Syllabus educational component of the Ministry of Education (elective discipline)

Complex mechanization of road works

Subjects:	Complex mechanization of road works
Level of higher education:	first (undergraduate)
Course page in Moodle:	https://dl2022.khadi.kharkov.ua/course/view.php?id=727
The scope of the educational	4 credits (120 hours)
component	
Final control form	Test
Consultations:	on schedule
Name of the department:	department of construction and road machinery
	named after A.M. Kholodova
Teaching language:	English
Course leader:	Viktor Borisovych Kosolapov, Ph.D., associate
	professor
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Brief content of the educational component:

The goal istraining of specialists in the field of organizing and ensuring the operation of fleets of machines in the conditions of modern construction production, formation of practical skills and abilities for independent selection of parameters and solving typical problems of complex mechanization of road works.

Subject: pedagogically – an adapted system of concepts about the principles of selecting parameters and solving typical problems in the operation and maintenance of machines. **The main tasks of studying an academic discipline are:**

- the formation of students' knowledge and ideas about the main operational properties of machines, the influence of operating modes and operating conditions on the performance of machines;

- mastering the skills of analyzing the impact of the main indicators of machines on the efficiency of their use;

– mastering the methodology for selecting projects of road construction mechanization bases for specific BDM parks.

Prerequisites for studying the educational component:

Higher mathematics; General structure of construction and road machines; Basics of road construction technology; Operational materials; Theory of mechanisms and machines; Machine parts; Hydraulics, hydraulic and pneumatic drives.

Competencies acquired by the acquirer:

General competences:

The ability to think abstractly

The ability to apply knowledge, demonstrating a professional approach in one's activities, which allows solving tasks in the field of lifting and transport, construction, road and reclamation machines.

Ability to gather and interpret information and express judgments about relevant social, scientific or ethical problems.

Ability to communicate information, ideas, problems and solutions in a form accessible to both specialists and non-specialists.

Ability to generate new ideas (creativity)

Special (professional) competences:

The ability to apply typical analytical methods and computer software for solving engineering tasks in the field of lifting and transport, construction, road and reclamation engineering.

The ability to apply fundamental scientific facts, concepts, theories, principles to solve professional tasks and practical problems of industrial mechanical engineering.

Knowledge, ability and skills to develop and implement scientific projects and programs in the field of lifting and transport, construction, road, reclamation machines and equipment.

Learning outcomes:

Knowledge and understanding of the basics of technological, fundamental and engineering sciences, which are the basis of lifting and transport, construction, road and reclamation engineering.

Knowledge and understanding of mechanics and lifting and transport, construction, road and reclamation engineering and the prospects for their development.

Analyze engineering objects, processes and methods.

Thematic plan

Topic No	Name of topics (LK, LR, PR, SZ, SR)		Number of				
			extram ural				
	LC Introduction The state of complex mechanization of road construction in modern conditions	0,5	0.5				
1	State of complex mechanization of road construction in modern conditions	2	-				
	SR The state of complex mechanization of road construction in the leading countries of the world	12	9				
	LK Basic provisions and theoretical foundations of complex mechanization of road construction						
2	PR Calculation of machine reserve	2	2				
	SR Calculation of machine reserve. Calculation of basic parameters of road construction flows	15	15				
	LK Complex mechanization of earthwork construction						
3	3 PR Calculation of basic parameters of road construction 2 flows SR Complex mechanization of concentrated earthworks 15						
	LK Complex mechanization of road surface construction	2	1				
4	PR Complex mechanization of road surface construction	2	-				
	SR Complex mechanization of foundation layer construction	10	20				
	LK Basic provisions and theoretical foundations of complex mechanization of road construction enterprises	3	-				
5	PR Basic provisions and theoretical foundations of complex mechanization of road construction enterprises	2	-				
	SR Structure and general planning of production enterprises	12	25				

