology of scientific research and skills in the practical application of specific methods of scientific research in professional activities, study of the principles and methods of management and implementation of scientific research, organization of the researcher's work, ethics and morality of science; acquisition of practical skills in organizing research, publishing and implementing research results.</td></tr>
<tr><td>14.</td><td>Study prerequisitesOK, connection with others educational components of the OP</td><td colspan="8">“Modern achievements in food science”, “Methodology of conducting scientific research”</td></tr>
<tr><td>15.</td><td>Policy academic virtue</td><td colspan="8">If cheating is discovered during the exam, the student's work is canceled again.</td></tr>
</table>

16.	Link for the course in system Moodle	https://cdn.snau.edu.ua/moodle/course/view.php?id=5891

2. RESULTS TEACHING BY EDUCATIONAL COMPONENT AND THEIR CONNECTION WITHSOFTWARE LEARNING OUTCOMES

Learning outcomes in the discipline[1]	Program learning outcomes[2]				How is it rated?RND [4]
	2	3	4	5	
DRN 1. Formulate and test hypotheses; use appropriate evidence to substantiate conclusions, in particular, the results of theoretical analysis, experimental studies and mathematical and/or computer modeling, and available literature data.	+				*Knowledge assessment by checking the processing of the basic lecture notes and practical class reports* *Test* *Individual task*
DRN 2. Use modern tools and technologies for searching, processing and analyzing information on food technology problems, in particular, statistical methods for analyzing large-scale and/or complex data, specialized databases and information systems.		+			
DRN 3. Plan, organize and carry out experimental and/or theoretical research in the field of food technology using modern tools and equipment, information technology and software.			+		
DRN 4 . Have advanced conceptual and methodological knowledge, demonstrate research skills in the field of food technology and at the border of subject areas, sufficient to conduct scientific and applied research in order to obtain new knowledge and/or implement innovations at the level of modern world achievements in science and technology.				+	

1. CONTENT OF THE EDUCATIONAL COMPONENT (PROGRAM EDUCATIONAL DISCIPLINES)

Topic.	Distribution in within general budget time	Recommende

[1]The list that is given in the work program under "to know, to be able to".
When defining the DNR in the work program, you can not highlight "know, be able to", but give a general list.
[2]indicate the PRN numbers as they are given in the OP.
MANDATORY! The PNRs listed in the appendix must match the "+" ones listed in the PNR and OK correspondence matrix of the educational program.

List of questions, what will be considered within topics	Auditorium work		Independent work	dliterature [5]
	Luke	Pr		
Topic 1. Introduction. Scientific foundations of the formation of fundamental and applied research.	2	-	5	[1,2,5,6]
Topic 2. Information and literary sources as a basic component of scientific research. *Medicine. Formation of the direction of research . Determination of the general purpose of the research . Formation of the goals and objectives of the research . Work with special literary and information sources .*	2	4	5	[4 , 8 ,1 5]
Topic 3. State regulatory documents, methods and techniques for conducting an experiment.	2	-	5	[9,10]
Topic 4. Laboratory equipment and instruments. Determination of functional purpose and possibilities of application in scientific research. *Drug . Main stages of research . Creation of a research work program . Formation of a research diary . Conducting cross-tests according to the principle of research in laboratory and industrial conditions .*	2	4	5	[11,12]
Topic 5. Formation of a roadmap for scientific research .	2	-	5	[12,14,15]
Topic 6. Organization of a scientific experiment based on the principle of modulating conditions as close as possible to industrial ones. *JI3. Technology of ZRG products using dietary supplements, non-traditional raw materials and creative trends.*	2	4	5	[2, 1 0 , 11]
Topic 7. Formation of a food product based on the principle of adjusting production processes and the chemical composition of the starting raw materials	2	-	5	[3,5,11]
Topic 8. Modeling a recipe bookmark to improve the quality, safety, and functionality of a food product. *LZ. Research into the influence of physicochemical processes on the formation of the quality and safety of food products . Formation of the structure of solutions based on the principle of modulating and adjusting production processes . Formation of sensory and functional indicators of the product based on the principle of modulating the physicochemical composition of the starting raw materials .*	2	4	5	[11, 13,1 7 ,1 8]
Topic 9. Mathematical modulation, processing of the results of a scientific experiment.	2	-	5	[9 , 16]
Topic 10 . Fundamentals of substantiating scientific results. Preparation of a general report on scientific research. *LS. Formation of conclusions from research results . Justification of research results using the principles of mathematical calculations and modeling. Formation of general conclusions . Formatting research results in accordance with the structure .*	2	4	5	
Total	**20**	**20**	**50**	

3. METHODS TEACHING AND TEACHING

DRN	**Teaching methods** (work to be carried outteacher during classroom lessons , consultations)	**Quantity hours**	**Teaching methods** (what types educational activities have to perform student independently)	**Keel-st hours**
DRN 1. Formulate and test hypotheses; use appropriate evidence to substantiate conclusions, in particular, the results of theoretical analysis, experimental studies and mathematical and/or computer modeling, and available literature data.	Lecture class (teaching lecture material, conversation, demonstration of graphic material)	10	Familiarization with lecture material, preparation of a basic lecture outline. Presentation of decisions made and preparation of abstracts and reports.	12
DRN 2. Use modern tools and technologies for searching, processing and analyzing information on food technology problems, in particular, statistical methods for analyzing large-scale and/or complex data, specialized databases and information systems.	Lecture class (teaching lecture material, conversation, demonstration of graphic material). Practical lesson (solving assigned tasks).	10	Familiarization with lecture material, preparation of a basic lecture outline. Presentation of decisions made and preparation of abstracts and reports . Presentation of the results of practical classes, preparation of reports.	12
DRN 3. Plan, organize and carry out experimental and/or theoretical research in the field of food technology using modern tools and equipment, information technology and software.	Practical exercises (solving assigned tasks) .	10	Presentation of the results of practical classes, preparation of reports.	12
DRN 4 . Have advanced conceptual and methodological knowledge, demonstrate research skills in the field of food technology and at the border of subject areas, sufficient to conduct scientific and applied research in order to obtain new knowledge and/or implement innovations at the level of modern world achievements in science and technology.	Practical classes (solving assigned tasks).	10	Presentation of the results of practical classes, preparation of reports.	14

5. EVALUATION BY EDUCATIONAL COMPONENT

5.1. Summative assessment

5.1.1. For evaluation expected results teaching provided

No.	Methods summative evaluation	Points / Weightin general assessment	Date drafting
	Module 1 (50 points)		

1.	Written test on theoretical material	*2 5 points / 2 5 %*	By the end of week 8
2.	Execution and defense of practical works	*2 5 points / 2 5 %*	By the end of week 8
	Module 2 (50 points)		
3.	Written test on theoretical material	*2 5 points / 2 5%*	By the end of week 14
4.	Execution and defense of practical works	*2 5 points / 2 5%*	By the end of week 14
5.	Test – oral interview	*60-100 points*	By the end of week 15

5.1.2. Criteria evaluation

Component [8]	**Unsatisfactorily**	**Satisfactorily**	**Good**	**Excellent** [9]
Written assignment on theoretical material	*< 15 points*	*16 - 19 points*	*2 0 -2 4 points*	*25 points*
	Task requirements not met	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.	The answers to all questions are given	The answers to all questions are given, demonstrated, creativity, thoughtfulness, and the original is proposed. problem solving
Execution and defense of practical works	*< 15 points*	*16 - 19 points*	*2 0 -2 4 points*	*25 points*
	Task requirements not met	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.	The answers to all questions are given	Done all requirements tasks, demonstrated creativity, thoughtfulness, proposed own problem solving
Test – oral interview	*< 59 points*	*60-74 points*	*75 - 89 points*	*90-100 points*
	Task requirements not met	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.	The answers to all questions are given	Done all requirements tasks, demonstrated creativity, thoughtfulness, proposed own problem solving

5.2. Formative evaluation:

For evaluation current progress in training and understanding directions furtherimprovement provided

No.	***Elements formative evaluation***	***Date***
	Fall semester	

1.	*Oral knowledge test after study topics 1- 5*	*Week 7*
2.	*Oral knowledge control after study topics 6 - 10*	*14 week*
3.	*Oral questioning during practical work*	*Within 1-14 weeks*
4	*Feedback from teacher under time preparation for the test*	*14 week*

6. EDUCATIONAL RESOURCE (LITERATURE)

6.1. Main

1. Ladanyuk A.P., Vlasenko L.O., Kyshenko V.D. Methodology of scientific research: a textbook. – Kharkiv: Lira-K, 2018. – 352 p.

2. Kostyukevich V.M. Fundamentals of research work of higher education students at the master's and doctorate degrees: a textbook. – Kyiv: KNT, 2017. – 634 p.

3. Pentylyuk M.I., Oleksenko V.P., Gaidaenko I.V. Educational and research work of students: teaching and methodological manual. – Kherson, 2020. – 158 p.

4. Radchenko A.E., Yarantseva E.O. Reference notes for lectures on the discipline "Methodology of scientific research" for students of specialty 181 Food technologies of the OPP "Food technologies in the restaurant industry". – Kharkiv: DBTU, 2022. – 60 p.

5. Vazhinsky S.E., Shcherbak T.I. Methodology and organization of scientific research: a textbook. – Sumy: Sumy State University named after A.S. Makarenko, 2016. – 260 p.

6. Ladyka V.I., Shilman L.Z., Pertsevoy F.V., Pivovarov P.P. and others. Modern achievements of food science: a textbook. – Sumy: Oldi-Plus, 2022. – 352 p.

7. Danylyan O.G., Dzyoban O.P. Methodology of scientific research: textbook. – Kharkiv: Pravo, 2019. – 368 p.

8. Koryagin M.V., Chik M.Yu. Fundamentals of scientific research: a textbook. – Kyiv: Alerta, 2019. – 492 p.

9. Bilukha M.T. Fundamentals of Scientific Research. – Kyiv: Higher School, 1997. – 314 p.

10. Hryshchenko I.M., Hryhorenko O.M., Borysenko V.O. Fundamentals of Scientific Research: Textbook. – Kyiv: KNUTE, 2001. – 186 p.

11. Kovalchuk V.V., Moiseyev L.M. Fundamentals of Scientific Research: Textbook. – Kyiv: Professional, 2005. – 240 p.

12. Krutov V.I., Grushko I.M., Popov V.V. and others. Fundamentals of scientific research: a textbook for technical universities. – Moscow: Higher School, 1989. – 400 p.

13. Narynyan A.R., Pozdeyev V.P. Fundamentals of Scientific Research: a textbook. – Kyiv: Publishing House of the European University, 2002. – 109 p.

14. Romanchykov V.I. Fundamentals of Scientific Research: a textbook. – Kyiv: IZMN, 1997. – 244 p.

15. Baskakov A.Ya., Tulenkov N.V. Methodology of scientific research: a textbook. – Kyiv: MAUP, 2002. – 216 p.

16. Food technologies. Part 1. Innovations in the food industry: a textbook for graduate students / O.Yu. Melnyk, M.Yu. Savchenko-Pererva, T.M. Stepanova and others. ; ed. Oksana Melnyk. - Odessa: Oldi+, 2024. - 145 p. 8 . Molecular cuisine: advantages and disadvantages, as well as the impact on the body of specific cooking technology. URL: https://ukr.media/food/386564/.

Review on working program (syllabus)

Parameter, by which is being evaluated working program (syllabus) of the educational component by the guarantor or memberproject group	**Yes**	**No**	**Comment**
Results teaching by educational component (DRN) respond NRC			
Results teaching by educational component (DRN) respond foreseen PRN (for mandatory OK)			
Results teaching by educational component give possibility to measure and to evaluate level their achievement			

Member project groups OP_____Marina Savchenko____
(name) (full name) (signature)

Parameter by which the work program is evaluated(syllabus) of the educational component by the teacher of the relevant department	Yes	No	Comment
General information about educational component there are sufficient			
Results teaching by educational component (DRN) respond NRC			
Results teaching by educational component (DRN) give possibility to measure and to evaluate level their achievement			
Results teaching (DRN) relate to competencies students, and not content disciplines (contain knowledge, skills,skills, and not topics educational programs disciplines)			
Content OK formed in accordance to structural-logical schemes			
Educational activity (teaching and learning methods) gives opportunity students achieve expected results teaching (DRN)			
The educational component involves learning through research, What there are appropriate and sufficient for relevant equal higher education			
Strategy evaluation in within educational component corresponds politics University/Faculty			
The provided evaluation methods allow to assessdegree of achievement of learning outcomes in education component			
Load students there are adequate volume educational component			
The recommended learning resources are sufficient for achievement results teaching (DRN)			
Literature there are relevant			
List educational resources contains necessary for achievement DRN software products			

Reviewer (teacher departments) food technology Associate Professor Koshel Olena _____
(name) (position, Full name) (signature)