Syllabus
educational component

Software Ertification

Discipline name:	**Certification of software**
Level of higher education:	**first (bachelor's)**
Course page in Moodle:	***https://dl2022.khadi-kh.com/course /view.php?id=896***
The volume of the educational component	**4 credits (120 hours)**
Form of final control	**Passed**
Consultations:	**on schedule**
Name of the department:	**Department of Metrology and Life Safety**
Language of instruction:	**English**
Course leader:	**Olga Maletska, Ph.D.**
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Summary of the educational component:
The goal is to provide students with a system of theoretical and practical knowledge in the field of conformity assessment of software, which will allow them to be used in professional activities.

Subject: application of knowledge on conformity assessment during the preparation of a model of software quality according to its quality indicators established in international standards, development of technical specifications for software development, operational documents, documents on its testing and support from the customer. implementation of provisions, norms and rules of standardization throughout the software life cycle, application of the software quality model, international and national regulatory documents on software quality indicators, organization and conduct of testing and maintenance of software.

The main tasks of studying the discipline are:
-    providing an idea of technical regulation, conformity assessment, in particular certification, and standardization;
-    consideration of the requirements of modern international standards for assessing the conformity and quality of software;
-    deepening knowledge about the life cycle and quality of software;
-    study of the capabilities of the software quality assessment model based on the use of quality indicators;
-    formation of skills for determining quality indicators for assessing software quality;
-    formation of skills in document development on different software life cycles (requirements for development, user guidance, documentation of processes for testing and maintenance).

Prerequisites for studying the educational component:
Fundamentals of software engineering; Architecture and analysis of software requirements, Software design and construction

Competences that the applicant acquires:
General competencies:
    The ability to learn and master modern knowledge.

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

Special (professional) competencies:

Ability to identify, classify and formulate software requirements;

Ability to formulate and meet software quality requirements in accordance with customer requirements, specifications and standards;

Ability to comply with specifications, standards, rules and recommendations in the professional field when implementing life cycle processes

Learningoutcomes:

Know and apply professional standards and other regulatory documents in the field of software engineering;

Have the skills to develop, coordinate, design and release all types of program documentation;

Know approaches to evaluating and ensuring the quality of software.

Thematic plan

Topic number	Title of topics (LK, LR, PR, SZ, WED)	Number of hours	
		Eye	Correspondence
1	LUKE. European and national system of technical regulation. History of the development of the European system of technical regulation. Formation of a national system of technical regulation. Harmonization of the national system of technical regulation with the European one.	2	
	PR 1. Determination of the basic principles of technical regulation in Ukraine.	2	
	WED. The study of the material of the topic LC 1. Preparation for the implementation of PR 1. Study of the Law of Ukraine "On Technical Regulations and Conformity Assessment". Registration of the report on PR 1.	11	
2	LUKE. International and national standardization. History of standardization. Types of standardization. Regulatory documents. Application of national regulations. Information base.	2	
	PR 2. Types of regulatory documents, their search and application.	2	
	WED. The study of the material of the topic LC 2. Preparation for the implementation of PR 2. Study of the Law of Ukraine "On Standardization". Registration of the report on PR 2.	11	
3	LUKE. Systems life cycle processes Organization and implementation of software conformity assessment. Requirements for the quality of systems and software according to international standards.	2	
	PR3. Determination of software quality characteristics.	2	
	WED. Study of the material of the topic LC 3. Preparation for the implementation of PR 3. Study of ISO/IEC 25001 and ISO/IEC 25010 standard. Registration of the report on PR 3	11	

4	LUKE. Types of software users. Indicators for assessing the quality of software during its use and their application.	2	
	PR 4. Determining the characteristics of software quality assessment indicators	2	
	WED. The study of the material of the topic LC 4. Preparation for the implementation of PR 4. Study of ISO/IEC 25010 standard. Registration of the report on PR 4	11	
5	LUKE. Application of elements of software quality indicators.	2	
	PR 5. Installation of elements of software quality indicators.	2	
	WED. The study of the material of the topic LC 5. Preparation for the implementation of PR 5. Study of ISO/IEC 25021 standard. Registration of the report on PR 5.	11	
6	LUKE. Dokumenty, which set requirements for the software. The order of development.	2	
	PR6. Development of technical specifications for the software and product description.	2	
	WED. The study of the material of the topic LC 6. Preparation for the implementation of PR 6. Study of ISO/IEC 25021 standard. Registration of the report on PR 6.	11	
7	LUKE. Development of operational documents of the software. Software testing.	2	
	PR7. Development of operational software documents and documents for testing.	2	
	WED. The study of the material of the topic LC 7. Preparation for the implementation of PR 7. Study of ISO/IEC 25051 standard. Registration of the report on PR 7.	11	
8	LUKE. Software support. Software maintenance requirements.	2	
	PR8. Development of a software support plan.	2	
	CP8. The study of the material of the topic LC 8. Preparation for the implementation of PR 8. Study of ISO/IEC 14764. Registration of the report on PR 8.	11	
Together	LUX	16	
	PR (LR, NW)	16	
	WED	88	

Individual educational and research task (if any): not provided

Teaching methods:
verbal (lectures, explanations, narration, conversation, discussion, work with a book, etc.)
visual (method of illustration and demonstration), practical tasks.

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 performance of specific 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 are recorded in the journal of accounting for academic performance.– " excellent": the applicant perfectly mastered the theoretical material, demonstrates deep knowledge of relevant topic or academic discipline, main provisions;
- "good": the applicant has mastered the theoretical material well, 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:

$$K^{nomoч} = \frac{K1 + K2 + ... + Kn}{n},$$

where $K^{nomoч}$ is the final assessment of success based on the results of current control;
$K1, K2,..., Kn$ – assessment of the success of n the -th 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
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	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	unzarached

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	Well	Enrolled	With	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	Enrolled	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	Satisfactory	Enrolled	And	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)

Score in points	National scale score		ECTS score	
	Exam	Passed	Score	Criteria
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;
– course work must be protected no later than a week before the start of the examination session *(indicated if available)*;
– 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.

1.   O. E. Maletska Lecture notes "Fundamentals of technical regulation" [Electronic resource] / distance course: *https://dl.khadi.kharkov.ua/course/view.php?id=896*

2. Law of Ukraine "On Technical Regulations and Conformity Assessment": .
3. Law of Ukraine "On Standardization".
4. DSTU ISO/IEC 17000:2007 Conformity assessment. Glossary of terms and general principles.
5. International standards series ISO/IEC 250 00.

Supporting literature
1. DSTU 1.1:2015National standardization. Standardization and related activities.

Glossary of Terms

2. DSTU 1.5: 2015 National standardization. Rules for the development, teaching and execution of national regulatory documents (ISO/IEC Directives Рет 2:2011, NEQ).

3. DSTU 1.7: 2015 National standardization. Rules and methods for adopting international and regional regulations

Additional Sources:
1. Distancecourse: ***https://dl2022.khadi-kh.com/course /view.php?id=896***

Developer
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