Syllabus selective component SC

(conventional designation of the educational component in the educational program (EP))

Subjects:	Technological quality assurance
Level of higher education:	the second (master's)
Course page in Moodle:	https://dl2022.khadi-
	kh.com/course/index.php?categoryid=800
The scope of the educational	3 credits (90 hours)
component	
The form of the final control	test
Consultations:	on schedule
Name of the department:	department of metal technology and materials sci-
	ence
Teaching language:	Ukrainian, English (if available)
Course leader:	Lalazarova Nataliia, PhD, Associate Professor
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Technological quality assurance

Brief content of the educational component:

The goal is to ensure the quality of products at the stage of their production. In this course, you learn the basic principles of designing technological processes for processing parts and assembling products, taking into account the entire complex of technological operations and technological heredity, as well as the main requirements for the selection of technological methods and modes of processing, taking into account the features of the design details, given surface quality parameters and equipment capabilities.

Subject: theoretical and methodological foundations of ensuring the quality of machinebuilding products.

The main tasks of studying an academic discipline are:

- study of the basic principles of designing technological processes of obtaining blanks by methods of casting, pressure treatment, welding, mechanical processing, thermal, chemical-thermal, thermo-mechanical processing and PPD;

- study of the main requirements for the selection of technological methods and modes of processing, taking into account the features of the design of the part, the specified parameters of the surface quality and the capabilities of the equipment;

- study of quality parameters of the obtained products;

- selection of the main ways of improving product quality by technological methods.

Prerequisites for studying the educational component:

Physics, physical foundations of strength and plasticity.

Competencies acquired by the acquirer:

General competences:

Integral competence: the ability to ensure product quality at the stage of its manufacture.

General competences in the discipline "Technological quality assurance":

- the ability and readiness to implement modern technological processes of manufacturing products that ensure their quality.

Special (professional) competences:

- knowledge of technological processes of manufacturing products

- knowledge of the effects of technological processes on the quality of manufactured products;

- knowledge of product quality parameters;
- knowledge of ways to improve product quality by technological methods.

The results of the training are clear to the lighting program:

- to understand the features of the technological processes of casting, welding, vise processing, mechanical processing of products

- know how the parameters of technological processes may have the greatest impact on the quality of products

- choose the optimal value of the parameters of technological processes with the method of omitting the maximum quality of products

- to analyze the parameters of the quality of the prepared products

- rozroblyat ways to improve the quality of products by technological methods.

Learning outcomes according to the educational program:

- to understand the peculiarities of technological processes of casting, welding, pressure treatment, mechanical processing of products;

- to know which parameters of technological processes have the greatest impact on product quality;

- to be able to choose optimal values of parameters of technological processes in order to obtain the maximum quality of products;

- to be able to analyze quality parameters of manufactured products;

- develop ways to improve product quality using technological methods.

Thematic plan

	Name of topics (lectures - Lec. Jaboratory works - LW, practical				
Nº topic	works - PW individual work - IW)				
	works - r w, individual work - iw)				
	Lec 1. Ensuring the quality of products during production by	2			
	methods of casting, welding, and pressure treatment	~			
1	LW 1. Study of the quality of castings from iron-carbon alloys	2			
I	LW 2. Investigation of the quality of welded joints obtained by var-	2			
	ious methods.	Z			
	IW. Defects of products formed during pressure treatment	8			
	Lec 2. Defects of products formed during pressure treatment	2			
	LW 3. Investigation of the properties of steel parts after quenching	C			
	with high-frequency currents				
	Lec 3. Ensuring the quality of products by thermal and chemical-	C			
2	thermal treatment	Z			
	LW 4. Research of the properties of surface layers of products	2			
	strengthened by chemical and thermal treatment	Z			
	IW. Defects of the surface layer after chemical and thermal treat-	6			
	ment	0			
	Lec 4. Ensuring the quality of products by mechanical processing	2			
	LW 5. Study of the influence of elements of the cutting mode on				
3	the quality of the surface layer of products made of iron-carbon	2			
4	alloys				
	IW. Roughness parameters of the surface layer	7			
	Lec 5. Ensuring the quality of products by surface plastic de-	C			
	molding	2			
	LW 6. Study of the influence of diamond smoothing parameters	2			
	on the properties of the surface laver of products made of high-				