6	LK Complex mechanization of asphalt plants	3	9
	PR Calculation of the composition of secondary links of production and transport complexes ABZ	4	1
	SR Calculation of the composition of the secondary links of production and transport complexes of ABZ	8	8
	LK Complex cement mechanization of concrete plants	3	5
7	PR Calculation of the composition of the secondary links of the production and transport complexes of the Central Bank	4	
	SR Calculation of the composition of secondary links of production and transport complexes of the Central Bank	8	15
8	LK Prospects for the development of complex mechanization of road construction in modern conditions	0,5	-
	PR Prospects for the development of complex mechanization of road construction in modern conditions		-
	SR Modern trends of complex mechanization of road construction	8	3
	LK	16	4
Toget her	PR	16	4
	SR	88	112
		120	120

Individual educational and research task(in the presence):

Teaching methods:

TM1-verbal method (lecture);

- TM2 practical method (practical classes);
- TM4 work with educational and methodical literature;
- TM8 project method.

Assessment forms and methods

- FMO2 final control (semester assessment)
- FMO3 oral control (conversation)
- FMO5 test control
- FMO7 practical examination (protection of practical works)

Evaluation system and requirements:

Current performance

1 The current success of applicants for the performance of educational types of work in training sessions and for the performance of independent work tasks is evaluated using a four-point rating scale with subsequent transfer to a 100-point scale. During the evaluation of the current performance in are counted all types of work provided by the curriculum program

1.1 Lecture classes are evaluated by determining the quality of performance of specified tasks.

1.2 Practical classes are evaluated by the quality of performance of a control or individual task, performance and design of practical work.

2 Evaluation of the current success rate of higher education applicants is carried out at each practical session (laboratory or seminary) on a four-point scale ("5", "4", "Z", "2") and are entered in accounting journal academic success

- "excellent": the winner mastered the theoretical material flawlessly, demonstrates deep knowledge of the relevant topic or academic discipline, the main provisions;

- "good": the applicant has mastered the theoretical material well, has the main aspects from primary sources and recommended literature, presents it in a reasoned manner; has practical skills, expresses his thoughts on certain problems, but certain inaccuracies and errors are assumed in the logic of the presentation of theoretical content or in the analysis of practical ones;

- "satisfactory": the applicant has basically mastered the theoretical knowledge of the educational topic or discipline, orients himself in primary sources and recommended literature, but answers unconvincingly, confuses concepts, answers additional questions uncertainly, does not have stable knowledge; when answering questions of a practical nature, reveals inaccuracy in knowledge, does not know how to evaluate facts and phenomena, connect them with the future profession;

- "unsatisfactory": the applicant has not mastered the educational material of the topic (discipline), does not know scientific facts, definitions, hardly orients himself in primary sources and recommended literature, lacks scientific thinking, practical skills are not formed. **3**Final score by current activity is recognized as an arithmetic average sum points for each lesson, for individual work, current control works according to the formula:

$$K^{current} = \frac{K1 + K2 + \dots + Kn}{n}$$

Where $K^{current}$ – final assessment of success based on the results of current control;

K1, K2, ..., Kn- evaluation of success *n* -th measure of current control;

n - the number of measures of current control.

Grades are converted in points according to the calculation scale (table 1).

4-point scale	100 points scale	4-ball scale	100 points scale	4-ball scale	100 points scale	4-ball scale	100 points scale
5	100	4.45	89	3.90	78	3.35	67
4.95	99	4.4	88	3.85	77	3.3	66
4.9	98	4.35	87	3.80	76	3.25	65
4.85	97	4.3	86	3.75	75	3.2	64
4.8	96	4.25	85	3.7	74	3.15	63
4.75	95	4.20	84	3.65	73	3.1	62
4.7	94	4.15	83	3.60	72	3.05	61
4.65	93	4.10	82	3.55	71	3	60
4.6	92	4.05	81	3.5	70	from 1.78 to 2.99	from 35 to
							59
						reassen	nbly
4.55	91	4.00	80	3.45	69	from 0 to 1.77	from 0 to 34
4.5	90	3.95	79	3,4	68	repeated study	

Table 1 – Recalculation of the average grade for the current activity into a multipoint scale

Final assessment:

1 A student of higher education receives a credit in the last lesson in the discipline based on the results of the current assessment. The average score for the current activity is converted into points on a 100-point scale, according to the conversion table (table 1).

