

Syllabus
selective component of VC

Mine surveying

Discipline name:	Mine surveying
Level of higher education:	First (undergraduate)
Course page in Moodle:	https://dl2022.khadi.kharkov.ua/course/view.php?id=2582
The volume of the educational component	4 credits (120 hours)
Form of final control	Test
Consultations:	on schedule
Name of the department:	Department of Road Design, Geodesy and Land Management
Language of instruction:	English
Course leader:	Lyudmila Oleksandrivna Kovalenko, Ph.D., associate professor
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Brief content of the educational component:

The goal is practical training of students as future specialists for independent performance of engineering and geodetic works during the construction of tunnels, bridge crossings and other transport structures.

Subject: principles of performing engineering and geodetic works during the construction of tunnels, bridge crossings and other transport structures.

The main tasks of studying an academic discipline are:

- formation of students' knowledge, skills and practical skills in working with geodetic equipment on the surface of the earth, in underground tunnels and on installation sites;
- supervision of tunneling, installation of building structures, control over the compliance of the completed works with design data.

Prerequisites for studying the educational component:

Geodesy; Higher mathematics; Physics

Competencies acquired by the acquirer:

General competences:

The ability to apply the acquired knowledge in the professional field, the ability to integrate it with existing ones;

Ability to work in a team, using the skills of interaction with colleagues and ensure quality performance of work;

Special (professional) competences:

Ability to apply regulatory and legal acts, regulatory and technical documents, reference materials in professional activities.

The ability to apply modern information, technical and technological support in the field of design, construction of objects of the road and transport complex;

Ability to perform technical control, supervision during construction, repair and reconstruction of bridges, tunnels and other engineering structures;

Learning outcomes:

Know and apply in professional activity regulatory and legal acts, regulatory and technical documents, reference materials in the field of geodesy and land management and related fields.

To carry out survey and research, topographic-geodetic, cartographic, project and project-research works when performing professional tasks in geodesy.

Choose and use tools, equipment, equipment and software, which are necessary for the performance of surveying works.

Thematic plan

Topic number	Title of topics (LK, LR, PR, SZ, SR)	Number of hours	
		Full-Time	Correspondence
1	2	3	4
1	LK	–	–
	LR – Determination of the position of the axial points of the tunnel in the initial and final portals of the tunnel.	4	1
	SR - The main tasks of surveying work during the construction of road tunnels.	4	7
2	LK	–	–
	LR – Breakdown of the axial points of the tunnel in the initial and final portals of the tunnel on the terrain.	2	1
	SR – Passing the tunnel in an open way. Shield method of penetration.	5	7
3	LK	–	–
	LR – Determination of the direction of the tunnel axis in the initial and final portals on the terrain.	4	1
	SR - Standards for the design of road tunnels.	4	6
4	LK	–	–
	LR – Calculation of the expected error of the tunnel failure.	2	
	SR - Tunnel triangulation and polygonometry.	4	7
5	LK	–	–
	LR – Determination of the design slope of the tunnel axis and its task when tunneling in the terrain.	4	1
	SR – Orientation of the underground geodetic base. Ways of orientation.	5	7
6	LK	–	–
	LR – Calculation of geodetic data for dividing the axis and contour of the tunnel in plan.	2	1
	SR – Determination of the position of the axial points of the tunnel. Binding to reference geodetic network points.	5	7
7	LK	–	–
	LR – Working terrain when the tunnel contour is brought into the wild.	4	1
	SR – Geodetic works during tunnel breakdown in plan.	5	7
8	LK	–	–
	LR – Transfer of the height mark to the bottom of the pit during tunnel construction.	4	1
	SR - Elevation grounding in the construction of tunnels on the surface of the earth and underground.	4	7
9	LK	–	–
	LR - Calculation of data for tunneling along a circular curve.	2	1

	SR – Engineering and geodetic works during the transfer of the height mark to the bottom of the tunnel.	5	7
10	LK	–	–
	LR – Demolition work on the site during tunneling along a circular curve.	4	1
	SR - Underground leveling. Laying of leveling courses. Periodicity of leveling.	5	7
11	LK	–	–
	LR – Calculation of data for tunneling by rounding with transition curves.	2	1
	SR – Surveying work during the construction of the tunnel along a circular curve.	5	7
12	LK	–	–
	LR – Excavation work on the site during the tunnel tunnel rounding with transitional curves.	4	–
	SR – Surveying work during the tunnel breakdown by rounding with transitional curves.	5	7
thirteen	LK	–	–
	LR – surveying control of the shape and dimensions of the cross-section of the tunnel during its construction.	2	1
	SR - Geodetic works during the control of the cross profile of the tunnel.	4	7
14	LK	–	–
	LR – Calculation of geodetic parameters for rendering the centers of the bridge supports in nature by the method of corner serifs.	2	1
	SR – Engineering and geodetic works during the construction of tunnels by the mining method.	4	6
15	LK	–	–
	LR – Compilation of the breakdown drawing for the breakdown of the centers of the bridge supports.	2	–
	SR – Engineering and geodetic works during the construction of bridge crossings.	4	6
16	LK	–	–
	LR – On-site work when removing the centers of the bridge supports.	4	–
	SR – Engineering and geodetic works during the construction of bridge crossings.	4	6
In total for semester 6 - LR		48	12
SR		72	108
ALL by discipline		120	120

Teaching methods:

visual verbal (explanation, story, conversation, discussion, work with a book), laboratory tasks and independent work of the student.

Grading system and requirements:

Current success

1 The current success of applicants for the performance of educational types of work in training sessions and for the performance of tasks of independent work is assessed using a four-point scale of grades, followed by recalculation into a 100-point scale. During the assessment of current performance, all types of work provided for by the curriculum are taken into account.

1.1 Lectures are evaluated by determining the quality of the specified tasks.

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

1.3 Laboratory classes are assessed by the quality of the implementation of reports on the performance of laboratory work.

1.4 Seminars are evaluated by the quality of the individual task / abstract.

2 Evaluation of the current performance of applicants for higher education is carried out at each practical lesson (laboratory or seminar) on a four-point scale ("5", "4", "C", "2") and recorded in the journal of accounting for academic performance.

– "excellent": the applicant perfectly mastered the theoretical material, demonstrates deep knowledge of the relevant topic or academic discipline, the main provisions;

– "good": the applicant has well mastered the theoretical material, owns the main aspects from primary sources and recommended literature, reasonably teaches it; has practical skills, expresses his reasoning about certain problems, but assumes certain inaccuracies and errors in the logic of presenting theoretical content or in the analysis of practical;

– "satisfactory": the applicant has mainly mastered the theoretical knowledge of an academic topic or discipline, is oriented in primary sources and recommended literature, but unconvincingly answers, confuses concepts, uncertainly answers additional questions, does not have stable knowledge; answering questions of a practical nature, reveals inaccuracies in knowledge, does not know how to evaluate facts and phenomena, connect them with a future profession;

– "unsatisfactory": the applicant has not mastered the educational material of the topic (discipline), does not know scientific facts, definitions, is almost not oriented in primary sources and recommended literature, there is no scientific thinking, practical skills are not formed.

3 The final score for current activities is recognized as the arithmetic average sum of points for each lesson, for individual work, current tests according to the formula:

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

where K^{nomou} – is the final assessment of success based on the results of current control;

$K1, K2, \dots, Kn$ – assessment of the success of the measure of current control;

n – the number of measures of current control.

Scores are converted to points according to the recalculation scale (Table 1).

Table 1 – Recalculation of the average score for current activities into a multi-point scale

4-point Scale	100-point Scale	4-point Scale	100-point Scale	4-point Scale	100-point Scale	4-point Scale	100-point Scale
<u>5</u>	<u>100</u>	<u>4,45</u>	<u>89</u>	<u>3,90</u>	<u>78</u>	<u>3,35</u>	<u>67</u>
<u>4,95</u>	<u>99</u>	<u>4,4</u>	<u>88</u>	<u>3,85</u>	<u>77</u>	<u>3,3</u>	<u>66</u>
<u>4,9</u>	<u>98</u>	<u>4,35</u>	<u>87</u>	<u>3,80</u>	<u>76</u>	<u>3,25</u>	<u>65</u>
<u>4,85</u>	<u>97</u>	<u>4,3</u>	<u>86</u>	<u>3,75</u>	<u>75</u>	<u>3,2</u>	<u>64</u>
<u>4,8</u>	<u>96</u>	<u>4,25</u>	<u>85</u>	<u>3,7</u>	<u>74</u>	<u>3,15</u>	<u>63</u>
<u>4,75</u>	<u>95</u>	<u>4,20</u>	<u>84</u>	<u>3,65</u>	<u>73</u>	<u>3,1</u>	<u>62</u>

<u>4,7</u>	<u>94</u>	<u>4,15</u>	<u>83</u>	<u>3,60</u>	<u>72</u>	<u>3,05</u>	<u>61</u>
<u>4,65</u>	<u>93</u>	<u>4,10</u>	<u>82</u>	<u>3,55</u>	<u>71</u>	<u>3</u>	<u>60</u>
<u>4,6</u>	<u>92</u>	<u>4,05</u>	<u>81</u>	<u>3,5</u>	<u>70</u>	from 1,78 to 2,99	from 35 to 59
						Reassembly	
<u>4,55</u>	<u>91</u>	<u>4,00</u>	<u>80</u>	<u>3,45</u>	<u>69</u>	from 0 to 1,77	from 0 to 34
<u>4,5</u>	<u>90</u>	<u>3,95</u>	<u>79</u>	<u>3,4</u>	<u>68</u>	Re-study	

Final assessment

1 The applicant for higher education receives credit at the last lesson in the discipline based on the results of the current assessment. The average score for current activities is converted into points on a 100-point scale, according to the recalculation table (Table 1). Applicants for higher education who have an average current grade in a discipline lower than "3" (60 points) in the last lesson can increase their current score by passing tests in the discipline.

Assessment of knowledge of applicants by testing is carried out on a scale:

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

2 The condition for obtaining the test is:

- working out all missed classes;
- the average current score in the discipline is not lower than "3" (60 points).

3 For the implementation of individual independent work and participation in scientific events, applicants are awarded additional points.

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

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

- prizes in the discipline at the international / all-Ukrainian competition of scientific student works – 20 points;
- prizes 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 KhNADU in the discipline – 5 points;
- implementation of individual research (educational and research) tasks of increased complexity – 5 points.

3.3 The number of additional points may not exceed 20 points.

4 The result of training is evaluated (*choose the right one*):

- on a two-point scale (credited/not credited) according to table 2;
- on a 100-point scale (for differentiated standings) according to Table 3.

The final score, together with additional points, cannot exceed 100 points.

Table 2 – Scale of transfer of points to the national grading system

On a 100-point scale	On a national scale
from 60 points to 100 points	enrolled
less than 60 points	unaccounted for

Table 3 – Scale of assessment of applicants' knowledge based on the results of the final control in the discipline

Score in points	National scale score		ECTS score	
	Exam	Passed	Score	Criteria
90-100	Perfectly	Enrolled	A	The theoretical content of the course is mastered entirely, without gaps, the necessary practical skills of working with the mastered material are formed, all the training tasks provided by the training program have been completed, the quality of their implementation is estimated by the number of points close to the maximum
80-89	Well	Enrolled	B	The theoretical content of the course is mastered entirely, without gaps, the necessary practical skills in working with the mastered material are mainly formed, all the training tasks provided by the training program have been completed, the quality of most of them is estimated by the number of points close to the maximum
75-79			C	The theoretical content of the course is mastered entirely, without gaps, some practical skills of working with the mastered material are not sufficiently formed, all the training tasks provided by the training program have been completed, the quality of none of them is assessed by the minimum number of points, some types of tasks are performed with errors
67-74	Satisfactory		D	The theoretical content of the course is partially mastered, but the gaps are not significant, the necessary practical skills in working with the mastered material are mainly formed, most of the training tasks provided by the training program have been completed, some of the tasks performed may contain errors

