Syllabus
«Methods of logistic analysis»

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Expected learning outcomes
As a result of studying the discipline, the student
must know:

- full cost analysis, the process of accounting for all significant resource costs associated with the promotion of material flow within the allocated logistics system (principle of systematic logistics);
- calculation of the amount of resources needed to advance the material flow within the controlled area (principle of concreteness of logistics);
- calculation tools that allow you to substantiate the choice of the best solution (principle of scientific logistics);
- mathematical formalization and features of the application of multi-criteria decision-making methods and approaches;

must be able to:

- apply modern research methods of mathematical models and algorithms of intelligent data analysis;
- develop mathematical models and algorithms for solving scientific and practical problems of making optimal decisions and designing logistics systems;

The scope of the discipline: 4 ECTS credits (16 hours of lectures, 32 hours of practice).

Purpose: the formation of students' theoretical knowledge and practical skills, regarding decision-making in the field of management of material and information flows and logistics systems, and in the practical consolidation of students' understanding of the need for unified management of end-to-end material flows, in the orientation of learning a holistic vision of processes in logistics.

The **concept** of logistics is based on the fundamentals of system analysis, which are used to model material, financial, information flows, logistics operations and logistics systems. Also, the purpose of training is to form a system of theoretical knowledge and practical skills from the basics of the mathematical apparatus of decision-making in logistics, which are used in the formalization of algorithmic problems by means of modern information technologies, to ensure the quality of professional training in accordance with existing standards.

The content of the discipline

Topic 1. Logistics as a science and a field of professional activity
Topic 2. Logistics systems and chains
Topic 3. Inventory management in logistics
Topic 4. Control in the field of purchasing activities and decision-making on placing orders
Topic 5. Determining the size of the warehouse and the break-even point of the warehouse
Topic 6. Determining the location of the distribution warehouse
Topic 7. Decision-making methods in logistics
Topic 8. Information technologies in logistics
Topic 9. Logistics concepts in the field of production

- implement various methods and approaches of multi-criteria decision-making in practice and be able to compare the results to choose the optimal decision option;
- use tools and software packages to visualize the obtained decision-making results.

Prerequisites
"Fuzzy Sets Theory and Fuzzy Logic", "Decision Making Theory", "Control Systems".

Consequences
The knowledge gained during the discipline can be used in the disciplines or areas "Intelligent decision support systems", "Software intelligent control systems", "Methods of computational intelligence".

Technical support
Practices on the discipline are carried out in computer classes using Microsoft Visual Studio, Java SE, Python, C#.

Deadline policy
Works that are submitted in violation of deadlines without good reason are evaluated at a lower grade.

Academic Integrity Policy
Provides independent performance of practices. Write-off (including using mobile devices) is prohibited. The work is not credited in case of detection of plagiarism or write-off.

Evaluation criteria of laboratory works / practices / individual works / reports / projects

Maximum number of points – a student with high quality independently performed the entire scope of work, answers all questions related to the work performed, and makes additional calculations, for example, using the methods calculation of the amount of resources needed to advance the material flow within the controlled area processing offered to him by the teacher. The teacher has no complaints about the software implementation and performance requirements.
Approximately 70%-99% of the maximum number of points – a student with sufficient quality independently completed all tasks, but in the process he made some mistakes, which, after pointing to them by the teacher, corrected themselves. He answers some questions with a slight error. The additional calculations offered by the teacher make with some complexity. Not all work requirements are met.
Approximately 40%-69% of the maximum number of points – a student of average quality independently completed all tasks, but did not meet all the requirements for implementation. He answers the question with a slight error. The additional calculations offered by the teacher, for example, using calculation tools that allow you to substantiate the choice of the best solution student of decision making makes with insignificant errors. Not all requirements for the design of the work are met.
Approximately 1%-39% of the maximum number of points – a student performed all the work independently, but the quality of implementation is insufficient (errors in calculations, not all work requirements are met). The answers to the questions about the work are not entirely clear. There are errors in the answers.
0 points – a student did not perform the entire amount of work, or performed with gross errors. He has problems with calculations by certain methods, does not know the theoretical material, the software implementation does not meet the requirements.