Graduates of higher education, who have an average current grade in the discipline lower than "3" (60 points), in the last session can increase their current grade by taking tests in the discipline.

Assessment of the knowledge of applicants through testing is carried out according to the following scale:

- "Excellent": at least 90% of correct answers;
- "Very good": 82% to 89% correct answers;
- "Good": from 74% to 81% of correct answers;
- "Satisfactory": from 67% to 73% of correct answers;
- "Fair enough": 60% to 66% correct answers;

-"Unsatisfactory": less than 60% of correct answers.

2 The condition for obtaining credit is:

-making up for all missed classes;

-the average current grade in the discipline is not lower than "3" (60 points).

3 For performing individual independent work and participating in scientific events, winners are awarded additional points.

3.1 Additional points are added to the sum of points scored by the student of higher education for the current educational activity (for disciplines, for which the final form of control is a test), or to the final grade in the discipline, for which the final form of control is an exam.

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

-prizes in the discipline at the international / all-Ukrainian competition of scientific student works - 20 points;

-prize places in the discipline at the All-Ukrainian Olympiads - 20 points;

-participation in the international / all-Ukrainian competition of scientific student works - 15 points

-participation in international / all-Ukrainian scientific conferences of students and young scientists - 12 points;

-participation in all-Ukrainian Olympiads in the discipline - 10 points

-participation in olympiads and scientific conferences of the Khnadu in the discipline - 5 points;

-performance of individual scientific and research (educational and research) tasks of increased complexity - 5 points.

3.3The number of additional points cannot exceed 20 points.

4The result of the study is evaluated (select is required):

-on a two-point scale (passed/failed) according to table 2;

-on a 100-point scale (for differentiated assessment) according to table 3.

The final grade together with additional points cannot exceed 100 points.

Table 2 - The scale for transferring points to the national evaluation system

On a 100-point scale	On a national scale		
from 60 points to 100 points	counted		
less than 60 points	not counted		

 Table 3– The scale for evaluating the knowledge of the students based on the results

 of the final control of the academic discipline

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Score	Evaluati	on on a		Evaluation according to the ECTS scale	
in	nationa	al scale	Dation	Criterie	
points	exam	test	Rating	Criteria	
90- 100	Perfectly	Enrolled	A	The theoretical content of the course has been mastered in its entirety, without gaps, the necessary practical skills for working with the mastered material have been formed, all educational tasks provided for in the training program have been completed, the quality of their performance has been assessed with a number of points close to the maximum	
80–89 75-79	9 <u>Fine</u> 9	B	The theoretical content of the course has been mastered in its entirety, without gaps, the necessary practical skills for working with the mastered material have mainly been formed, all educational tasks provided for by the training program have been completed, the quality of most of them has been assessed with a number of points close to the maximum The theoretical content of the course has been mastered in its entirety, without gaps, some practical skills of working with the mastered material have not been formed enough all		
	Enrolled		educational tasks provided for by the training program have been completed, the quality of none of them has been assessed with a minimum number of points, some types of tasks have been completed with errors		
67-74	ctorily	ctorily	D	The theoretical content of the course is partially mastered, but the gaps are not of a significant nature, the necessary practical skills for working with the mastered material are basically formed, most of the educational tasks provided by the training program have been completed, some of the completed tasks may contain errors	
60–66	Satisfac		E	The theoretical content of the course has been partially mastered, some practical work skills have not been formed, many educational tasks provided by the training program have not been completed, or the quality of some of them has been assessed with a number of points close to the minimum.	

