

**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE**

**SUMY NATIONAL AGRARIAN UNIVERSITY**

Faculty of Food Technology

Department of Food Technology and Safety

**Syllabus of the educational component**

of the Educational Component

**MC18 FUNDAMENTALS OF SCIENTIFIC RESEARCH**

(mandatory)

Implemented within the educational program

**G – Engineering, Manufacturing and Construction**

in specialty **G13 – Food Technology**

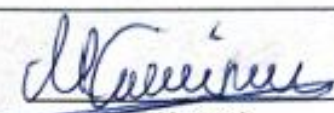
at **the first (bachelor's)** level of higher education

Sumy – 2026

Developer:



Tetiana SYNENKO,  
PhD, Associate Professor of the Department of Food Technology and Safety

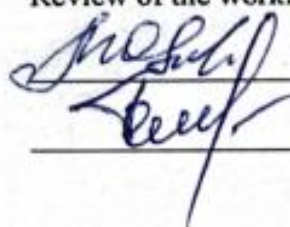
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| Reviewed, approved and approved on meetings departments<br><b>Food Technology and Safety</b> | protocol dated <u>19.05</u> 2026 No. <u>17</u>                                                                                                     |
|                                                                                              | Manager departments <u></u> <b>Maryna SAMILYK</b><br>(signature) |

**Agreed:**

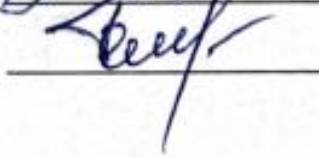
Guarantor of the educational program "Food Technologies"  **Olena KOSHEL**

Dean of the Faculty of Food Technology  **Nataliia BOLHOVA**

Review of the working program provided by:



Oksana MELNYK, Candidate of Technical Sciences, Associate Professor

 Anna HELIKH, Candidate of Technical Sciences, Associate Professor

Methodist of the Education Quality,  
Licensing and Accreditation Department

  
(signature)

N. Bananik  
(first name, surname)

Registered in the electronic database: date: 18.06 2026

**Information on Review of the Working Program (Syllabus)**

| Educational<br>the year in<br>which are<br>introduced<br>changes | Number of the<br>appendix to the work<br>program with a<br>description of the<br>changes | Changes reviewed and approved                            |                           |                                      |
|------------------------------------------------------------------|------------------------------------------------------------------------------------------|----------------------------------------------------------|---------------------------|--------------------------------------|
|                                                                  |                                                                                          | Date and number<br>minutes of the meeting<br>departments | Head of the<br>Department | Guarantor<br>educational<br>programs |
|                                                                  |                                                                                          |                                                          |                           |                                      |
|                                                                  |                                                                                          |                                                          |                           |                                      |
|                                                                  |                                                                                          |                                                          |                           |                                      |
|                                                                  |                                                                                          |                                                          |                           |                                      |

