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

Work program (syllabus) of the educational component MC 10 Scientific bases of waste-free technologies of food industry

Mandatory

(name and status (mandatory / optional)

Implemented within the educational program "Food Technology"
in specialty 181 "Food Technology"
at the second level of higher education

Sumy - 2022

Developer: _____ Bidiuk D.O., Ph.D., senior lecturer
(signature) (surname, initials) (academic degree and title, position)

_____ Bokovets S.P., assistant
(signature) (surname, initials) (academic degree and title, position)

Considered, approved and approved at the meeting of the Department of Food Technology	protocol from 14.06.2022 №18
	Acting head of the departments _____ (signature) Melnyk O.Y. (surname, initials)

Agreed:

Guarantor of the educational program _____ (signature) Pertsevoi F.V. (full name)

Acting Deputy Dean, where the educational program is implemented _____ (signature) Bolhova N.V. (full name)

Review of the work program (attached) provided: _____ Melnyk O.Y. (full name)

_____ Koshel O.Y. (full name)

Methodist of the Department of Education Quality, licensing and accreditation _____ (signature) _____ (full name)

Registered in the electronic database: date: 05.07. 2022

Information on viewing the work program (syllabus):

Educational year in which are made changes	The number of the application to the work program with a description of the changes	The changes were considered and approved		
		Date and number minutes of the meeting departments	Head of Department	Guarantor educational programs

1. GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT

1.	Name OK	OK10 Scientific bases of waste-free technologies of food industry			
2.	Faculty / department	Food Technology / Department of Food Technology			
3.	Status OK	Obligatory			
4.	Program / Specialty (programs), the component of which is OK for (to be filled in for *mandatory OK)*	Educational program: Food Technology / specialty: 181 "Food Technology"			
5.	OK it may be proposed for (to be filled in for sample OK)	-			
6.	NQF level	Level 7			
7.	Semester and duration study	The third semester The duration of the study is 15 weeks			
8.	Number of loans ECTS	5 credits			
9.	The total number of hours and their distribution	Contact work (classes)			Individual work
		Lectures	Practical / seminar	Laboratory	
		4		**10**	**136**
10.	Language of instruction	English			
11.	Teacher / Coordinator educational component	Bidyuk Dmytro Olehovych			
11.1	Contact Information	Auditorium of the department 212m, building №4. Tel. (050) 781-20-27, E-mail: xbach@ukr.net consultation time: every Wednesday from 1 pm to 2 pm			
12.	General description educational component	Within the framework of this educational component, an idea of modern technologies for the extraction of valuable biologically active substances from by-products of the food industry is provided. The student will be acquainted with the optimization of food processing technologies to minimize the generation of food waste, by-products of the food industry, using them to create useful products with added value for food and non-food purposes. The discipline reviews the problems associated with food waste, considers ways to dispose of food waste, by-products of the food industry, taking into account global environmental standards and as a means of achieving sustainable development goals.			
thirteen.	The purpose of education component	Acquaintance with the latest research and practice in the field of waste-free resource-saving technologies of food products, areas of processing and disposal of food waste and by-products of the food industry into valuable products, taking into account global environmental requirements.			
14.	Prerequisites for studying OK, connection with other educational components of the OP	The educational component is related to other educational components "General technologies of the food industry", "Theoretical foundations of food production", "Food quality management"			
15.	Academic policy integrity	If the fact of writing off during the exam is revealed, the student's work is canceled and the exam is re-taken.			
16.	Course link in Moodle system	https://cdn.snau.edu.ua/moodle/course/view.php?id=5044			

