

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

Working Program (Syllabus) of the Educational Component

**20 TECHNOLOGY OF WATER, NON-ALCOHOLIC,
LOW-ALCOHOL, AND ALCOHOLIC BEVERAGESOK**

Specialty	181 "Food Technologies"
Educational Program	Food Technologies
Higher Education Level	First (Bachelor's)

Developer: Vasyl TISHCHENKO, Ph.D. in Agricultural Sciences, Associate Professor of the Department of Food Technologies and Safety

Reviewed and approved at the meeting of the Department of Food Technologies and Safety	Protocol No. 17 dated May 19, 2026.
	Head of the Department (підпис) Maryna SAMILYK (прізвище, ініціали)

Agreed: Educational Program Guarantor:

Doctor of Philosophy, Associate Professor _____ Olena KOSHEL

Dean of the Faculty where the educational program is implemented:

_____ Nataliia BOLGOVA

Review of the working program provided by:

Ph.D. in Technical Sciences, Assoc. Prof. _____ Oksana MELNYK

Ph.D., Assoc. Prof. _____ Tetiana SYNENKO

Methodologist of the Department of Educational Quality, Licensing, and Accreditation:
_____ (_____) (signature) (Full Name)

Registered in the electronic database: Date: _____ 2026

SNAU, 2026 year

1. GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT

1	Name of the Educational Component (EC)	EC20 Technology of Water, Non-Alcoholic, Low-Alcohol, and Alcoholic Beverages				
2	Faculty/Department	Food Technologies / Food Technologies and Safety				
3	EC Status	Mandatory				
4	Program/Specialty (programs) of which the EC is a part (to be completed for mandatory ECs)	"Food Technologies" / 181 "Food Technologies"				
5	NQF Level	First (Bachelor's) level of higher education				
6	Semester and duration of study	3rd year, 5th semester, 15 weeks				
7	Number of ECTS credits	5 credits				
8	Total hours and their distribution	Contact hours (full-time study)			Contact hours (part-time study)/	
		Lectures	Laboratory sessions	Independent work	Lectures	Laboratory sessions
		30	30	90		2
9	Language of instruction	Ukrainian				
10	Instructor/Coordinator of the educational component	Vasyl Ivanovych Tyshchenko, Associate Professor, Candidate of Agricultural Sciences				
11	Contact information	tischenko_1958@ukr.net				
12	General description of the educational component	The syllabus for the course "Technology of Water and Non-Alcoholic, Low-Alcohol, and Alcoholic Beverages" is designed for students majoring in "Food Technologies" (Specialty 181). The course aims to provide students with theoretical and practical knowledge regarding new trends in water technology and the specifics of producing low-alcohol and alcoholic beverages, as well as to develop skills for their application in food industry enterprises.				
13	Objective of the educational component	The aim of this course is to equip future specialists with in-depth theoretical knowledge and practical skills regarding the processes and technological operations involved in water treatment and the production of non-alcoholic, low-alcohol, and alcoholic beverages of specified quality and safety. The primary objectives of the course are: - to provide higher education students with fundamental knowledge and key terminology regarding the technology of water and the production of non-alcoholic, low-alcohol, and alcoholic beverages; - to study the principles, theories, laws, and general processes involved in the technology of water and the production of non-alcoholic, low-				

		alcohol, and alcoholic beverages; fundamental process flow diagrams for the production of major beverage and water categories, along with processing parameters and control methods; production methods for core beverage products; mastering laboratory methods for assessing the quality and safety of beverages and water; learning to use regulatory documentation regarding water and beverages; analyzing data on process operations and providing recommendations for their optimization; and reproducing fundamental process flow diagrams for the production of major beverage and water categories, as well as characterizing the technological processes and their operating parameters.
14	Prerequisites for studying the educational component; connection with other educational components of the educational program.	1. The educational component is based on knowledge from the following disciplines: "Biochemistry," "Processes and Equipment in Food Production," "Theoretical Foundations of Food Production," "Food Microbiology," and "Food Product Control Methods." 2. The educational component serves as a foundation for the study of the following disciplines: OK 27 "Organization of Restaurant Operations," OK 29 "Design of Food Enterprises and Restaurant Establishments," OK 30 "Pre-graduation Internship," and OK 31 "Preparation and Defense of the Qualification Thesis." There are no restrictions.
15	Academic Integrity Policy	Compliance is ensured in accordance with the Code of Academic Integrity and the requirements set forth in the "Regulation on Academic Integrity of Sumy National Agrarian University." (https://snau.edu.ua/viddil-zabezpechennya-yakosti-osviti/zabezpechennya-yakosti-osviti/akademichna-dobrochesnist)
16	Electronic resourceLink to the course materials on the Moodle platform	https://cdn.snau.edu.ua/moodle/course/view.php?id=4634
17	Keywords	Beverages, technology, malt, mash, tinctures, fruit liqueurs, fermentation, distillation

