



Scientific work on the topic of master's dissertation

Working program of basic discipline (Silabus)

Requisites for basic discipline

Level of higher education	<i>Second (master's)</i>
Branch of knowledge	<i>16 Chemical and Bioengineering</i>
Specialty	<i>163 Biomedical Engineering</i>
Educational program	<i>Medical Engineering</i>
Discipline status	<i>Mandatory discipline</i>
Form of study	<i>full-time / day / mixed / remote</i>
Year of preparation, semester	<i>1st year (autumn, spring semester)</i>
The scope of discipline	<i>4 ECTS credits / 120 hours</i>
Semester control / Control measures	<i>Test Work, Modular Test</i>
Lessons schedule	<i>According to the schedule on the site http://rozklad.kpi.ua/</i>
Language of instruction	<i>English</i>
Information about course leader / teachers	<p><u>Lecturer:</u> <i>Scientific work on the topic of master's dissertation 1. Fundamentals of scientific work (autumn semester):</i> Associate Professor of BME, Candidate of Biological Sciences <u>Kalashnikova Larysa</u>, e-mail – doc_hom2000@yahoo.com</p> <p><u>Practical:</u> <i>Scientific work on the topic of master's dissertation 1. Fundamentals of scientific work (autumn semester):</i> Associate Professor of BME, Candidate of Biological Sciences <u>Kalashnikova Larysa</u>, e-mail – doc_hom2000@yahoo.com</p> <p><i>Scientific work on the topic of master's dissertation 2. Research work on the topic of master's dissertation (<u>spring semester</u>)</i> Dr. med.nauk., prof. Department of BMI <u>Maksymenko Vitaliy</u>, e-mail – maksymenko.vitaliy@gmail.com.</p>
Course placement	<i>Platform «Sikorsky» - course «High-tech systems for diagnosis and therapy Medical Microprocessor Systems»</i>

Distribution of hours

Semester	Lectures	Practical	Laboratory	Self-study
<i>autumn semester</i>	<i>9</i>	<i>18</i>		<i>33</i>
<i>spring semester</i>		<i>18</i>		<i>42</i>

C urriculum of the discipline

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

The discipline "Scientific work on the topic of the master's dissertation" is aimed at forming in students: the ability to search, analyze and synthesize information from various sources to establish cause-and-effect relationships in a living organism, events and phenomena; formulate the purpose, objectives of the study, have the skills to collect primary material, follow the research procedure; to present the results of own research orally / in writing for specialists and non-specialists, to operate with categories, concepts and

facts during the methodological substantiation of research programs and projects, procedures and techniques; to analyze the results of scientific research; to form conclusions and proposals; draw up research results in the form of scientific theses, reports, articles. The discipline considers the conceptual apparatus of science, acquaints with the methods and techniques of scientific research, forms the need for new knowledge and, as a consequence, interest in science. At the same time, this discipline reveals great prospects for the creative aspects of the chosen specialty.

The purpose of studying the discipline "Scientific work on the topic of master's dissertation" is to provide students with knowledge on the basics of scientific activity, to create and develop practical skills and abilities to solve real problems in setting, organizing, planning and performing research, and managing scientific and technical work and collective scientific creativity.

To study the discipline requires skills:

- 1. Knowledge of a foreign language.*
- 2. Ability to abstract thinking, analysis and synthesis.*
- 3. Ability to search, process and analyze information from various sources.*

General competencies (OPP was put into effect by the Rector's Order NON/ 89/2021 of 19.04.2021):

- GC 1-** *Ability to abstract thinking, analysis and synthesis.*
- GC 2-** *Ability to search, process and analyze information from various sources.*
- GC 3-** *Ability to identify, formulate and solve problems.*
- GC 4-** *Ability to work in a team.*
- GC 5-** *Ability to work in an international context.*

Special (professional) competencies (OPP was put into effect by the Rector's Order NON/ 89/2021 of 19.04.2021):

- PC 1** - *Ability to solve complex problems of biomedical engineering using the methods of mathematics, natural and engineering sciences.*
- PC 2** - *Ability to develop a working hypothesis, plan and set experiments to test the hypothesis and achieve the engineering goal using appropriate technologies, technical means and tools.*
- PC 3** - *Ability to analyze complex medical engineering and bioengineering problems and formalize them to find quantitative solutions using modern mathematical methods and information technology.*
- PC 4** - *Ability to create and improve tools, methods and technologies of biomedical engineering for research and development of bioengineering facilities and systems for medical and technical purposes.*
- PC 5** - *Ability to develop terms of reference for creation, as well as to model, evaluate, design and construct complex bioengineering and medical engineering systems and technologies.*
- PC 6** - *Ability to study biological and technical aspects of functioning and interaction of artificial biological and biotechnical systems.*
- PC 7** - *Ability to work in a multidisciplinary team.*

The program learning outcomes after studying the discipline "Scientific work on the topic of the master's dissertation" are (OPP was put into effect by the Rector's Order NON/ 89/2021 of 19.04.2021):

- PLO 1** - *Understanding of fundamental-applied, medical-physical and bioengineering bases of technologies and equipment for research of physiological and pathological processes of the person .*
- PLO 2** - *Understanding the principles of action of modern diagnostic equipment and display systems of biomedical information, the basis of appropriate software .*
- PLO 3** - *Possession of modern methods of scientific research software, construction of adequate theoretical models and methods of their substantiation..*
- PLO 4** - *Application of calculation methods and selection of classical and new designs of biomaterials, elements of devices and systems of medical appointment .*

- PLO 8** - Knowledge of general requirements for the conditions of engineering, technological and scientific projects .
- PLO 10** - Knowledge in the most advanced fields of education and professional activity and at the junction of different fields
- PLO 11** - Understanding the latest achieving in Biomedical Engineering
- PLO 12** - Understanding of ethical, environmental and commercial constraints in engineering practice
- PLO 13** - Knowledge of a foreign language to an extent sufficient for general and professional communication
- PLO 16** - