

**Syllabus  
of the elective component  
Transport systems**

Discipline	<b>Transport systems</b>
Higher education level	<b>first (bachelor's degree)</b>
Moodle course web-page	<a href="https://dl2022.khadi-kh.com/course/view.php?id=3205">https://dl2022.khadi-kh.com/course/view.php?id=3205</a>
Educational component volume	<b>3 credits (90 hours)</b>
Final control form	<b>test</b>
Consultations	<b>according to the schedule</b>
Department	<b>Transport Systems and Logistics Department</b>
Language of teaching	<b>English</b>
Course leader	<b>Tokmylenko Tetiana, senior lecturer</b>
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**Educational Component Summary:**

**The purpose:** formation of a full view of the transport operation as a system at training highly qualified specialists to solve independently theoretical and practical problems of researching and managing the transport systems by using system analysis.

**The subject of the study:** theoretical and methodological foundations of research and management of transport systems functioning at the modern stage.

**The main tasks of the academic discipline are:**

- to form a system of knowledge and skills at students to solve typical problems of transport systems functioning;
- to carrying out analysis and synthesis of transport systems using the principles of a system approach and modern methods;
- to determine the purpose of system functioning and formation of system efficiency criteria, the limits of the transport system and the structure of the external environment and the nature of its relationship with the system under study;
- to study the internal structure of the transport system and determine its constituent elements, find dependencies characterizing the relationship between the elements of the transport system;
- to search by modeling the optimal system state;
- to form skills of using information and communication technologies, the ability to develop and manage projects and the desire to preserve the environment and, presentation of obtained results.

**Prerequisites for studying the educational component:**

Higher mathematics. Theory of Probability and Mathematical Statistics. Vehicles. General course of transport. Traffic rules. Fundamentals of systems theory and management. Geoinformation systems.

**Competencies acquired by the applicants:**

**General competencies:**

- ability to conduct research at the appropriate level;
- ability to develop projects and manage them;
- ability to evaluate and ensure the quality of performed works;

- ability to assess and ensure the quality of the work performed;
- ability to generate new ideas (creativity);
- skills in using information and communication technologies;
- aspiration to protect the environment;
- knowledge and understanding of the subject area and understanding of professional activity;
- ability to abstract thinking, analysis and synthesis

**Special (professional) competences:**

- ability to analyze and predict parameters and performance indicators of motor vehicle systems and technologies, taking into account the influence of the external environment;
- ability to research and manage the functioning of transport systems and technologies.

**Training results:**

- to classify and identify transport processes and systems. To evaluate parameters of transport systems. To perform system analysis of transport systems;
- to develop new and improve existing transport systems and technologies, determine development goals, existing limitations, performance criteria and areas of use;
- to evaluate critically scientific values and achievements of society in the development of transport technologies
- to research transport processes, experiment, analyze and evaluate the parameters of transport systems and technologies
- to develop, design, manage projects in the field of transport systems and technologies;
- to develop, plan, implement methods of safe activity in the field of transport systems and technologies;
- to develop and use transport technologies taking into account requirements to environmental protection.

**Thematic plan**

Theme №	Theme (L, PW, PW, SEW)	Hours	
		full-time training	part-time training
1	L. Elements of general systems theory	2	-
	SEW. Fundamental determinants for considering the system performance. Definition of concepts characterizing the functioning and development of the system	6	10
2	L. Transport systems	2	2
	SEW. Classification of motor vehicle systems. Transport planning and configuration of city networks	6	10
3	L. The method of researching transport systems	2	-
	SEW. Determining the structure of the external environment and the nature of its relations with the system under study	6	10
4	L. Elements of the transport system	2	2
	PW. Forecasting the volume of transportation of the motor vehicle enterprise	4	-
	SEW. Transport system elements	8	10

