SYLLABUS
of the academic course
"Technical Work Standardization in Agro-Industrial Production"

GENERAL INFORMATION ABOUT THE ACADEMIC COURSE	
Higher Education Level	second (master's)
Code and Name of the Specialty	G11 Industrial Engineering H7 Agricultural Engineering G19 Construction and Civil Engineering
Type and Name of the Educational Programme	Educational and Professional Programme "Technologies and Means of Mechanization of Agricultural Production" Educational and Professional Programme "Machines and Means of Mechanization of Agricultural Production" Educational and Professional Programme "Technologies of Building Structures, Products and Materials" Educational and Scientific Programme "Service Engineering in Agro-Industrial Production"
Year of Study, Semester	1st year, 2nd semester
Course Workload and Form of Semester Assessment	Number of ECTS credits – 4, Total number of hours – 120, of which: lectures – 16 hours, practicals – 34 hours, independent study – 70 hours. Form of semester assessment – pass.
Language(s) of Instruction	English
Faculty, Department	Faculty of Engineering and Technology for Building and Vocational Education
Contact Details of the Course Developer(s)	Oleksandr Vasylovych Petrash Candidate of Technical Sciences, Associate Professor, Associate Professor, Department of Building and Vocational Educatione-mail: oleksandr.petrash@pdau.edu.ua Telegram: @Alex_Row07
PLACE OF THE ACADEMIC COURSE IN THE EDUCATIONAL PROGRAMME	
Status of the Academic Course	elective, department-level
Prerequisites for Studying the Academic Course	An understanding of the fundamentals of agro-industrial technologies, soil cultivation methods, and the specifics of crop and livestock production. Knowledge of the equipment and technologies used in the agro-industrial sector. Basic knowledge of mathematics, particularly mathematical modeling and data analysis, which enables the calculation of resource consumption rates and production volumes.
Competencies	*General Competencies (GC):* *GC 1. Ability to search for, process, and analyze information from various sources.* *GC 2. Ability to identify, formulate, and solve problems.* *GC 3. Ability to make well-founded decisions.* *Professional Competencies (PC):* *PC 1. Ability to develop and apply technical norms and standards for agro-industrial production.* *PC 2. Ability to analyze the efficiency of technological processes in agricultural production and manage quality.*
Programme Learning Outcomes	LO 2. Ability to analyze and optimize production processes based on technical standards.

THE ROLE OF THE ACADEMIC COURSE IN DEVELOPING SOFT SKILLS (SOFT SKILLS)

The academic course “Technical Work Standardization in Agro-Industrial Production” plays an important role in developing soft skills among higher education students of the Faculty of Engineering and Technology. The key aspects of this development include teamwork and cooperation, communication skills, critical thinking, organizational skills, adaptability and flexibility, as well as ethical and environmental awareness.

The course promotes teamwork skills through collaborative assignments that help students interact effectively and work towards common goals. Lectures, practical classes, and presentations develop the ability to communicate clearly and effectively, present ideas, and participate in constructive discussions. The analysis of technological processes and the solution of real-life professional problems contribute to the development of critical thinking, enabling students to evaluate alternative solutions and identify the most appropriate ones.

Working under changing microclimatic conditions and applying new technological solutions help students develop their ability to adapt to new situations and respond promptly to changes. Particular attention to accounting for time and material consumption fosters a responsible attitude towards natural resources and the environment and promotes an understanding of the importance of complying with environmental and ethical standards.

The academic course “Technical Work Standardization in Agro-Industrial Production” contributes to the comprehensive development of soft skills that are essential for successful professional activity and personal growth. It develops students’ ability to work effectively in teams, communicate professionally, think critically, organize and manage their activities, and understand the importance of technological standards and work standardization in professional practice.

PURPOSE OF THE ACADEMIC COURSE

The objective of this course is to equip students with knowledge and practical skills in the field of standardization, certification, specification, and quality control of products, processes, and resources in the agro-industrial sector. Students will study the methods and principles of technical standardization, which enable the optimization of resource use, increased labor productivity, and improved product quality, while taking into account safety, environmental sustainability, and economic efficiency requirements.

ACADEMIC COURSE PROGRAMME

Topic 1. Technical Standardization.

Work Measurement. Work movement, task, operation, process, technology. Time and output standards. Methods for establishing standards.

Topic 2. Determining the Scope of Work and Associated Materials.

Elemental cost estimates. Rules for calculating the scope of work. Statement of work scope. Defect reports. Determining material and equipment requirements.

Topic 3. Design and Cost Estimation Documentation.

The concept of unit rates. Preparing local cost estimates. Preparing project-level cost estimates. Consolidated cost estimate.

Topic 4. Analysis of the correct application of unit rates.

Analysis of machinery and equipment used. Verification of resources used. Adjustment of unit rates. Regulatory support for innovative development in the industry.