2. LEARNING OUTCOMES OF THE EDUCATIONAL COMPONENT AND THEIR LINK TO PROGRAMME LEARNING OUTCOMES

Learning outcomes for the educational component: Upon completion of the educational component, the student is expected to be able to...	Program learning outcomes that the educational component aims to achieve					How RND is assessed
	PRN1	PRN 3	PRN 5	PRN 8	PRN 21	
DNR 1. To analyze and solve theoretical and practical problems in the field of technology for water and for non-alcoholic, low-alcohol, and alcoholic beverages.	+					Preparation of lecture notes and laboratory work materials; Completion of modular tests; Completion of independent work;
DNR 2. Use digital technologies to provide information support for professional activities and conduct		+				

applied research in the field of water technology and the production of non-alcoholic, low-alcohol, and alcoholic beverages.						Oral defense of laboratory assignments; Final multiple-choice test (modular assessment)
DNR 3. Apply scientific knowledge regarding beverage production processes, as well as the nature and dynamics of the physicochemical, biochemical, and microbiological transformations of raw material composition during processing.			+			
DNR 4. Analyze or make decisions regarding the improvement of beverage technology, taking into account global industry trends.				+		
DNR 5. To present the results of activities to the professional community and the general public with the aim of implementing ideas and facilitating technology transfer in the beverage production sector.					+	

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

Topic. List of issues to be addressed within the topic.	Allocation within the total time budget		SRS	Recommended reading
	Classroom work			
	Lecture	Laboratory session		
Module 1				
Lecture 1. Classification, product range, and production technologies for non-alcoholic beverages. 1. Classification and composition of non-alcoholic beverages. 2. Product range and characteristics of non-alcoholic beverages. 3. Technological flowcharts for non-alcoholic beverages. 4. Mineral waters. 5. Technology of fermented beverages. 6. Bread kvass production technology. 7. Preparation of non-alcoholic beverages based on grain-based raw materials. 8. Identification and expert assessment of non-alcoholic beverages.	4 / 2			[1], [2], [5], [16], [7],[8],[12], [13], [16],

9. Methods for enhancing beverage stability during storage.				
Laboratory Session 1. 1. Study of the specifics of preparing non-alcoholic beverages based on bread-derived raw materials. 2. Study of the specifics of preparing non-alcoholic fermented beverages. 3. Determination of raw material quality. Determination of total water hardness. Determination of the mass fraction of solids in beverages. Product calculations.		4/4		
Topics for independent study 1. Tasting technique for non-alcoholic beverages. 2. Specifics of tasting tonic waters. 3. Specifics of tasting isotonic drinks. 4. Specifics of tasting kvass. 5. Specifics of tasting mineral water.			20/32	
Lecture 2. Classification, product range, and production technology of low-alcohol beverages. 1. History of beer, international beer terminology, and beer varieties. 2. Significance and properties of beer. 3. Specifics of beer production technologies based on the primary raw materials used. 4. Beer quality assessment. 5. Organoleptic criteria for assessing beer quality.	6 /2			[2], [3], [6], [7], [8], [13] [14], [15],
Laboratory Work 2. Beer classification, product range, and production technology. 1. Study of the classification, product range, and production technologies of various beer types. 2. Determination of malt enzymatic activity. 3. Calculation of process parameters for wort preparation. 4. Mash preparation technology. 5. Beer defects. 6. Product calculations.		6/4		
Topics for independent study 1. Beer tasting technique. 2. Characteristics of beer appearance. 3. Characteristics of beer aroma and bouquet. 4. Characteristics of beer taste. 5. Low-alcohol fruit and berry beverages.			20/30	
Total for the module	10 /4	10/8	40/32	
Module 2				
Lecture 3. Classification, assortment, and production technology of wines. 1. Classification, assortment, and characteristics of various types of wine. 2. Grape wines (table, fortified (strong), and dessert wines). Specifics of their production technology. 3. Fruit and berry wines. Specifics of their production technology.	10 /2			[1], [3], [5], [6], [7], [11], [13], [1],

