National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute"

Department of Design Automation for Energy Processes and Systems

Methods and Organization of the Scientific Research
Work program of the discipline (Syllabus)

Course Requisites

Educational level	***Third (PhD)***
Field of knowledge	*12 Information technology*
Specialty	*121 Software Engineering*
Educational program	*Software Engineering*
Course status	*Normative*
Form of study	*Part-time*
Year of study, semester	*1 year, spring semester*
Number of ECTS credits	*2 ECTS credits (60 hours)*
End-of-semester control / control measures	*Final test*
Timetable	*According to the timetable* *http://rozklad.kpi.ua/*
Language of study	*English*
Information about course leader / teachers	Practical training: Ph.D., Associate Professor, Musienko Andrii Petrovych, mysienkoandrey@gmail.com
Course placement	http://campus.kpi.ua/

Curriculum

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

The discipline "Methods and organization of research activities" studies a set of interconnected systems that make up the organization of scientific activities, as one of the ways to improve the results of the process of writing a dissertation and research in the field of information technology.
The purpose of the discipline is to form higher competencies in higher education students:
- Ability to critically analyze, evaluate and synthesize new and complex ideas in software engineering.
- Ability to develop and implement software projects, including their own research, which provide an opportunity to rethink existing and create new holistic knowledge.
- Ability to critically rethink existing software engineering technologies and track trends.
- Ability to develop technical documentation for research projects.

- Ability to design scientific reports and publications on research in accordance with existing standards and norms of academic integrity.
- Ability to search, process and analyze information from various sources.
- Ability to critically analyze, evaluate and synthesize new and complex ideas.
- Ability to rethink existing and create new holistic knowledge and / or professional practice and to solve significant social, scientific, cultural, ethical and other problems.
- Ability to expand the boundaries of knowledge using the results of original research.

- Ability to ensure continuous self-development and self-improvement, responsibility for the development of others in the professional field, adhering to pedagogical ethics, the rules of academic integrity in scientific and pedagogical activities.
- Ability to use adequate methods of effective interaction with representatives of different groups (social, cultural and professional).
- Ability to work in a team, form positive relationships with colleagues, communicate with the general scientific community and the public in the field of software engineering.
- Ability to lead in the initiation and implementation of complex innovative international projects.
Subject of academic discipline: methods of organization of research activities; ways to increase the competitiveness of products in domestic and foreign markets; preservation of scientific and technical potential.
As a result of studying the discipline, applicants for higher education will acquire the following general program learning outcomes:
- Deeply understand the general principles and methods of software engineering, as well as research methodology, apply them in their own research in the field of software engineering and in teaching practice.
- Have advanced conceptual and methodological knowledge in software engineering and at the boundaries of subject areas, as well as research skills sufficient to conduct scientific and applied research at the level of modern world achievements in the field, gaining new knowledge and / or innovation.
- Freely present and discuss with experts and non-specialists the results of research, scientific and applied problems of software engineering in state and foreign languages, qualified to reflect the results of research in scientific publications in leading international scientific journals.
- Be able to develop new and improve existing models, methods, tools in the field of software engineering, which ensure the development of technologies for software development and use.
During the study of the discipline "Methods and organization of research activities" are used:
- Method of problem-oriented learning;
- Active learning strategy, according to which the teacher's communication with graduate students is carried out through surveys, independent, tests, tests, etc .;
- Personality-oriented development technologies based on active forms and methods of learning (team work (team-based learning), pair work (think-pair-share), brainstorming method, etc.);
- Heuristic methods (methods of creating ideas, methods of solving creative problems, methods of activating creative thinking).

2. Prerequisites and postrequisites of the discipline (place in the structural and logical scheme of education according to the relevant educational program)

The discipline "Methods and organization of research activities" requires knowledge of the disciplines of PhD degree in specialty 121 Software Engineering.

3. The content of the discipline

PRACTICAL TRAINING

1. The structure of the dissertation.

2. Qualification components of the dissertation.

3. The order of defense of dissertations at the level of Doctor of Philosophy (PhD)

Test

4. Training materials and resources

Basic literature:

1. Алейнікова О. В.Інноваційний та інвестиційний менеджмент. Навчальний посібник / О. В. Алейнікова, Н. М. Притула – Київ: ДВНЗ «Університет менеджменту освіти», 2016. – 614 с.

2. Бубенко П.Т. Регіональні аспекти інноваційного розвитку : [монографія] / П.Т. Бубенко. -Х.: НТУ «ХПІ», 2002. - 316 с.

3. Василенко В.О. Інноваційний менеджмент : навч. посіб. / В.О. Василенко. - К. : ЦУЛ, Фенікс 2003. - 440 с.

4. Геєць В.М. Інноваційні перспективи України / В.М. Геєць, В.П.Семіноженко. - Х. : Константа, 2006. - 272 с.

5. Ілляшенко С.М. Управління інноваційним розвитком / С.М. Ілляшенко. - Суми : Університ. кн., 2003. - 278 с.

6. Основи методології та організації наукових досліджень: Навч. посіб. для студентів, курсантів, аспірантів і ад'юнтів / за ред. А.Є. Конверського. — К.: Центр учбової літератури, 2010. — 352 с.

7. Dharmapalan B. Scientific Research Methodology / B. Dharmapalan. – Alpha Science, 2012. - 250 p.

8. Економічні дослідження (методологія, інструментарій, організація, апробація): навч. посібн.; за ред. А.А. Мазаракі. – К.: Київ. нац. торг.-екон. ун-т., 2010. – 280 с.

9. Демківський А.В. Основи методології наукових досліджень: навч. посібн. / А.В. Демківський, П.І. Безус. – К.: Акад. муніцип. упр., 2012. – 276 с.