	strength cast iron						
	IW. Combined methods of surface plastic deformation						
	Lec 6. Improving the quality of parts by physical methods and applying coatings	2					
5	LW 7. Study of the influence of laser hardening parameters on the properties of the surface layers of steel products	2					
	IW. The effect of plasma treatment on the quality of the surface layer	8					
	Lec 7. Quality assurance during assembly	2					
6	IW. The role of product assembly in the product quality assurance system	12					
7	Lec 8. Development of technological methods for improving prod- uct quality	2					
	LW 8. Study of the influence of processing on the "white layer" and diamond smoothing on the properties of the surface layers of products made of high-strength cast iron	2					
	IW. Development of combined methods of product quality improvement	14					
	Lec	16					
Together	LW	16					
	IW	58					

Teaching methods:

- 1) verbal: lecture, explanation, story, conversation, work with a book;
- 2) visual: method of illustrations, method of demonstrations;
- 3) practical: 3.1 traditional: laboratory; consultations.

System assessment 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 performance of a control or individual task, performance and design of practical work.

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

1.4 Seminar classes are evaluated by the quality of individual assignment/abstract.

2 The current performance of higher education applicants is assessed at each practical session (laboratory or seminar) on a four-point scale ("5", "4", "Z", "2") and entered in the journal of academic performance.

- "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 an argumentative 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 The final score for the current activity is recognized as the arithmetic mean sum of points for each lesson, for individual work, current test works according to the formula:

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

where K^{nomoy} 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 – Conversion of the average score for the current activity into 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
						reasser	mbly
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. The average score for the current activity is converted into points on a 100 -point scale, according to the conversion table (table 1).

Applicants for higher education who have a current grade point average in the discipline lower than "3" (60 points) can increase their current grade by taking tests in the discipline in the last session.

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 participation in scientific events, additional points are awarded to the winners.

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 .

3.3 The number of additional points cannot exceed 20 points.

4 The learning result is evaluated (select the required one) :

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

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

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

Table 2 – Scale	for transferring	points to the	national	evaluation	system
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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	Evaluation on a national scale		Evaluation according to the ECTS scale		
in points			Rating	Criteria	
	exami- nation	test			
90-100	Perfectly	Enrolled	A	The theoretical content of the course has been mastered in its entirety, without gaps, the nec- essary practical skills for working with the mas- tered 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	

Score	Evaluati	ion on a	Evaluation according to the ECTS scale		
IN points	nationa	al scale	Rating	Criteria	
points	exami-	test			
	nation				
80–89	Ų	Enrolled	В	The theoretical content of the course has been mastered in its entirety, without gaps, the nec- essary practical skills for working with the mas- tered material have mainly been formed, all ed- ucational tasks provided for by the training pro- gram have been completed, the quality of most of them has been assessed with a number of points close to the maximum	
75-79	Oka		Enrolled	С	The theoretical content of the course has been mastered in its entirety, without gaps, some practical skills of working with the mastered ma- terial have not been formed enough, all educa- tional tasks provided for by the training program have been completed, the quality of none of them has been assessed with a minimum num- ber of points, some types of tasks have been completed with errors
67-74	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	Satisfa		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 pre- scribed training programs of educational tasks have not been completed, or the quality of their implementation has been assessed with a num- ber of points close to the minimum; with addi- tional independent work on the course material, it is possible to improve the quality of the per- formance of educational tasks (with the possibil- ity of retaking)	

Score	n Evaluation on a national scale		Evaluation according to the ECTS scale		
n points			Rating	Criteria	
	exami- nation	test			
0–34	Unacceptable		F	The theoretical content of the course has not been mastered, the necessary practical work skills have not been formed, all completed edu- cational 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;

- the coursework 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 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.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 Khnadu (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;

- 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:

1. Basic literature

1.1. Bozhenko L.I. Tekhnolohiia mashynobuduvannia. Proektuvannia ta vyrobnytstvo zahotovanok: Pidruchnyk. – Lviv: Svit, 1996. – 368 s.