2. LEARNING OUTCOMES OF THE EDUCATIONAL COMPONENT AND THEIR RELATIONSHIP WITH THE SOFTWARE LEARNING OUTCOMES

MC learning outcomes: After studying the educational component, the student is expected to be able to... »	Program learning outcomes						As estimated. LOEC
	PLO 1	PLO 3	PLO 4	PLO 7	PLO 13	PLO 14	
LOEC 1. Apply new methods of preserving and storing food products, use bioplastics for packaging raw materials, semi-finished products and finished products, as well as develop an innovative food product from various types of raw materials, taking into account economic efficiency		x			x		*Assessment of knowledge by checking the elaboration of the reference syllabus of lectures and laboratory classes* *Examination* *Computer testing (certification)*
LOEC 2. Apply practical skills in using special equipment, software and modern methods of zero-waste technologies in the production of innovative food products in certain branches of food technology		x				x	
LOEC 3. Demonstrate knowledge of the latest trends in the field of waste-free resource-saving technologies of food products, directions of processing and utilization of food waste and by-products of the food industry into valuable products	x			x		x	
LOEC 4. Know modern methods of processing food raw materials and waste, the latest technologies for extracting valuable biologically active substances from by-products of the food industry;			x	x			
LOEC 5. Demonstrate knowledge of ways to optimize technologies for processing food raw materials to minimize the formation of food waste, by-products of the food industry, ways of using them to create useful food and non-food products, problems related to food waste;			x			x	
LOEC 6. To work with technical, economic and technological documentation when solving problems of various nature in the field of food technology	x		x				
LOEC 7. Demonstrate initiative and ingenuity during the development and implementation of technical and technological innovations. Be able to independently make non-standard creative decisions, bear responsibility for them, generate new ideas and implement them in practical activities, demonstrate the ability to adapt;			x	x		x	

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

Topic. List of issues to be addressed within the topic.	Distribution within the total time budget			Recommended Books
	Classroom work		Independent work	
	Lecture	Lab. less.		
Topic 1. By-products of the food industry and their use *Lec.* 1. Food waste and by-products for industrial use. 2. By-products from the grain processing industry. 3. Fruit and vegetable by-products. 4. By-products of the meat and poultry processing industries. *Lab. less.* Study of organoleptic, physico-chemical and functional-technological indicators of by-products of the food industry *Ind. work.* 1. By-products of seafood processing. 2. By-products of the dairy industry. 3. Coffee processing. By-products and waste from coffee processing. 4. Disposal of coffee by-products and waste. 5. Processing and production of tea. Tea by-products and waste and their disposal	2	4	68	[1-12]
Topic 2. Bioprocessing of waste from beef, pork, chicken and eggs *Lec.* 1. Various by-products and wastes from beef and pork processing. 2. By-products and wastes from chicken and egg processing. 3. Proteins and peptides derived from by-products of chicken waste processing. *Lab. less.* The use of by-products of the food industry in the composition of food products *Ind. work.* 1. Valorization of beef and pork meat processing waste. 2. Valorization of egg waste. 3. Biogas and production of electricity from vegetable waste. 4. Extraction of biologically active compounds from plant waste. 5. Food fibers from vegetable waste.	2	6	68	[1-12]
Total	**4**	**10**	**136**	

4. TEACHING AND TEACHING METHODS

LOEC	**Teaching methods** (work to be carried out by the teacher during classes, consultations)	**Number of hours**	**Teaching methods** (what types of educational activities the student must perform independently)	**Number of hours**
LOEC 1. Demonstrate knowledge on waste-free technologies in the conditions of existing food industry enterprises and restaurants, the use of new methods of canning and storage of food, the use of bioplastics for packaging raw materials, semi-finished and finished products;	Lecture (teaching lecture material, conversation, demonstration of graphic material)	3	Acquaintance with lecture material, registration of the basic synopsis of lectures. Presentation of decisions and preparation of abstracts, reports with visual support	27
LOEC 2. Demonstrate knowledge of the latest trends in the field of waste-free resource-saving technologies of food products, areas of	Lecture (teaching lecture material, conversation, demonstration of graphic material)	3	Acquaintance with lecture material, registration of the basic synopsis of lectures. Presentation of decisions and preparation of abstracts, reports	27

processing and disposal of food waste and by-products of the food industry into valuable products;			with visual support	
LOEC 3. Demonstrate knowledge of modern methods of processing food raw materials and waste, the latest technologies for the extraction of valuable biologically active substances from by-products of the food industry;	Laboratory lesson (consideration of technological situations with the provision of recommendations for solving technological problems of production)	3	Presentation of the results of laboratory classes, preparation of reports	27
LOEC 4. Demonstrate knowledge of optimization of food processing technologies to minimize the generation of food waste, by-products of the food industry, ways to use them to create useful food and non-food products, problems related to food waste;	Laboratory lesson (consideration of technological situations with the provision of recommendations for solving technological problems of production)	3	Presentation of the results of laboratory classes, preparation of reports	27
LOEC 5. Demonstrate initiative and ingenuity in the development and implementation of technical and technological innovations. Be able to independently make non-standard decisions of a creative nature, be responsible for them, generate new ideas and implement them in practice, demonstrate the ability to adapt;	Lecture (teaching lecture material, conversation, demonstration of graphic material)	2	Acquaintance with lecture material, registration of the basic synopsis of lectures. Presentation of decisions and preparation of abstracts, reports with visual support	28