10. Prathapan K. Research Methodology for Scientific Research. / K. Prathapan. – Dreamtech Press, 2019. – 272 p.

11. Краус Н.М. Методологія та організація наукових досліджень: навч.-метод. посібн. / Н.М. Краус; Полтав. нац. техн. ун-т ім. Ю. Кондратюка. – Полтава : Оріяна, 2012. – 180 с.

12. Рябчій В. А. Теорія похибок вимірювань: навч. посібник / А. В. Рябчій, В. В. Рябчій ; М-во освіти і науки України, Нац. гірн. ун-т., 2006. – 165 с.

Additional literature:

1. *Khine M.S. Advances in Nature of Science Research: Concepts and Methodologies/ M.S. Khine. – Springer, 2012. – 268 p.*
2. *Крушельницька О.В. Методологія та організація наукових досліджень : навч. посібн. / О.В. Крушельницька. – К.: Кондор, 2003. – 192 с.*
3. *Н Мочерний С В. Методологія економічного дослідження / С.В. Мочерний. – Львів: Світ, 2001. – 416 с.*
4. *Пономаренко В.С. Аналіз даних у дослідження соціально-економічних систем / В.С. Пономаренко, Л.М. Малярець. – Х.: ВД "ІНЖЕК", 2009. – 432 с.*
5. *Білуха М Т. Методологія наукових досліджень / М.Т. Білуха. – К.: АБУ, 2002. – 480 с.*
6. *Marik B. "When Should a Test Be Automated?", Testing Foundations, 1998, pp.1-20.*
7. *Su Клименюк О.В. Методологія та методи наукового дослідження: навч. посібн. / О.В. Клименюк. – К.: Міленіум, 2005. – 186 с.*
8. *Khine M.S. Advances in Nature of Science Research: Concepts and Methodologies/ M.S. Khine. – Springer, 2012. – 268 p.*
9. *Крушельницька О.В. Методологія та організація наукових досліджень : навч. посібн. / О.В. Крушельницька. – К.: Кондор, 2003. – 192 с*
10. *Пономаренко В.С. Аналіз даних у дослідження соціально-економічних систем / В.С. Пономаренко, Л.М. Малярець. – Х.: ВД "ІНЖЕК", 2009. – 432 с.*

11. Білуха М Т. Методологія наукових досліджень / М.Т. Білуха. – К.: АБУ, 2002. – 480 с.
12. Клименюк О.В. Методологія та методи наукового дослідження: навч. посібн. / О.В. Клименюк.
– К.: Міленіум, 2005. – 186 с.

Educational content

5. Methods of mastering the discipline (educational component)

№	Type of educational activity	Description
	Section 1	
1	Practical activity 1: The structure of the dissertation.	What is a dissertation. Science as a system of knowledge about the laws of development. Relevance of the topic of dissertation research. Object of study. Subject of study. The purpose and objectives of the study. Scientific task. Requirements for the title of the dissertation. The main part of the dissertation. Conclusions to the sections and general conclusions to the dissertation. Tasks for self-study: To explore all the issues in the context of his dissertation.
2	Practical activity 2: Qualification components of the dissertation	The concept of "scientific result". Novelty of scientific result. Reliability of scientific result. Forms of realization of scientific results. Ways to implement scientific results. Acts on the implementation of scientific results. Tasks for self-study: To explore all the issues in the context of his dissertation.
3	Practical activity 3: The order of defense of dissertations at the level of Doctor of Philosophy (PhD)	Conditions for the formation of a specialized academic council for the defense of the dissertation. Composition of the specialized scientific council. Requirements for the level of scientific qualification of the applicant. Submission of documents to the council, defense of the dissertation and awarding the degree of Doctor of Philosophy. Cancellation of the council's decision. Consideration of appeals

6. Self-study

The discipline "Methods and organization of research activities" is based on independent preparation for classes on theoretical topics.

№	Topic for self-study	Hours	Reference
1	Preparation for practical activity 1. The structure of the dissertation.	27	1, 3-4, 8-14

2	*Preparation for practical activity 2. Qualification components of the dissertation*	*27*	*1, 3, 15-24*

Policy and control

7. Policy of academic discipline (educational component)

- *Attending practical classes is a mandatory part of studying the material;*
- *In practical classes the teacher uses his own presentation material;*
- *The test is obtained based on the results of independent student work specified at the end of practical classes.*

8. Types of control and rating system of assessment of learning outcomes (RSO)

During the semester, graduate students perform 2 practical tasks. Maximum number of points for each computer workshop: 50 points.
Points are awarded:
50 points - a complete answer to the question during the defense (not less than 90% of the required information), the practical task is performed correctly;
40 points - a sufficiently complete answer to the question during the defense (not less than 75% of the required information), the practical task is performed correctly;
30 points - incomplete answer to the question during the defense (not less than 60% of the required information), minor errors in the practical task;
Maximum number of points for the implementation and defense of computer workshops:
50 points × 2 practical classes = 100 points.
The rating scale for the discipline is equal to:
Rc = Rpractice = 100 points.
Semester control: credit

The amount of points for the test is transferred to the examination grade according to the table:Table of correspondence of rating points to grades on the university scale:

Number of pints	*Grades*
100-95	Excellent
94-85	Very good
84-75	Good
74-65	Satisfactorily
64-60	Sufficiently
Less 60	Unsatisfactory
Admission conditions are not met	Not allowed

Work program of the discipline (Syllabus):

Developed by Ph.D., Associate Professor, Musienko Andrii Petrovych

Approved *by department _____ (protocol № ___ from _____)*

Resolved *by Methodical commission of the faculty (protocol № __ from _____)*