1.2. Kozakova N. V. Upravlinnia yakistiu produktsii, sertyfikatsiia ta audyt v mashynobuduvanni : navch. posibnyk dlia studentiv spetsialnosti «Prykladna mekhanika» dennoi, zaochnoi ta dystantsiinoi form navchannia / N. V. Kozakova, Ye. V. Ostroverkh, V. O. Fedorovych. – Kh. : NTU «KhPI», 2018. –253s.

1.3. Kontrol yakosti produktsii v mashynobuduvanni: navch. posibnyk/ H.Ye. Fedorov, M.M. Yamshynskyi, A.M. Fesenko, M.A. Fesenko. – Kramatorsk: DDMA, 2008. – 352 s.

1.4. Zvariuvannia, rizannia y kontrol yakosti pid chas vyrobnytstva metalokonstruktsii : pidruch. dlia zdobuvachiv prof. (prof.-tekhn.) osvity / O.H. Bykovskyi; red. L. M. Prokho-rova.– Kyiv: Osnova, 2021. – 396 s.

1.5. Rudenko P. O. Tekhnolohichni metody vyrobnytstva zahotovok detalei mashyn / P. O. Rudenko, V. M. Pleskach, Yu. O. Kharlamov. – Dnipropetrovsk : Nauka i osvita, 1999. – 252 s.

1.6. Materialoznavstvo : pidruchnyk / S. S. Diachenko, I. V. Doshchechkina, A. O. Movlian, E. I. Pleshakov. – Kh. : Vyd-vo KhNADU, 2007. – 440 s.

1.7. Prialin M.A. Tekhnolohii mekhanoobrobnoho vyrobnytstva. – Dnipropetrovsk: Nauka i osvita, 2000. – 136 s.

1.8. Khrychykov V.E., Meniailo O.V. Lyvarne vyrobnytstvo chornykh i kolorovykh metaliv: Navch. posibnyk. – Vydannia druhe, doopratsovane. - Dnipropetrovsk: NMetAU, 2015. – 89s.

1.9. Intehrovani tekhnolohii obrobky materialiv [Tekst]: pidruchnyk / E.S. Hevorkian, L.A. Tymofeieva, V.P. Nerubatskyi ta in. – Kharkiv: UkrDUZT, 2016. – 238 s.

1.10. Tekhnolohiia konstruktsiinykh materialiv. / Chastyna tretia. Osnovy mekhanichnoi obrobky materialiv. Navchalnyi posibnyk / V.M. Klymenko, O.P Shylina, A.Yu. Osadchuk / Navchalnyi posibnyk. Vinnytsia: UNIVERSUM-Vinnytsia, 2008. – 90 s.

1.11. Tekhnolohiia konstruktsiinykh materialiv: Obrobka metalevykh vyrobiv rizanniam. Praktykum [Elektronnyi resurs] : navchalnyi posibnyk dlia studentiv tekhnichnykh spetsialnostei / KPI im. Ihoria Sikorskoho ; uklad.: D. A. Lesyk, V. V. Dzhemelinskyi, Yu. V. Kliuchnykov, O. T. Serditov. – Kyiv : KPI im. Ihoria Sikorskoho, 2021. – 119 s.

2. Supporting literature

2.1. Resursozberihaiuchi tekhnolohii vyrobnytstva lytva dlia aviatsiinoho dvyhunobuduvannia / V.O. Bohuslaiev, K.B. Balushok, V.V. Klochykhin, Ye.V. Milonin, V.V. Naumyk, V.A. Shalomieiev. – Zaporizhzhia: AT «Motor Sich», 2021 r. – 197 s.

2.2. Tekhnolohiia konstruktsiinykh materialiv ta materialoznavstvo (obrobka metaliv rizanniam) [Tekst] : navch. posib. / V. L. Pakharenko, M. M. Marchuk, O. V. Pakharenko ; Nats. un-t vod. hosp-va ta pryrodokorystuvannia. - 2-he vyd., pererob. i dopov. - Rivne : NUVHP, 2018. - 252 s.

3. Information resources

https://pitbddma.org.ua/wpcontent/uploads/2018/01/%D0%BA%D0%BE%D0%BD%D1%81%D0%BF%D0%B5%D0%BA %D1%82-%D0%BF%D0%BE%D0%BB%D0%BDs%D1%8B%D0%B9.pdf

(адреси сайтів з матеріалами)

Developer(s) syllabus of the educational discipline

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