



SCIENTIFIC WORK ON THE MASTER'S THESIS

TOPIC. PART 1. BASICS OF THE SCIENTIFIC RESEARCH

Syllabus

Details of the educational component

Level of higher education	<i>Second (Master)</i>
Branch of knowledge	<i>12 Information Technologies</i>
Specialty	<i>121 Software Engineering</i>
Educational program	<i>Software Engineering of Multimedia and Information-Retrieval Systems</i>
Status of the educational component	<i>Normative</i>
Form of education	<i>Full-time</i>
A year of training	<i>1 year, Autumn semester</i>
The scope of the educational component	<i>Lectures: 9 academic hours, workshops: 18 academic hours, student's self-training: 33 academic hours.</i>
Semester control / control measures	<i>Test</i>
Schedule of classes	<i>According to the schedule for the autumn semester of the current academic year (rozklad.kpi.ua)</i>
Language of instructions	<i>English</i>
Information about head of the course / teachers	<i>DSc, assoc. prof. Yevgeniya Sulema, sulema@pzks.fpm.kpi.ua</i>
Course location	<i>Google classroom. Access is given to registered students.</i>

Program of educational component

1. Description of the educational component, its purpose, subject of study and learning outcomes

The purpose of studying the discipline "Scientific work on the master's thesis topic", in particular, the credit module "Scientific work on the master's thesis topic. Part 1. Basics of the scientific research", is the formation of students' ability to independently carry out scientific research on the topic of a master's thesis.

The subject of the credit module is "Scientific work on the master's thesis topic. Part 1. Basics of the scientific research" is the organization of scientific research in the field of software engineering.

*Studying the credit module "Scientific work on the master's thesis topic. Part 1. Basics of the scientific research" allows students to develop the **competencies** necessary for conducting scientific research on the topic of a master's thesis:*

GC01 – Ability to abstract thinking, analysis and synthesis;

GC03 – Ability to conduct research at the appropriate level;

GC04 – Ability to communicate with representatives of other professional groups of different levels (with experts from other fields of knowledge / types of economic activity);

GC05 – Ability to generate new ideas (creativity);

PC07 – Ability to critically comprehend problems in the field of information technology and at the frontiers of knowledge, to integrate relevant knowledge and solve complex problems in broad or multidisciplinary contexts;

PC10 – Ability to plan and perform research in software engineering;

PC11 – Ability to apply and develop fundamental and interdisciplinary knowledge to successfully solve scientific problems of software engineering.

Program learning results from the credit module "Scientific work on the master's thesis topic. Part 1. Basics of the scientific research":

PLO06 – Develop and evaluate software design strategies; substantiate, analyze and evaluate options for design solutions in terms of the final software product quality, resource constraints and other factors;

PLO14 – Predict the development of software systems and information technology;

PLO17 – Collect, analyze, evaluate the information needed to solve scientific and applied problems, using scientific and technical literature, databases and other sources;

PLO18 – Develop mathematical and software for research in software engineering;

PLO20 – Plan and perform research in the software engineering area, choose methods and tools, analyze the results, justify the conclusions;

PLO22 – Be able to represent research results in the form of articles in scientific journals and abstracts of reports at scientific and technical conferences.

2. Pre-requisites and post-requisites of the educational component (place in the structural and logical scheme of training according to the relevant educational program)

The successful study of the discipline "Scientific work on the master's thesis topic" is preceded by the study of the disciplines of the curriculum of bachelor's training in the specialty 121 Software engineering.

The theoretical knowledge and practical skills obtained during the mastering of the discipline "Scientific work on the master's thesis topic" can be used during the preparation of a master's thesis.

3. Content of the academic discipline

Credit module "Scientific work on the master's thesis topic. Part 1. Basics of the scientific research" involves studying the principles of organizing scientific research, in particular research within the framework of the master's thesis, as well as the methodology and methods of scientific research. The credit module ends with a credit.

4. Educational materials and resources

Basic literature:

1. Educational and methodological materials from the discipline "Scientific work on the master's thesis topic".

Use to master discipline skills. The materials are in Google classroom. Access is granted to registered students.

2. Subbotin S.A., Oliinyk A.A. Handbook on the writing, formatting, review, analysis and publication of scientific works. Zaporizhzhya, 2016. 298 p.

Additional literature:

3. Scientific articles on the subject of master's research.

Use to master discipline skills. Open access materials.