## 1. GENERAL INFORMATION ABOUT THE EDUCATIONAL COMPONENT

|                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |         |                   |         |                  |         |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------------|---------|------------------|---------|
| Name of the educational component                             | MC18 Fundamentals of Scientific Research                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         |                   |         |                  |         |
| Status of the educational component                           | Mandatory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |                   |         |                  |         |
| Faculty / Department                                          | Faculty of Food Technology; Department of Food Technology and Safety                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |         |                   |         |                  |         |
| Program / Specialty for which the component is included       | Educational and Professional Program “Food Technologies” (2025); Specialty G13 Food Technologies                                                                                                                                                                                                                                                                                                                                                                                                                                                  |         |                   |         |                  |         |
| NQF level                                                     | Level 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |         |                   |         |                  |         |
| Semester and duration of study                                | Semester 3, weeks 1–15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |                   |         |                  |         |
| Number of ECTS credits                                        | 5.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |         |                   |         |                  |         |
| Total workload and distribution of hours: 150                 | Contact work (classes)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |                   |         | Independent work |         |
|                                                               | Lectures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |         | Practical classes |         |                  |         |
|                                                               | Daily                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Abroad. | Daily             | Abroad. | Daily            | Abroad. |
|                                                               | 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 4       | 30                | 10      | 106              | 136     |
| Language of instruction                                       | Ukrainian, English                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |                   |         |                  |         |
| Instructor / Coordinator of the educational component         | Tetiana SYNENKO, PhD, Associate Professor of the Department of Food Technology and Safety                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |                   |         |                  |         |
| Contact information                                           | Room 317m;<br>Tel.: +380684870521;<br>E-mail: <a href="mailto:tatiana.synenko@snau.edu.ua">tatiana.synenko@snau.edu.ua</a>                                                                                                                                                                                                                                                                                                                                                                                                                        |         |                   |         |                  |         |
| General description of the educational component              | The educational component is aimed at developing initial knowledge, abilities and skills required for organizing, conducting and presenting research activities in the field of food technologies. Students master the principles of scientific cognition, stages of research work, methods of searching, analyzing and systematizing scientific information; acquire skills in presenting research results in the form of abstracts, reports and articles in accordance with academic standards; and learn the principles of academic integrity. |         |                   |         |                  |         |
| Purpose of the educational component                          | To develop students’ basic knowledge and skills in the organization, planning, implementation and presentation of scientific research in the field of food technologies.                                                                                                                                                                                                                                                                                                                                                                          |         |                   |         |                  |         |
| Prerequisites and links with other EPP educational components | The educational component is based on the prior study of Ukrainian Language and Academic Writing, Modern Multimedia Technologies, and Theoretical Foundations of Food Production. The component provides a basis for preparing the qualification work.                                                                                                                                                                                                                                                                                            |         |                   |         |                  |         |
| Academic integrity policy                                     | The study of the discipline is based on academic integrity principles and compliance with the requirements specified in the Regulation on Academic Integrity of Sumy National Agrarian University.                                                                                                                                                                                                                                                                                                                                                |         |                   |         |                  |         |
| Course link                                                   | <a href="https://cdn.snau.edu.ua/moodle/course/view.php?id=6377">https://cdn.snau.edu.ua/moodle/course/view.php?id=6377</a>                                                                                                                                                                                                                                                                                                                                                                                                                       |         |                   |         |                  |         |
| Keywords                                                      | scientific research, methodology, scientific problem, experiment, academic integrity, scientific creativity                                                                                                                                                                                                                                                                                                                                                                                                                                       |         |                   |         |                  |         |

## 2. LEARNING OUTCOMES OF THE EDUCATIONAL COMPONENT AND THEIR RELATION TO PROGRAM LEARNING OUTCOMES

After completing the educational component, the student is expected to be able to:

| Code | Course Learning Outcome<br>«After studying the educational component, the student is expected to be able to... »                                                                                                                                                                         | Program Learning Outcome(s) addressed |      |      |       |       |       | Assessment methods                                                                                                                                                            |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|-------|-------|-------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|      |                                                                                                                                                                                                                                                                                          | PLO4                                  | PLO5 | PLO6 | PLO14 | PLO18 | PLO29 |                                                                                                                                                                               |
| CLO1 | Search and process scientific and technical information from various sources and apply it to solve specific technical and technological tasks.                                                                                                                                           |                                       |      |      |       |       |       | Preparation and defense of practical works; modular testing; mini-project of scientific research; participation in scientific conferences, seminars and student competitions. |
| CLO2 | Develop or improve technological processes for processing raw materials of animal and plant origin, with control of physicochemical, biochemical and microbiological transformations of raw material components during the technological process.                                        |                                       | x    |      |       |       |       |                                                                                                                                                                               |
| CLO3 | Identify and analyze the main factors influencing the processes of synthesis, transformation and metabolism of food components, and substantiate the physiological role of nutrients in human nutrition.                                                                                 |                                       |      | x    |       |       |       |                                                                                                                                                                               |
| CLO4 | Make rational technical and technological decisions and increase production efficiency by implementing resource-saving and competitive technologies.                                                                                                                                     |                                       |      |      | x     |       |       |                                                                                                                                                                               |
| CLO5 | Implement innovative developments in production and justify the feasibility of their implementation, taking into account socially significant issues, fundamentals of economics, logistics and information technologies, and analyze the state and dynamics of demand for food products. |                                       |      |      | x     |       |       |                                                                                                                                                                               |
| CLO6 | Plan and conduct scientific research both independently and as part of a scientific group.                                                                                                                                                                                               |                                       |      |      |       | x     |       |                                                                                                                                                                               |

