

Syllabus
educational component of VC
(conditional designation OK in the educational program (ONP))

Welding materials and their production

Subjects:	Welding materials and their production
Level of higher education:	the second (master's)
Course page in Moodle:	https://di2022.khadi-kh.com/course/index.php?categoryid=829
The scope of the educational component	3 credits (90 hours)
Final control form	Test
Consultations:	Not provided by the curriculum
Name of the department:	Department of Metal Technology and Materials Science
Teaching language:	Ukrainian
Course leader:	Valery Anatolviyovych Bagrov , candidate of technical sciences , associate professor
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Brief content of the educational component:

The goal is to acquaint students with the history and prospects of the development of modern welding materials, the technology of their production .

Subject : physical processes during welding and surfacing and the production technology of welding materials at the modern level.

The main tasks of studying an academic discipline are:

- acquisition of knowledge by students of higher education about the main types of welding materials and the peculiarities of their production;
practical - formation of skills and abilities to apply modern electric welding technologies, knowledge of the features of various types of electric welding, their application and scope of use.

Prerequisites for studying the educational component:

the discipline is studied after
study of the disciplines "Technology of construction materials and materials science", "Metallurgy of integral joints and their diagnostics", "Theory of alloys", "Increasing the wear and corrosion resistance of parts".

Competencies acquired by the acquirer:

General competences :

The ability to generate new ideas and implement them in the form of sound innovative solutions.

Ability to find, process and analyze information from various sources.

Ability and readiness to implement modern technological processes of obtaining and processing materials and technologies for improving properties and restoring products in order to meet their production requirements.

Special (professional) competences:

The ability to perform scientific research, analyze and process the results of natural or model experiments, using regulatory documents, new hypotheses in the field of materials science, information technology, software.

Ability to perform a literature search of sources in the professional field and critically evaluate published materials.

Specialized knowledge of the latest methods and techniques of modeling, development and research of materials.

Learning outcomes according to the educational program:

To know and understand measures to restore and ensure high operational properties of machine parts, welded joints and various structures.

Know the main groups of materials and reasonably make their selection for specific operating conditions.

Use experimental methods of studying structural, physical-mechanical, electrophysical, magnetic, optical and technological properties of materials.

Apply knowledge and understanding of experimental planning methods, perform experimental studies and process their results.

Thematic plan

Topic No	Name of topics (LK, LR, PR, SZ, SR)	Number of hours
		ocular
1	LK INTRODUCTION. STRUCTURE OF WELDED JOINTS	2
	PR (LR, SZ) STUDY OF AUTOMATIC MELTING OF ELECTRODES WITH ALLOY COATING	2
	SR Development of information support for each module (topic)	6
2	LK GENERAL SCHEME OF INTERACTION OF METAL, GAS AND SLAG PHASES DURING WELDING. BEHAVIOR OF METAL COMPONENT WELDING MATERIALS DURING WELDING, DISOXIDATION, ALLOYING	2
	PR (LR, SZ) STUDY OF THE INFLUENCE OF THE COEFFICIENT OF INTRODUCING A CURRENT ADDITIVE ON THE PRESSURE INDICATORS DURING SOLDERING WITH WEAR-RESISTANT ALLOYS UNDER FLUX	2
	SR Development of information support for each module (topic)	6
3	LK METAL WELDING MATERIALS. WIRE FOR WELDING COLORED METAL AND OTHER WELDING MATERIALS. COVERED ELECTRODES FOR MANUAL ARC WELDING AND SOLDERING.	2
	PR (LR, SZ) STUDY OF THE INFLUENCE OF THE COEFFICIENT OF INTRODUCING A CURRENT ADDITIVE ON THE PRESSURE INDICATORS DURING SOLDERING WITH WEAR-RESISTANT ALLOYS UNDER FLUX.	2
	SR Development of information support for each module (topic)	6
4	LK TECHNOLOGICAL SCHEME OF ELECTRODE MANUFACTURING.	2
	PR (LR, SZ.) CALCULATION OF THE CHARGE OF COVERED ELECTRODES FOR WELDING.	2
	SR Development of information support for each module (topic)	8
5	LK POWDERED WIRES FOR WELDING AND SOLDERING. PRODUCTION OF POWDER WIRE	2

	PR (LR, SZ) CALCULATION OF THE CHARGE OF COVERED ELECTRODES FOR SOLDERING.	2
	SR Development of information support for each module (topic)	8
6	LK SHIELDING GASES FOR ARC WELDING. ACTIVE PROTECTIVE GASES.	2
	PR (LR, SZ) CALCULATION OF THE CHARGE OF POWDERED WIRES FOR SOLDERING. .	2
	SR Development of information support for each module (topic)	8
7	LC TYPES OF WELDING FLUXES AND METHODS OF THEIR PRODUCTION	2
	PR (LR, SZ) CALCULATION OF MELTED FLUXES	2
	SR Development of information support for each module (topic)?	8
8	LK PRODUCTION OF MELTED FLUXES. PRODUCTION OF UNMELTED FLUXES.	2
	PR (LR, SZ) CALCULATION OF CERAMIC FLUXES.	2
	SR Preparation for the final inspection	8
Together	LK	16
	PR (LR, SZ)	16
	SR	58

Individual educational and research task (if available): absent

Teaching methods:

- 1) verbal: 1.1 traditional: lectures, explanations, stories, etc.;
- 1.2 non-traditional: electronic version, remote.
- 2) visual: method of illustrations, method of demonstrations
- 3) practical: 3.1 traditional practical classes
- 3.2 non-traditional stations

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 academic performance, all types of work provided for by the educational program are taken into account.