Educational content

5. Methods of mastering the educational component

No.	Type of training session	Description of the training session
1	Lecture 1. Science as a system of ideas about the world	The essence of science and scientific research. Object of scientific research. Subject of scientific research. The aim of the study. Research tasks. Classification of sciences. Task for self-training item 6, No. 1.
2	Lecture 2. Organization of science and scientific research	State policy in the field of science. Organizational structure of science. System of training of scientific and scientific-pedagogical personnel. Task for self-training item 6, No. 2.
3	Lecture 3. Methodology and methods of scientific research	Methodology of scientific research. Scientific paradigm. Methods of scientific research. Task for self-training item 6, No. 3.
4	Lecture 4. The logic of scientific research	General scheme of scientific research. Organization and planning of scientific research. Master's thesis as a result of scientific research. Task for self-training item 6, No. 4.
5	Workshop 1. Scientific workshop	Scientific reports of 2-3 students on the topic of the master's thesis and their discussion. Task for self-training item 6, No. 5.
6	Workshop 2. Scientific workshop	Scientific reports of 2-3 students on the topic of the master's thesis and their discussion. Task for self-training item 6, No. 5.
7	Workshop 3. Scientific workshop	Scientific reports of 2-3 students on the topic of the master's thesis and their discussion. Task for self-training item 6, No. 5.
8	Workshop 4. Scientific workshop	Scientific reports of 2-3 students on the topic of the master's thesis and their discussion. Task for self-training item 6, No. 5.
9	Workshop 5. Scientific workshop	Scientific reports of 2-3 students on the topic of the master's thesis and their discussion. Task for self-training item 6, No. 5.
10	Workshop 6. Scientific workshop	Scientific reports of 2-3 students on the topic of the master's thesis and their discussion. Task for self-training item 6, No. 5.
11	Workshop 7. Scientific workshop	Scientific reports of 2-3 students on the topic of the master's thesis and their discussion. Task for self-training item 6, No. 5.
12	Workshop 8. Scientific workshop	Scientific reports of 2-3 students on the topic of the master's thesis and their discussion. Task for self-training item 6, No. 5.
13	Workshop 9. Scientific workshop	Scientific reports of 2-3 students on the topic of the master's thesis and their discussion. Task for self-training item 6, No. 5.

6. Student's self-training

The discipline "Scientific work on the master's thesis topic" is based on the independent preparation of master's students for classroom classes on theoretical and practical topics.

No.	The topic assigned for self-training	Number of hours	Literature
1	Preparation for the lecture 1	1	1; 2
2	Preparation for the lecture 2	1	1; 2
3	Preparation for the lecture 3	1	1; 2
4	Preparation for the lecture 4	1	1; 2
5	Preparation for the workshop 1-9	29	1; 3

Policy and control

7. Policy of academic educational component

- Rules of behavior in classes: activity, respect for those present, turning off phones.
- Adherence to the policy of academic integrity.

8. Rating system for evaluating learning outcomes

During the semester, students prepare and present during the scientific seminar a report on the first results of scientific research on the topic of their master's thesis: analysis of literary sources on the topic of the master's thesis, formulation of the object, subject, goal and tasks of the research.

Points are awarded for:

- 1) presentation and report,
- 2) active participation in the discussion of the speeches of other speakers.

The maximum number of points for the report: 55 points.

Points for the presentation and report are awarded for:

- quality of the material presented in the report and presentation: 0-25 points;
- quality of presentation and report: 0-25 points;
- quality of answers to questions: 0-5 points.

Material quality assessment criteria:

- 20-25 points – the analysis of the results is deep and well-argued;
- 10-19 points – the analysis of the results is sufficiently complete;
- 1-9 points – the analysis of the results is superficial;
- 0 points – there is no analytical material.

Criteria for assessing the quality of the presentation and report:

- 20-25 points – the presentation is well designed, the report is well prepared;
- 10-19 points – the presentation is designed with sufficient quality, the report is prepared, but has minor flaws;
- 1-9 points – the presentation is poorly designed, the report is poorly prepared, has significant shortcomings;
- 0 points – no presentation, report.

Criteria for evaluating the quality of answers to questions:

- 5 points – the answer is complete, well-founded;
- 3-4 points – the answer has minor flaws;
- 1-2 points – the answer has significant flaws;
- 0 points – no answer.

The maximum number of points for a scientific report:

25 points + 25 points + 5 points = 55 points.

Criteria for evaluating active participation in the discussion of the speeches of other speakers at the scientific seminar:

5 points – the master's student provided meaningful questions, comments, remarks, recommendations;

1-3 points – general questions were asked by the master's student;

0 points – the master's student did not participate in the discussion.

The maximum number of points for active participation in the discussion of the speeches of other speakers:

*5 points * 9 scientific seminars = 45 points.*

The rating scale for the discipline is equal to:

R = RS = 55 points for a report at a scientific seminar + 45 points for active participation in the discussion of the speeches of other speakers = 100 points.

Calendar control: is carried out twice a semester as a monitoring of the current state of fulfillment of the syllabus requirements.

At the first certification (8th week), the student receives "credited" if his current rating is at least 12 points (50% of the maximum number of points a student can receive before the first certification).

At the second certification (14th week), the student receives "passed" if his current rating is at least 20 points (50% of the maximum number of points a student can receive before the second certification).

Semester control: assessment.

Conditions for admission to semester control:

With a semester rating (r_c) of at least 60 points, the student receives credit "automatically" according to the table (see the Table of correspondence of rating points to grades on the university scale). Otherwise, he has to perform the final control work.

A necessary condition for admission to the credit is a speech at a scientific seminar.

If the student does not agree with the "automatic" grade, he can try to improve his grade by writing a credit test, while his points received for the semester are kept, and the better of the two grades received by the student is assigned ("soft" grading system).

Table of correspondence of rating points to grades on the university scale:

<i>Scores</i>	<i>Rating</i>
100-95	Excellent
94-85	Very Good
84-75	Good
74-65	Satisfactory
64-60	Fair
Less than 60	Unsatisfactory
Admission conditions not met	Not allowed

The syllabus prepared by DSc, assoc. prof. Yevgeniya Sulema.

Approved by the PZKS department (protocol No. 13 dated 22.06.2022).

Approved by the Methodical Commission of the Faculty of Applied Mathematics (protocol No. 9 dated 24.06.2022).