60–66			E	The theoretical content of the course is partially mastered, some practical skills of work are not formed, many of the training tasks provided by the training program have not been completed, or the quality of some of them is estimated by the number of points close to the minimum.
35–59	Disappointing	Not credited	FX	The theoretical content of the course is partially mastered, the necessary practical skills of work are not formed, most of the provided training programs have not been completed, or the quality of their implementation is estimated by the number of points close to the minimum; with additional independent work on the course material, it is possible to improve the quality of the training tasks (with the possibility of re-compilation)
0–34	Unacceptable		F	The theoretical content of the course has not been mastered, the necessary practical skills of work are not formed, all completed training tasks contain gross errors, additional independent work on the course material will not lead to any significant improvement in the quality of the training tasks (with a mandatory repeated course)

Course Policy:

- the course involves teamwork, the environment in the audience is friendly, creative, open to constructive criticism;
- mastering the discipline involves the obligatory attendance of lectures and practical classes, as well as independent work;
- independent work involves the study of individual topics of the discipline, which are made in accordance with the program for independent study, or were considered briefly;
- all tasks envisaged by the program must be completed within the prescribed period;
- if the applicant for higher education is absent from the classroom for a good reason, he presents the completed tasks during the independent preparation and consultation of the teacher;
- while studying the course, applicants for higher education must comply with the rules of academic integrity set forth in the following documents: "Rules of academic integrity of participants in the educational process of KhNADU" (https://www.khadi.kharkov.ua/fileadmin/P_Standart/pologeniya/stvnz_67_01_dobroch_1.pdf), "Academic integrity. Verification of the text of academic, scientific and qualification works for plagiarism" (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 KhNADU" (https://www.khadi.kharkov.ua/fileadmin/P_Standart/pologeniya/stvnz_67_01_MEK_1.pdf).
- in case of detection of the fact of plagiarism, the applicant receives 0 points for the task and must re-complete the tasks provided for in the syllabus;
- write-offs during tests and exams are prohibited (including using mobile devices). Mobile devices are only allowed to be used during online testing.

Recommended Books:

1. Kovalenko L.O. Methodical instructions for laboratory classes and independent work in the discipline "Surveying" specialty 193 "Geodesy and land management" / L.O. Kovalenko, T.I. Tymoshevska, I.V. Musienko, T.A. pouring Kharkiv: Khnadu, 2022. 42 p.
2. Bilchenko A.V. Transport tunnels: Training manual. Kharkiv: Khnadu, 2008. 264 p.
3. Batrakova A.G., Kuzmin V.I. Engineering and geodetic monitoring and control in construction. Part I. Engineering and geodetic works during the construction of bridge crossings: Training manual. Kharkiv: Khnadu, 2018. 116 p.
4. Batrakova A.G. Engineering and geodetic monitoring and control in construction. Part II. Geodetic works in the construction of tunnels: Training manual / A.H. Batrakova, E.V. Dorozhko, V.I. Kuzmin, D.O. Batrakov. Kharkiv: Khnadu, 2020. 150 p.

Additional sources:

1. distance course:
<https://dl2022.khadi.kharkov.ua/course/view.php?id=2582>
2. <http://files.khadi.kharkov.ua>
3. <http://www.nbvv.gov.ua>
4. <http://korolenko.kharkov.com>
5. <http://library.univer.kharkov.ua>

Developer (developers)
syllabus of the discipline

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