Theme №	Theme (L, PW, SEW)	Hours	
		full-time training	part-time training
5	L Methods of the criterion formation of transport systems efficiency	2	-
	PW. Choosing the best movement option	2	-
	SEW. Main parts of the multicriteria optimization problem	10	12
6	L. Determination of the structure of the external environment	2	-
	PW. Calculation of the passenger correspondence matrix by the gravity method	4	2
	SEW Sustainable operation of transport systems	8	10
7	L. Modeling of transport networks	2	1
	PW. Making up the topological scheme of the city	2	-
	SEW Modeling of transport networks in modern software packages	8	10
8	L Indicators of objects system properties	2	1
	PW. Determination of the area of economic sustainability of the transport system. Determination of the economic indicator of the reliability of the transport system	4	-
	SEW. Stability and reliability of transport systems	6	10
Sum	L	16	6
	PW	16	2
	SEW	58	82
Total		90	90

**Individual educational and research task:** not provided.

### Teaching methods:

- 1) verbal:
  - 1.1 traditional: lectures, explanations, talks, etc.;
  - 1.2 interactive: discussions, online questionnaires, online testing, etc.;
- 2) visual: illustration method, demonstration method, online presentations;
- 3) practical:
  - 3.1 traditional: practical classes;
  - 3.2 interactive: workshop, training, «World Cafe», brainstorm.

### Evaluation system and requirements:

#### Ongoing achievements

**1** The applicants' ongoing achievement in the performance of the both educational activities and self-education work while training is evaluated using a four-point scale with the further conversion into the 100-point scale. While evaluating all kinds of works provided by the educational program are taken into account.

**1.1** Lectures are evaluated by determining the quality of specific tasks performance.

**1.2** Practical classes are evaluated by the quality of performance of the tests or individual tasks, execution and design of the report on practical works.

**2** The final evaluation of the discipline is determined as a sum of points on:

- passed standard tests, verbal questioning, attendance and communication activity level;
- in-class practical tasks execution and theoretical preparation.

Applicants' evaluation score scale according to the ongoing control is given in table1.

**Table 1** – Points distribution under the themes defining a final test score according to the discipline ongoing assessment

Ongoing Assessment								Discipline total score
Theme 1	Theme 2	Theme 3	Theme 4	Theme 5	Theme 6	Theme 7	Theme 8	100
10	12	12	14	14	14	12	12	

### Final estimation

**1** The final test score is got by the applicant at the last double-lesson according to the discipline ongoing assessment. The condition to pass the test is not less than 60 points score.

**2** Higher education applicants who have an ongoing assessment score less than 60 points can increase it at the last class by taking a combination of written and oral tests that comprise both answering 2 professionally-oriented question and a problem solution with further commenting the work done or standard tests. The applicants who made the tasks previewed by the practical classes are allowed to pass the final test.

**3** Extra-points are awarded to the applicants for participation in scientific events.

**3.1** Extra-points are added to the achieved sum of points by the higher education applicant for the current educational activity.

**3.2** The number of extra-points awarded for different types of individual tasks depends on their volume and importance:

- participation in the international / all-Ukrainian competition of scientific students' works – 15 points;
- participation in international / all-Ukrainian scientific conferences of students and young scientists – 12 points;
- participation in all-Ukrainian discipline competitions– 10 points;
- implementation of individual scientific and research (educational and research) tasks of increased complexity – 5 points.

**3.3** The number of extra points might not exceed 20 points.

**4** The result of the study is evaluated on a two-point scale (passed/failed) according to table 2. The total score comprising the extra-points might not exceed 100 points.

**Table 2** – Conversion of the score into national evaluation system

According to 100-point scale	According to the national scale
between 60 scores and 100 scores	Passed
Less than 60 scores	Failed

### Course policy:

- the course involves working in the team, the environment in the audience is friendly, creative, open to constructive criticism;
- the discipline requires mandatory attendance of lectures and practical classes, as well as self-education work;
- self-education work involves studying certain discipline themes, which are submitted in accordance with the program for self-education work, or have been considered briefly;
- all the tasks provided by the program must be completed within the prescribed time-frame;
- if the higher education applicant is absent for valid reasons, he/she passes the completed tasks during the self-education work and consultations provided by the teacher;
- while studying the course, higher education applicants should follow the rules of academic integrity set out in such documents: «Rules of academic integrity of participants