3. Specialty and aromatized wines. Specifics of their production technology. 4. Sparkling and semi-sparkling wines; Champagne (brut, dry, semi-dry, semi-sweet, sweet). 5. Other sparkling wines and the specifics of their production technologies.				
Laboratory Work 3. Study of the wine production process. 1. Examination of raw materials and quality assessment. 3. Analysis and selection of technological parameters for wine production from various types of raw materials. 4. Product calculations.		6/2		
Laboratory Work 4. Wine quality assessment based on physicochemical indicators. Methodology for wine quality assessment. 2. Determination of wine strength (alcohol content). 3. Quality assessment of various types of wine based on physicochemical indicators. 4. Tasting assessment method and its specific features.		4/2		
. Topics for independent study 1. Specifics of honey wine and beverage production technology. 2. Honey wine: selection of ingredients. 3. Must preparation and the fermentation process. 4. Maturation and aging of honey wine.			30/34	
Lecture 4. Classification, product range, and production technology of strong alcoholic beverages. 1. Classification and product range of strong alcoholic beverages. 2. Characteristics of strong alcoholic beverages: vodka, infused spirits and balms, fruit liqueurs and cordials, whisky, rum, gin, tequila, cognac, calvados, brandy, etc.	10 /2			
Laboratory Work 5. Key criteria for selecting raw materials for distillate production. 1. Technological requirements for water, yeast, and raw materials. 2. Examples of calculating the projected yield of the alcohol-containing intermediate product. 3. Investigation of the effect of distillation parameters on the yield of the alcohol-containing intermediate product.		4/2		
Laboratory Work 6. Quality assessment of strong alcoholic beverages based on physicochemical parameters. 1. Determination of organoleptic and physicochemical parameters of alcohol. 2. Determination of vodka production technology. 3. Product calculations. strong alcoholic drinks.		6/2		

[3], [4], [7],
[8], [16],

Topics for independent study 1. Craft beverages based on traditional strong alcoholic drinks.			20/30	
Total for Module 2	20 / 4	20 / 8	50/64	
Grand Total	30 / 8	30 / 16	90/126	

4. TEACHING AND LEARNING METHODS

Code	Teaching methods	Number of hours	Learning methods	Number of hours
DNR 1. Analyze and solve theoretical and practical problems in the field of water, non-alcoholic, low-alcohol, and alcoholic beverage technology.	Problem-based lectures (these address issues related to the material presented by the lecturer, who focuses students' attention on the key aspects of the topic under discussion). The lecture format includes: presentation of theoretical material; overview lectures utilizing visual aids and summary outlines; and visualization-based lectures employing multimedia technologies.	30 / 0	Laboratory sessions are conducted as group classes involving the completion of individual tasks and small-group work. Depending on the specific activity, various interactive teaching methods are employed, such as discussions, case study analyses, dialogues, debates, and the case method. Individual assignments (independent study of designated topics and sections, and presentation of the material)	30 / 2
DNR 2. Use digital technologies to support professional activities and conduct applied research in the field of water, non-alcoholic, low-alcohol, and alcoholic beverage technology.				90 / 148
DNR 3. Apply scientific knowledge regarding beverage production processes, as well as the nature and dynamics of the physicochemical, biochemical, and microbiological transformations of raw material composition during processing.				
DNR 4. Analyze or make decisions regarding the improvement of beverage technologies, taking into account global industry trends.				
DNR 5. To present the results of activities to the				

professional community and the general public with the aim of implementing ideas and facilitating technology transfer in the beverage production sector.				
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5. ASSESSMENT OF THE EDUCATIONAL COMPONENT

5.1. Summative assessment

5.1.1. To assess the expected learning outcomes, the following is provided:

№	Summative assessment methods	Points / Weight in the overall score	Date of preparation
	Module 1 (50 points):		
1.	Interim Test "Module 1": The test consists of 25 questions, each worth 2 points.	50 / points. 50%	7 week
2.	Module 2 (50 points): Interim Test "Module 1": The test consists of 25 questions, each worth 2 points.	50 points. / 50%	15 week

5.2. Formative assessment:

To assess ongoing learning progress and identify areas for further improvement, the following is provided:

№	Elements of formative assessment	Date of preparation
1	Feedback in the form of a discussion on unit testing	7 week
2	Feedback in the form of a discussion on unit testing and the determination of the final grade	15 week

The form of final assessment for students is a graded pass/fail test. A student is not permitted to take the final assessment if the number of missed and un-remedied classes during the semester exceeds 20% of the course's total volume. Failure to complete the required assignments (module assessments) or an unsatisfactory result on the tests (0–34 points) constitutes grounds for retaking the course.