TEACHING AND LEARNING METHODS

Teaching Methods:

- verbal – lectures, storytelling, discussions;
- visual – illustrations, demonstrations;
- practical – hands-on activities, lab work, working with educational and methodological materials;
- independent study;
- computer-based and multimedia – use of multimedia presentations.

Teaching Methods:

- Lectures using multimedia technologies – provide a theoretical foundation for practical work; the instructor uses presentations and demonstrations.
- Practical sessions – aimed at reinforcing knowledge through practice to solve specific technical problems.
- Class discussions and group work – students are encouraged to work in groups to solve problems collaboratively, which develops communication and teamwork skills.
- Case method – students analyze specific cases of standardization in industry or engineering, which helps them apply theory to practice.

ASSESSMENT OF LEARNING OUTCOMES

Marking Scheme, Grading	Listed in the Appendix to the syllabus

Scale and Assessment Criteria for Learning Outcomes	
COURSE STUDY AND ASSESSMENT POLICY	
- regarding deadlines and rescheduling	Current assignments must be completed within the academic semester, as verified by the grading system through ongoing assessment. Students who receive a failing grade are permitted to make up their academic deficiencies within the timeframes established in accordance with Regulations on the Assessment of Learning Outcomes for Higher Education Students at the PDAU
- regarding Academic Integrity	Students pursuing higher education are required to comply with the provisions of the PDAU Code of Academic Integrity (2026) and the Procedure for Checking Academic Texts for Textual Borrowings (2026). Failure to complete work independently, cheating, plagiarism, and data fabrication are unacceptable and will result in academic disciplinary action. Academic Integrity at PDAU
- regarding the use of artificial intelligence tools	The use of artificial intelligence systems is governed by the Rules for the Use of Artificial Intelligence Systems in the Educational Process at PDAU (2026). Mode B (limited use of AI) has been established for this course: the use of AI is permitted for searching for and organizing sources, preparing the structure of assignments, translating, and checking language usage, provided that the use of AI in the work is clearly disclosed. Generating final practical results or calculations using AI without performing the work oneself is prohibited.
- regarding class attendance	Ongoing assessment takes place during classroom sessions to evaluate students' mastery of the material and their readiness to complete assignments. Missing classes may affect the number of points earned for ongoing academic performance. Students who, for valid reasons (supported by documentation), have missed classes have the opportunity to make them up within the specified timeframes in accordance with the academic debt clearance schedule.
- regarding the recognition of informal and non-formal education outcomes	The recognition of informal and non-formal education outcomes is outlined in the relevant Regulations of the PDAU, which regulates the procedure for recognizing and transferring academic achievements obtained through non-formal/informal education by students at all levels of higher education at PDAU by submitting a corresponding application and supporting documents (certificates, etc.).
- regarding appeals of assessment results	The procedure for appealing the results of inspection activities is carried out in accordance with Regulations on the Assessment of Learning Outcomes for Higher Education Students at PDAU

RECOMMENDED SOURCES OF INFORMATION

Main:

1. Umanska, V. G., & Shkolna, D. R. (2017). Features of the organization, control, and standardization of labor in a market economy. Economy and Society, (9), 935–939.
2. Arapov, O. S., & Doroshenko, T. M. (2017). Work standards as a factor in increasing production efficiency. Economic Analysis, 27(4), 188–195.
3. Mashoshina, T. V. (2020). Cost Estimation.
4. Mislick, G. K., & Nussbaum, D. A. (2015). Cost Estimation: Methods and Tools. John Wiley & Sons.
5. Jorgensen, M., & Shepperd, M. (2006). A systematic review of software development cost estimation studies. IEEE Transactions on Software Engineering, 33(1), 33–53.

References:

1. Labor Code: Law of Ukraine No. 2434-IX, as amended on July 19, 2022. https://zakon.rada.gov.ua/laws/show/322-08#Text (accessed September 6, 2022).
2. Boehm, B., Abts, C., & Chulani, S. (2000). Software development cost estimation approaches – A survey. Annals of Software Engineering, 10(1), 177–205.
3. Petrash, O.V. Material Intensity of Soil-Cement Piles Manufactured Using Drilling-Mixing Technology / M.O. Korshunov, O.V. Petrash // Proceedings of the All-Ukrainian Online Conference of Young Scientists and Students "Problems and Prospects of Sustainable Development and Spatial Planning of Territories," March 18, 2015 [Text]. – Poltava: Y. Kondratyuk Poltava National Technical University, 2015. – 305 pp.
4. Normative Studies of Drilling-Mixing Technology for the Production of Soil-Cement Piles / M.L. Zotsenko, S.S. Petrash, R.V. Petrash, O.V. Petrash, N.M. Popovich // Scientific Bulletin of Construction. – Kharkiv, 2016. – Issue 2 (84). – pp. 211–223.