of the KhNAHU Education process» ([https://www.khadi.kharkov.ua/fileadmin/P\\_Standart/pologeniya/stvnz\\_67\\_01\\_dobroch\\_1.pdf](https://www.khadi.kharkov.ua/fileadmin/P_Standart/pologeniya/stvnz_67_01_dobroch_1.pdf)), «Academic integrity. The text check of academic, scientific and qualification works for the plagiarism» ([https://www.khadi.kharkov.ua/fileadmin/P\\_Standart/pologeniya/stvnz\\_85\\_1\\_01.pdf](https://www.khadi.kharkov.ua/fileadmin/P_Standart/pologeniya/stvnz_85_1_01.pdf)), «Moral and ethical code of participants of the KhNAHU educational process» ([https://www.khadi.kharkov.ua/fileadmin/P\\_Standart/pologeniya/stvnz\\_67\\_01\\_MEK\\_1.pdf](https://www.khadi.kharkov.ua/fileadmin/P_Standart/pologeniya/stvnz_67_01_MEK_1.pdf)).

– in case of detecting the plagiarism, the applicant receives 0 points for the task and must retake the tasks provided in the syllabus;

– cheating during control works and examinations is prohibited (including mobile devices). Mobile devices are only allowed to be used during online testing.

### **Recommended literature:**

1. Milan Janic Transport Systems. Modelling, Planning, and Evaluation. – Boca Raton: CRC Press, 2021. 428 P.

2. Прокопенко Т.О. Теорія систем і системний аналіз : навч. посіб./ Т. О. Прокопенко ; М-во освіти і науки України, Черкас. держ. технол. ун-т. – Черкаси. ЧДТУ, 2019. 139 с.

3. Дудник І.М. Транспортна географія : підручник. – К.: НАУ, 2016. 288 с.

4. Кашканов В.А. Інформаційні системи і технології на автомобільному транспорті : навчальний посібник / В. А. Кашканов, А. А. Кашканов, В. П. Кужель. – Вінниця : ВНТУ, 2020. 104 с.

5. Токмиленко Т.Т. Sustainable development of the transport system / Т.Т. Токмиленко, М.М. Тесля // Збірник наукових праць «Інтеграційні процеси та інноваційні технології. Досягнення та перспективи технічних наук» (іноземними мовами, Вип. 7, ч. 1. – Харків: ХНАДУ, 2017. – С.226–230.

6. Токмиленко Т.Т. Цілісна інтегрована система мобільності. Трансформувannya мобільності пасажирів та вантажів / Т.Т. Токмиленко // Матеріали Міжнародної науково-практичної конференції «Перспективні напрями розвитку регіональних транспортних та логістичних систем». – Харків: ХНАДУ, 2018. – С.83-89.

7. Токмиленко Т.Т. Заходи щодо запобігання зараженню в сфері транспорту під час пандемії. Вплив пандемії на мобільність: лекції IV Міжнародної освітньої школи зі сталої мобільності (Київ, Харків, 21-24 квітня 2021 року). К.: Екодія, 2021. С. 36–42.

### **Additional sources:**

1. Центр транспортних стратегій : веб-сайт інформаційно-консалтингового центру «ЦТС». URL: <http://cfts.org.ua/>.

2. Державна служби України з безпеки на транспорті: офіційний веб-сайт. URL: <http://dsbt.gov.ua>.

3. Економічна статистика / Зовнішньоекономічна діяльність: офіційний веб-сайт. URL: [http://www.ukrstat.gov.ua/operativ/menu/menu\\_u/zed.htm](http://www.ukrstat.gov.ua/operativ/menu/menu_u/zed.htm).

4. Оновлена транспортна стратегія України. Напрямки політики на період до 2030 року : офіційний веб-сайт. URL: [https://mtu.gov.ua/files/strategy\\_ukr.pdf](https://mtu.gov.ua/files/strategy_ukr.pdf).

5. Світові тенденції розвитку міст: міжнародний досвід: офіційний веб-сайт. URL: <http://academy.gov.ua/ej/ej6/txts/07bovmmd.htm>.

6. Асоціація міжнародних автомобільних перевізників України: офіційний веб-сайт. URL: <http://www.asmap.org.ua/>.

7. Верховна Рада України : офіційний веб-сайт. URL: <http://rada.gov.ua/>.

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