| Code | Course Learning Outcome<br>«After studying the educational component, the student is expected to be able to... »                                                                                                    | Program Learning Outcome(s) addressed |      |      |       |       |       | Assessment methods |
|------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|------|------|-------|-------|-------|--------------------|
|      |                                                                                                                                                                                                                     | PLO4                                  | PLO5 | PLO6 | PLO14 | PLO18 | PLO29 |                    |
| CLO7 | Model the technological processes of food production facilities and catering establishments, taking into account current trends and innovations, with a view to their rapid adaptation in a production environment. |                                       |      |      |       |       | x     |                    |
| CLO8 | Present the interim and final results of scientific research with a view to sharing them with the academic community (in the form of abstracts, papers, articles, reports, original documents, or a thesis).        |                                       |      |      |       |       | x     |                    |

### Competencies Improved / Acquired through Non-formal Education

| Non-formal education course          | Competencies                                                                                                                                                                                                                                                                                                                                                                   | Evidence of learning outcomes                                                                                                                           |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Academic Integrity at the University | General: ability to learn and master modern knowledge; skills in using information and communication technologies; ability to make decisions and act according to the principle of non-acceptance of any manifestations of dishonesty. Professional: knowledge of academic integrity principles and ability to apply them in educational and professional activities.          | Certificate of successful completion indicating the number of hours. The authenticity of the certificate can be verified using the link provided on it. |
| From Beginner to Expert in AI        | General: ability to learn and master modern knowledge; ability to show initiative and entrepreneurship; skills in using information and communication technologies. Professional: development of subject-methodological and digital competence in the use of artificial intelligence; integration of acquired skills into professional, educational and scientific activities. | Certificate of successful completion indicating the number of hours. The authenticity of the certificate can be verified using the link provided on it. |

### 3. CONTENT OF THE EDUCATIONAL COMPONENT (PROGRAM ACADEMIC DISCIPLINE)

| Topic.<br>List of issues to be addressed within the topic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Lecture hours<br>(Daily /Abroad.) | Practical or independent-study hours<br>(Daily /Abroad.) | Recommended literature |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|----------------------------------------------------------|------------------------|
| MODULE 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                   |                                                          |                        |
| Lecture 1. Essence, tasks and stages of scientific research. The role of science in the development of food technologies<br>1. Concept of science. Main functions of science (cognitive, cultural, social, production).<br>2. Classification of scientific research by object and method.<br>3. Current state and role of science in the development of food technologies.<br>4. Structure and organization of research activities in higher education institutions.<br>5. Role of digital technologies in the development of scientific research. | 2/0                               |                                                          | 1–9                    |
| Practical class 1. Types of scientific research in the food sector.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                   | 2/0                                                      | 1–9                    |
| Practical class 2. Formulation of the problem, aim, tasks and hypothesis.                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                   | 2/1                                                      | 1–9                    |
| Independent study: Study of examples of modern research in food technologies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                   | 15/19                                                    | 1–9                    |
| Lecture 2. Methodology and methods of scientific cognition<br>1. Methodology of science: concept, levels and structure.<br>2. Main methods of scientific cognition: empirical, theoretical and general scientific methods.<br>3. Methods of induction, deduction, modeling, analysis and synthesis.<br>4. Specific features of applying methods in the food sector.<br>5. Selection of research methods depending on the aim and tasks.<br>6. Digital science tools. Use of intelligent systems in research planning.                              | 2/1                               |                                                          | 1–9                    |
| Practical class 3. Selection of empirical and statistical methods.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                   | 2/0                                                      | 1–9                    |
| Practical class 4. Selection of research methods in food technologies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                   | 2/0                                                      | 1–9                    |