Information Resources:

1. V.I. Vernadsky National Library of Ukraine (http://www.nbuv.gov.ua 3. “Agrarian Technologies” Journal URL: www.agrotechnologies.ua 4. “National Agrarian University of Ukraine: Electronic Library” URL: library.naau.edu.ua 5. “Agrarian Portal of Ukraine” URL: www.agroportal.ua	
Approval Details	Approved at a meeting of the Department of Construction and Vocational Education; Minutes No. 1, dated September 1, 2026

Appendix to the Syllabus

SCORING SYSTEM, GRADING SCALE, AND CRITERIA FOR EVALUATING LEARNING OUTCOMES

Grading Scale for the Course

Topic Title	Form for Assessing Student's Learning Outcomes			
	Independent Work	Performing exercises in practical sessions	Survey	In total
Topic 1. Technical Standardization.	5	15	5	25
Topic 2. Determining the Scope of Work and Associated Materials.	5	15	5	25
Topic 3. Design and Cost Estimation Documentation.	5	15	5	25
Topic 4. Analysis of the correct application of unit rates.	5	15	5	25
Total	20	60	20	100

Grading Scale and Criteria

Completion of a practical assignment

Number of points	Assessment Criteria
5	The practical assignment was completed to a high standard. It includes a comprehensive and in-depth analysis of the task, along with correct and well-reasoned conclusions. A variety of information sources were used, and a thorough analysis was conducted. Originality and creativity are evident in the solution to the assigned task. The student's thoughts are presented clearly and concisely, demonstrating the development of competencies and the achievement of the program's learning outcomes.
4	The practical assignment was completed to a high standard. The candidate demonstrates a good understanding of the topic. There are minor errors in the analysis, which is sufficient but contains some inaccuracies. The student demonstrates the ability to generate new ideas and propose innovative solutions, conduct experiments and analyze the results, as well as the ability to work in a team, which indicates the development of competencies and the achievement of the program's learning outcomes by the student.
3	The practical assignment was completed satisfactorily. There is a general understanding of the topic, but there are significant shortcomings in the analysis or conclusions; the analysis is superficial, and some important aspects are missing; the ability to apply knowledge in practice to new situations; the ability to format the results of the work in accordance with the requirements; the ability to present the results of one's work, which indicates the development of competencies and the achievement of the program's learning outcomes by the higher education student.
2	The practical assignment was partially completed. The student demonstrates a partial understanding of the topic, significant gaps in knowledge, and either no analysis or an

	incorrect one, indicating an average level of competency development and achievement of the program's learning outcomes.
1	The practical assignment was completed unsatisfactorily. There is a lack of understanding of the topic, which makes it impossible to fully assess the development of competencies and the achievement of the program's learning outcomes by the student.
0	The practical assignment was not completed, or the student demonstrates a complete lack of knowledge, analysis, or original ideas/proposals. The assignment was completed poorly or not at all. There are no presentations or explanations of the results, making it impossible to assess the student's development of competencies and achievement of the program's learning outcomes.

Grading Scale and Criteria

Survey

Number of points	Assessment Criteria
5	A deep understanding of the theory and practice of protected-culture technologies. The ability to apply knowledge to solve complex problems. Demonstration of a creative approach and original ideas. The student demonstrates a thorough understanding of all aspects of the topic, can explain complex concepts in simple terms, and proposes innovative solutions.
4	A deep understanding of the theory and practice of protected-culture technologies. The ability to apply knowledge to solve complex problems. Demonstration of a creative approach and original ideas. The student demonstrates a thorough understanding of all aspects of the topic, can explain complex concepts in simple terms, and proposes innovative solutions.
3	A satisfactory understanding of key concepts. The student is able to articulate the main tenets of the theory, but has difficulty with more complex issues. The student demonstrates basic knowledge but requires additional support to achieve a deeper understanding.
2	A superficial understanding of the topic. Difficulty articulating their own thoughts. An incomplete understanding of the basic principles. The student has limited knowledge and requires significant assistance to successfully complete assignments.
1	Lack of understanding of key concepts. Inability to answer questions substantively. The candidate does not demonstrate knowledge of the subject.
0	Did not show up for the survey or refused to answer questions, making it impossible to assess the development of competencies and the achievement of program outcomes.

Grading Scale and Criteria

Completion of independent study assignmentsu

Number of points	Assessment Criteria
3	The assignment has been completed in full and to a high standard. The student demonstrates a deep understanding of the theoretical material and its practical application. Additional sources of information were used. The paper is formatted in accordance with the requirements. The student has demonstrated a high level of independence, a creative approach, and analytical skills.
2	The assignment was completed satisfactorily. There are some shortcomings in the execution of the work, but overall, the assignment was completed correctly. There are minor errors in the calculations or conclusions. The student demonstrated a basic understanding of the material but needs to work on certain aspects further.

1	The assignment was completed unsatisfactorily. There are significant errors in the work. The student has not fully mastered the material and is having difficulty completing the assignments.
0	The assignment was not completed or was completed poorly. There are no signs of understanding the topic. The student did not complete the assignment or completed it at an unacceptable level, making it impossible to assess the development of competencies and the achievement of program outcomes.