The total score for the educational component is 100 points (based on the grading scale adopted at SNAU).

6. LEARNING RESOURCES (LITERATURE)

Primary sources.

1. Law of Ukraine No. 1023-XII of May 12, 1991, "On Consumer Rights Protection."
2. Law of Ukraine No. 2157 of December 21, 2000, "On the National Program for Promoting the Development of Small Entrepreneurship in Ukraine."
3. Bolbit Yu. L. State Control over the Production and Circulation of Alcohol, Alcoholic Beverages, and Tobacco Products in Ukraine: Monograph / Bolbit Yu. L., Pakhomov V. V.; Sumy State University. – Sumy: Sumy State University, 2020. – 182 p.
4. Lapytska N. V. Technology of Beverages, Extracts, and Concentrates: Study Guide for Higher Education Students / Ed. by Doctor of Technical Sciences, Prof. O. I. Syza. Chernihiv: T. H. Shevchenko National University "Chernihiv Colehium," 2021. 217 p.

5. Methodological guidelines for laboratory work in the discipline "Technology of Water and Non-alcoholic, Low-alcohol, and Alcoholic Beverages": methodological recommendations for independent study for students of the first (Bachelor's) level of higher education majoring in 181 "Food Technologies" / compiled by V.I. Tyshchenko. Sumy, 2024. 57 p. Minutes No. 3 dated January 30, 2024.
6. Methodological guidelines for laboratory work in the course "Technology of Water and Non-Alcoholic, Low-Alcohol, and Alcoholic Beverages": methodological recommendations for laboratory work for students of the first (Bachelor's) level of higher education majoring in 181 "Food Technologies" / compiled by V.I. Tyshchenko. Sumy, 2024. 57 p. Protocol No. 3 dated January 30, 2024.
7. Tyshchenko V.I. Lecture notes for the course "Technology of Water and Low-Alcohol and Alcoholic Beverages" for 1st-year students of the "Food Technologies" educational program (Protocol No. 1 dated September 16, 2021). Sumy: SNAU, 2021. 61 p.
8. Tyshchenko, V. I., Bozhko, N. V. Analysis of modern trends in the production of non-alcoholic beverages using unconventional plant raw materials. *Tavriyskyi Scientific Bulletin. Series: Technical Sciences*, (1), 2023, 114–124.

Additional sources.

9. Tyshchenko, V. I., & Bozhko, N. V. (2023). Use of phyto-extracts for the fortification of functional non-alcoholic beverages. **Bulletin of Uman National University of Horticulture**, (1), 123–127. <https://doi.org/10.32782/2310-0478-2023-1-123-127>
10. Tyshchenko, V. I., & Bozhko, N. V. Development of functional non-alcoholic beverages using phyto-extracts. *Proceedings of the International Scientific and Practical Conference "Industry and Craft for HoReCa in Tourism: Experience, Challenges, Innovations,"* May 23, 2023. Kyiv: NUFT. Part 1, p. 176.
11. Samilyk, M., Nosyk, M., & Tischenko, V. (2026). Assessment of the quality of alcoholic beverage based on black mulberry. *EUREKA: Life Sciences*. <https://doi.org/10.21303/2504-5695.2026.004284>
12. Huba S., Popova A., Bolhova N., Tyshchenko V., Huba O. Development of technology and formulation for a coffee beverage with enhanced nutritional value. *Scientific Bulletin of Tavria State Agrotechnological University*. 2024. No. 14(1). P. 1–19. <https://doi.org/10.32782/2220-8674-2024-24-1-19>
13. Tyshchenko V.I. Lecture notes on the discipline "Craft Technologies for Alcoholic and Non-Alcoholic Beverages" for Bachelor-level students, specialty 181 "Food Technologies," educational-professional program "Craft Technologies and Gastronomic Innovations" (full-time study). Sumy: Sumy NAU, 2024.
14. *Alcoholic Beverages: The Experience of Generations (Technology, Equipment, Formulations): Monograph* / P. L. Shyian, V. V. Sosnytskyi, O. Yu. Shevchenko, R. H. Kyrylenko. – Kyiv: Interservice, 2022. – 361 p.
15. Tristan Stephenson, **The Curious Bartender's Whiskey Road Trip: A Journey into Malt, Rye and Bourbon**. – Vivat Publishing, 2021. – 288 p. ISBN 978-966-982-281-9

Software

1. Set of test assignments.
2. Lecture outline/notes.
3. Course page on the Moodle platform.