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 execution and design of practical work.

2 Evaluation of the current performance of students of higher education is carried out at each practical session on a four-point scale ("5", "4", "3", "2") and entered in the journal of academic performance.

– "excellent": the applicant has fully mastered the theoretical material, provides comprehensive answers to the questions posed on the relevant topic, provides a correctly formatted report on the practical session, logically and well-groundedly explains the results obtained.

– "good": the applicant has mastered the theoretical material well, presents it in a reasoned manner; fully completed the practical part of the work and can substantiate them with skills, but certain inaccuracies and errors are assumed in the presentation of the theoretical material or in the analysis of the obtained results of the practical task;

– "satisfactory": the student mainly knows the theoretical material on the educational topic, orients himself in the obtained practical results, but answers unconvincingly, confuses

concepts, answers additional questions uncertainly, confuses concepts because he does not have stable knowledge; does not confidently orientate himself in the obtained practical results and cannot justify them correctly ;

– "unsatisfactory": the applicant has not mastered the educational material of the topic, does not know scientific concepts, is not oriented in theoretical issues and cannot explain the obtained practical results

3 The final score for the current activity is recognized as the average arithmetic sum of points for each practical session 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;

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

n – number of ongoing control measures.

O prices are converted into points according to the calculation scale (table 1).

Table 1 - Recalculation secondary evaluations for the current one activity in a multi-point scale

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
						reassembly	
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	

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. average assessment for current activity converted in points on a 100 -point scale, according to the table calculation (table 1) .

Applicants for higher education who have an average current grade in the discipline lower than "3" (60 points) can increase their current grade in the last session by answering additional 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": 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 credit is:

- making up for all missed classes;

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

3 For the performance of individual independent work and for various types of scientific research tasks, depending on their volume and importance, the winners are awarded no more than 20 additional points. The final grade together with additional points cannot exceed 100 points.

3.1 Additional points are added to the sum of points scored for the current educational activity, when the final form of control is a credit

4 Learning outcome is evaluated on a two- point scale (credited/not credited) according to table 2;

Table 2 – Transfer scale points in 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

Score in points	Evaluation on a national scale		Evaluation according to the ECTS scale	
	examination	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			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
75-79	Okay	Enrolled	C	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 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

Score in points	Evaluation on a national scale		Evaluation according to the ECTS scale	
	examination	test	Rating	Criteria
67-74	Satisfactorily		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			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.
35-59	Unsatisfactorily	Not 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			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;
- while studying the course, students of 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 the Khnadu" (https://www.khadi.kharkov.ua/fileadmin/P_Standart/pologeniya/stvnz_67_01_dobroch_1.pdf), "Academic integrity. Checking the text of completed academic papers and 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 the National Academy of Sciences of Ukraine (https://www.khadi.kharkov.ua/fileadmin/P_Standart/pologeniya/stvnz_67_01_MEK_1.pdf).

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

– copying of lectures or practical works, use of other people's educational materials (including the use of mobile devices) is prohibited. Mobile devices are allowed to be used only during the online verification of the results of the practical task, additional testing.

Recommended Books:

1. Basic literature

1. G.V. Yermolaev, V.V. Kvasnytskyi , V.F. Kvasnytskyi , S.V. Maksimova, V.F. Khorunov , V.V. Chigarev Brazing of materials: a textbook / G.V. Yermolaev, V.V. Kvasnytskyi, V.F. Kvasnytskyi , S.V. Maksy, V.F. Khorunov , V.V. Chigarev ; edited by V.F. Khorunov and V.F. Kvasnytskyi .– Mykolaiv: NUK, 2015. – 340 p. ISBN 978–966–321–307–1.

2. L. M. Lobanov , G. V. Yermolaev, V. V. Kvasnytskyi , O. V. Makhnenko , and others. Stresses and deformations during welding and brazing: textbook H 27 / L. M. Lobanov, G. V. Yermolaev, V. V. Kvasnytskyi , O. V. Makhnenko , G. V. Yegorov, A. V. Labartkava ; in general _ ed. L. M. Lobanova. - Mykolaiv: NUK, 2016. - 246 p. ISBN 978–966–321–310–1.

3. I.V. Krivtsun , V.V. Kvasnytskyi Special methods of welding [Text]: textbook / I. V. Krivtsun , V. V. Kvasnytskyi [etc.] ; ed. B. E. Paton. - Mykolaiv: NUK, 2017. - 348 p. - ISBN 978-966-321-321-7.

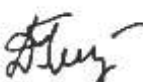
Developer(s)
syllabus of the educational
discipline



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