Score	Evaluation on a		Evaluation according to the ECTS scale			
in	nationa	al scale	Rating	Criteria		
points	exam	test	raing			
35–59	Unsatisfactorily	counted	FX	The theoretical content of the course has been partially mastered, the necessary practical work skills have not been formed, most of the prescribed training programs of educational tasks have not been completed, or the quality of their implementation has been assessed with a number of points close to the minimum; with additional independent work on the course material, it is possible to improve the quality of the performance of educational tasks (with the possibility of retaking)		
0–34	-34 Solution PC- Reptaple Nuacceptaple		F	The theoretical content of the course has not been mastered, the necessary practical work skills have not been formed, all completed educational tasks contain gross errors, additional independent work on the course material will not lead to any significant improvement in the quality of the performance of educational tasks (with a mandatory repeat course)		

Course policy:

- the course involves working in a team, the environment in the classroom is friendly, creative, open to constructive criticism;

- mastering the discipline involves mandatory attendance of lectures and practical classes, as well as independent work;

- independent work involves the study of individual topics of the academic discipline, which are presented in accordance with the program for independent study, or were considered briefly;

- all tasks provided by the program must be completed within the set time;

- if the student of higher education is absent from classes for a good reason, he presents the completed tasks during independent preparation and consultation of the teacher;

- laboratory works must be protected no later than a week before the beginning of the examination session (indicated if available);

- while studying the course, students of higher education must adhere to the rules of academic integrity set forth in the following documents: "Rules of academic integrity of participants in the educational process of the Khnadu" (https://www.khadi.kharkov.ua/fileadmin/P_Standart/pologeniya/stvnz_67_01_dobroch_1.p df), "Academic integrity. Checking the text of academic, scientific and qualification papers for

(https://www.khadi.kharkov.ua/fileadmin/P_Standart/pologeniya/stvnz_85_1_01.pdf),

"Moral and ethical code of participants in the educational process of the National Academy of Sciences

(<u>https://www.khadi.kharkov.ua/fileadmin/P_Standart/pologeniya/stvnz_67_01_MEK_1.pdf</u>). - in case of detection of plagiarism, the applicant receives 0 points for the task and must repeat the tasks provided for in the syllabus;

- writing off during tests and exams is prohibited (including using mobile devices). Mobile devices are allowed to be used only during online testing.

Recommended Books:

Basic literature

1. Kosolapov V.B. Operation of construction and road machines: Training. manual / V.M. Krasnokutskyi, V.B. Kosolapov - Kharkiv: Khnadu, 2014.

2. Khmara L.A. Road machines: Machines for the construction, repair and maintenance of highways:education manual. Part II / L. A. Khmara, O. S. Shipilov, V. D. Musiyko [and others]. - Kyiv-Dnipropetrovsk: NTU. – 2013.-399 p.

3. Polyansky S.K.,Bilyakovich M.O. Technical operation of construction and road vehicles and special vehicles. Tutorial. Part 2. Refueling and anointing. Management of the technical condition of machines. - K.: "Slovo" - 2011. - 448 p.

Supporting literature

1. Khmara L.A. Road machines: Asphalt concrete plants and asphalt mixing plants: training manual. Part III / L. A. Khmara, O. S. Shipilov, V. D. Musiiko, M. P. Kuzminets;. - Kyiv-Dnipropetrovsk: National Technical University, 2015. - 248 p.

2. Khmara L.A. Machines and equipment of the industry for the production of building materials, products and structures: atlas of structures / L. A. Khmara, M. O.Bilyakovich, M. P. Kuzminets [and others]. - Kyiv-Dnipropetrovsk: NTU. - 2015. - 324 p.

3. Kuzenko L.M. Road construction machines: a study guide / L.M. Kuzenko, D.V. Kuzenko, Z.Z. Vantukh, Y.Y. Cheesecake - Kyiv: "Condor" Publishing House, 2021. - 236 p.,

Additional sources:

distance course: https://dl2022.khadi.kharkov.ua/course/view.php?id=727

Developer(s)

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