| <b>Topic.<br/>List of issues to be addressed within<br/>the topic</b>                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Lecture<br/>hours<br/>(Daily<br/>/Abroad.)</b> | <b>Practical or<br/>independent-<br/>study hours<br/>(Daily<br/>/Abroad.)</b> | <b>Recommended<br/>literature</b> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------|
| Independent study: Research methodologies. Examples and comparison.                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                   | 15/19                                                                         | 1–9                               |
| Lecture 3. Stages of scientific research<br>1. Main stages of scientific research: problem formulation, formulation of the aim and tasks, hypothesis, selection of methods, experiment, analysis of results.<br>2. Formulation of the object, subject and tasks of research.<br>3. Development of a research program.<br>4. Innovative approaches to experiment design.<br>5. Examples of the structure of scientific research in food technologies.                                | 2/1                                               |                                                                               | 1–9                               |
| Practical class 5. Object, subject and novelty of research.                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                   | 2/1                                                                           | 1–9                               |
| Practical class 6. Development of a research program.                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                   | 2/1                                                                           | 1–9                               |
| Independent study: Development of a scientific project.                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                   | 16/19                                                                         | 1–9                               |
| Lecture 4. Search and analysis of scientific information<br>1. Sources of scientific information: primary sources, reviews, monographs, dissertations.<br>2. Principles of literature search: keywords, Boolean operators and filters.<br>3. Working with databases: Google Scholar, Scopus, Web of Science, Scientific Periodicals of Ukraine.<br>4. Open Science and AI assistants.<br>5. Fundamentals of critical literature analysis.<br>6. Preparation of a literature review. | 2/0                                               |                                                                               | 1–9                               |
| Practical class 7. Work with electronic scientific databases.                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                   | 2/1                                                                           | 1–9                               |
| Practical class 8. Critical analysis of sources: credibility and relevance. Writing a literature review.                                                                                                                                                                                                                                                                                                                                                                            |                                                   | 2/1                                                                           | 1–9                               |
| Independent study: Use of artificial intelligence in searching scientific information. Advanced tools for evaluating scientific sources (H-index, Altmetrics, Google Scholar, Publish or Perish, ResearchRabbit).                                                                                                                                                                                                                                                                   |                                                   | 15/22                                                                         | 1–9                               |

| <b>Topic.<br/>List of issues to be addressed within<br/>the topic</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Lecture<br/>hours<br/>(Daily<br/>/Abroad.)</b> | <b>Practical or<br/>independent-<br/>study hours<br/>(Daily<br/>/Abroad.)</b> | <b>Recommended<br/>literature</b>                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Non-formal education: Academic Integrity at the University<br>1. Introduction. 2. Academic integrity. 3. Plagiarism. 4. Academic writing. 5. Preconditions for creating an integrity-based university environment. 6. How to create an integrity-based university environment.                                                                                                                                                                                                                                                            |                                                   | 10                                                                            | <a href="https://vumonline.ua/course/academic-integrity-at-the-university/">https://vumonline.ua/course/academic-integrity-at-the-university/</a> |
| <b>MODULE 2</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                   |                                                                               |                                                                                                                                                   |
| Lecture 5. Planning and conducting an experiment<br>1. Principles of a scientific experiment. 2. Types of experiments: laboratory, field and modeling. 3. Experiment planning: selection of variables, control and repeatability. 4. Features of conducting experiments in the food industry. 5. Calculation of errors and reproducibility of results. 6. Digitalization and robotization.                                                                                                                                                | 2/0                                               |                                                                               | 1–9                                                                                                                                               |
| Practical class 9. Designing and conducting an experiment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                                   | 2/0                                                                           | 1–9                                                                                                                                               |
| Practical class 10. Basics of statistical analysis of results. Processing of results: mean values, errors and visualization.                                                                                                                                                                                                                                                                                                                                                                                                              |                                                   | 2/0                                                                           | 1–9                                                                                                                                               |
| Independent study: Digital tools for experiment planning.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                   | 15/19                                                                         | 1–9                                                                                                                                               |
| Lecture 6. Fundamentals of scientific creativity. Formatting scientific texts<br>1. Scientific language: style, structure and formatting requirements. 2. Types of scientific texts: report, abstract, article, course project and diploma project. 3. Structure of a scientific article: introduction, materials and methods, results, discussion, conclusions. 4. Rules for formatting tables, graphs and formulas. 5. Requirements for citation and references. 6. Scientific communication and visualization of results. New formats. | 2/1                                               |                                                                               | 1–9                                                                                                                                               |
| Practical class 11. Basics of scientometrics. Analysis of examples.                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                   | 2/0                                                                           | 1–9                                                                                                                                               |