5. EVALUATION BY EDUCATIONAL COMPONENT

5.1. Summative assessment

5.1.1. To assess the expected learning outcomes provided

№	Methods of summative evaluation	Points / Weight in the overall score	Date of compilation
1.	Written test on theoretical material	*20 points / 20%*	By the end of the 15th week
2.	Execution and protection of laboratory works	*20 points / 20%*	By the end of the 15th week
3.	Performing independent work. Public speech with visual accompaniment to the topic of the report (abstract)	*15 points / 15%*	By the end of week 14
4.	Final certification - multiple choice test	*15 points / 15%*	By the end of the 8th week
5.	Exam - written answer to the ticket	*30 points / 30%*	By the end of the 15th week

5.1.2. Evaluation criteria

Component	Unsatisfactorily	Satisfactorily	Fine	Perfectly
1. Written test on theoretical material	*<12 points*	*12-15*	*15-18 points*	*20 points*
	Task requirements not met	Answers to all questions are given, but some 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	Answer to all questions given, demonstrated, creativity, thoughtfulness, proposed own solution to the problem
Execution and protection of laboratory works	*<12 points*	*12-15*	*15-18 points*	*20 points*
	Task requirements not met	Answers to all questions are given, but some 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	All requirements of the task are fulfilled, creativity, thoughtfulness is shown, own solution of a problem is offered
Performing independent work	*<8 points*	*8-11*	*11-14 points*	*15 points*
	Task requirements not met	Answers to all questions are given, but some 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	All requirements of the task are fulfilled, creativity, thoughtfulness is shown, own solution of a problem is offered
Final certification - multiple choice test	*<8 points*	*8-11*	*11-14 points*	*15 points*
	Task requirements not met	Answers to all questions are given, but some 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	All requirements of the task are fulfilled, creativity, thoughtfulness is shown, own solution of a problem is offered
Exam - written answer to the ticket	*<12 points*	*12-24*	*25-29 points*	*30 points*
	Task requirements not met	Answers to all questions are given, but some 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	All requirements of the task are fulfilled, creativity, thoughtfulness is shown, own solution of a problem is offered

5.2. Formative assessment:

To assess current progress in learning and understanding areas for further improvement

№	Elements of formative assessment	Date
1.	Written survey after studying the topic 1	5 weeks
2	Written survey after studying the topic 2	10 weeks
3.	Oral interview during each laboratory session	Within 1-14 weeks
4	Feedback from the teacher in preparation for certification	8 weeks
5	Feedback from the teacher while working on the abstract	14 weeks

6. LEARNING RESOURCES (LITERATURE)

6.1. The main sources

1. Food processing by-products and their utilization / edited by Dr. Anil Kumar Anal. First edition. - 2018 by John Wiley & Sons Ltd, 592 P.
2. Utilization of bioactive compounds from agricultural and food waste / editor: Quan V. Vuong. - 2017 by CRC Press. 414 П.
3. Food Bioconversion.Handbook of Food Bioengineering, Volume 2 / Edited byAlexandru, Mihai Grumezescu, Alina Maria Holban.1st edition. 2017 - Academic Press. 550 П.
4. Integrated Processing Technologies for Food and Agricultural By-Products.Zhongli PanRuihong Zhang Steven Zicari. 1st Edition. 2019 - Academic Press. 452 П.

6.2. Information resources

7. Food Waste and Byproducts: An Opportunity to Minimize Malnutrition and Hunger in Developing Countries[Electronic resource] / Access mode:https://www.frontiersin.org/articles/10.3389/fsufs.2018.00052/full
8. Utilization of food processing by-products[Electronic resource] / Access mode:https://www.hilarispublisher.com/proceedings/utilization-of-food-processing-byproducts-8455.html
9. Food Byproducts as Sustainable Ingredients for Innovative and Healthy Dairy Foods[Electronic resource] / Access mode:https://pubmed.ncbi.nlm.nih.gov/30249001/