| <b>Topic.<br/>List of issues to be addressed within<br/>the topic</b>                                                                                                                                                                                                      | <b>Lecture<br/>hours<br/>(Daily<br/>/Abroad.)</b> | <b>Practical or<br/>independent-<br/>study hours<br/>(Daily<br/>/Abroad.)</b> | <b>Recommended<br/>literature</b>                                                                                                                 |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Practical class 12. Construction of graphs, tables and diagrams in scientific presentation.                                                                                                                                                                                |                                                   | 2/1                                                                           | 1–9                                                                                                                                               |
| Independent study: Creation and formatting of a scientific document using Grammarly, ChatGPT and SciSpace to check structure and style.                                                                                                                                    |                                                   | 15/19                                                                         | 1–9                                                                                                                                               |
| Lecture 7. Ethics and academic integrity; artificial intelligence in the scientific environment<br>1. Academic integrity: concept and main principles.<br>2. Copyright in scientific activity.<br>3. Publication ethics.<br>4. Challenges of AI use: plagiarism or a tool? | 2/1                                               |                                                                               | 1–9                                                                                                                                               |
| Practical class 13. Academic integrity and plagiarism checking.                                                                                                                                                                                                            |                                                   | 2/2                                                                           | 1–9                                                                                                                                               |
| Practical class 14. Preparation of an abstract/article on a selected topic.                                                                                                                                                                                                |                                                   | 2/2                                                                           | 1–9                                                                                                                                               |
| Practical class 15. Preparation of a presentation and report on a selected topic.                                                                                                                                                                                          |                                                   | 2/0                                                                           | 1–9                                                                                                                                               |
| Independent study: Detection of academic plagiarism. Plagiarism-checking software. AI services for self-checking.                                                                                                                                                          |                                                   | 16/19                                                                         | 1–9                                                                                                                                               |
| Non-formal education: From Beginner to Expert in AI<br>1. Generating texts and images. 2. Content generation. 3. Work with documents, tables and text translation. 4. Use of different AI tools. 5. Creation and configuration of AI agents and assistants.                |                                                   | 10                                                                            | <a href="https://vid-pochatkivcya-do-eksperta-v-ai-study.academyocean.com/">https://vid-pochatkivcya-do-eksperta-v-ai-study.academyocean.com/</a> |
| Total for the course                                                                                                                                                                                                                                                       | 14/4                                              | practical: 30/10;<br>independent<br>study: 106/136                            |                                                                                                                                                   |

#### 4. TEACHING AND LEARNING METHODS

| CLO           | Teaching methods                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Hours | Learning methods                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Hours   |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| CLO1–<br>CLO8 | Interactive lectures: use of multimedia presentations, diagrams, videos, discussion of real research cases, mini-discussions or online voting (Mentimeter, Kahoot). Problem-based learning (PBL): formulation of a real or simulated scientific problem in the food sector; group work to find ways to research and solve it. Flipped classroom: independent study of theory (videos, podcasts, articles), followed by practical discussion in the classroom and reflective tasks. Practical learning: conducting students' own mini-research with staged defense. Demonstration of digital and AI tools: use of templates, infographics and bibliography generators. | 44/14 | Active learning: small-group discussions and brainstorming based on a literature review. Inquiry-based learning: students formulate questions and hypotheses and investigate them using real data or simulated experiments. Project-oriented learning: individual or group research in food technologies, presentation of results and defense before the audience. Digital learning: independent work with online databases, scientometric platforms and computer programs for processing, formatting and presenting results. Reflective learning: keeping a researcher's diary/workbook, self-assessment and discussion of personal research progress. | 106/136 |

#### 5. ASSESSMENT FOR THE EDUCATIONAL COMPONENT

##### 5.1. Summative Assessment

The following methods are used to assess expected learning outcomes:

| No.                  | Summative assessment method                                                                      | Points / weight in the final grade | Deadline                      |
|----------------------|--------------------------------------------------------------------------------------------------|------------------------------------|-------------------------------|
| Module 1 (40 points) |                                                                                                  |                                    |                               |
| 1                    | Defense of practical works (7 works × 2 points)                                                  | 14 points / 14%                    | Within 5 days after the class |
| 2                    | Testing (multiple-choice test)                                                                   | 26 points / 26%                    | Week 7                        |
| 3                    | Non-formal education (additional/bonus)                                                          | 10 bonus points                    | Week 7                        |
| Module 2 (60 points) |                                                                                                  |                                    |                               |
| 4                    | Defense of practical works (8 works × 2 points)                                                  | 16 points / 16%                    | Within 5 days after the class |
| 5                    | Participation in a conference or competition; preparation and publication of an abstract/article | 20 points / 20%                    | Week 15                       |
| 6                    | Testing (multiple-choice test)                                                                   | 24 points / 24%                    | Week 15                       |
| 7                    | Non-formal education (additional/bonus)                                                          | 10 bonus points                    | Week 15                       |

### 5.1.2. Assessment Criteria

| Component                                                                             | Criteria                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Defense of a practical work                                                           | 0 points: the student completed the practical work but did not defend it.<br>1 point: most requirements are met, but some elements are missing.<br>1.5 points: all task requirements are met.<br>2 points: all task requirements are met; thoughtful work is demonstrated and an original solution to the problem is proposed. |
| Testing (multiple-choice test)                                                        | The test includes 26 questions in Module 1 and 24 questions in Module 2. Each correct answer is worth 1 point.                                                                                                                                                                                                                 |
| Participation in an international/national conference or student research competition | Confirmed participation is evaluated within the course assessment according to the approved scoring scheme.                                                                                                                                                                                                                    |
| Preparation of an abstract/article                                                    | Preparation of a scientific work (abstract or article) is evaluated at up to 20 points.                                                                                                                                                                                                                                        |
| Non-formal education                                                                  | Successful completion of an online course confirmed by a named certificate is evaluated as 10 bonus points.                                                                                                                                                                                                                    |

### 5.2. Formative Assessment

The following elements are used to assess current learning progress and identify areas for further improvement:

| No. | Formative assessment element                                                                                  | Date                                                                                                        |
|-----|---------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| 1   | Oral questioning after studying course topics                                                                 | Within 5 days after the class                                                                               |
| 2   | Oral feedback from the instructor and students during practical classes                                       | During the semester                                                                                         |
| 3   | Feedback through discussion of intermediate and final testing                                                 | Weeks 7 and 15                                                                                              |
| 4   | Feedback through discussion of the non-formal education course, conference report, article or scientific work | Before and after completing the course, participating in the conference/competition, or publishing the work |

Final assessment form – differentiated credit. The final number of points for the discipline (maximum 100 points per semester) is determined as the sum of points earned by the student during the semester.

A student is not admitted to the final assessment if the student has missed and not made up more than 20% of classes, has not completed modular control stages, has not completed the mandatory list of works and tasks provided in the working curriculum for the semester, or has an unsatisfactory semester rating (0–41 points).

## 6. EDUCATIONAL RESOURCES (LITERATURE)

### Main Sources

1. Fundamentals of Scientific Research: lecture course for higher education applicants of the Educational and Professional Program “Food Technologies” of full-time and part-time forms of study, Bachelor’s degree / compiled by T.P. Synenko. Sumy: SNAU, 2025. 100 p. (Minutes No. 2 dated 30 September 2025). <https://surli.cc/rbrdsc>
2. Fundamentals of Scientific Research: methodological recommendations for practical works for higher education applicants of the Educational and Professional Program “Food Technologies” of full-time and part-time forms of study, Bachelor’s degree / compiled by T.P. Synenko. Sumy: SNAU, 2025. 77 p. (Minutes No. 2 dated 30 September 2025). <https://surli.cc/emdfm>
3. Fundamentals of Scientific Research: methodological recommendations for independent work of higher education applicants of the Educational and Professional Program “Food Technologies” of full-time and part-time forms of study, Bachelor’s degree / compiled by T.P. Synenko. Sumy: SNAU, 2025. 46 p. (Minutes No. 2 dated 30 September 2025). <https://surli.cc/ahohtu>
4. Fundamentals of Scientific Research: workbook for practical works for higher education applicants of the Educational and Professional Program “Food Technologies” of full-time and part-time forms of study, Bachelor’s degree / compiled by T.P. Synenko. Sumy: SNAU, 2025. 78 p. (Minutes No. 2 dated 30 September 2025). <https://surli.cc/ywrdxl>

### Additional Sources

1. DSTU 3008–95. Documentation. Reports in science and technology. Structure and rules for formatting: official edition.
2. DSTU 3582–2013. Information and documentation. Bibliographic description. Abbreviation of Ukrainian words and phrases. General requirements and rules.
3. DSTU 7093:2009. Bibliographic record. Abbreviation of words and phrases in foreign European languages.
4. DSTU 8302:2015. Information and documentation. Bibliographic reference. General provisions and rules of compilation.
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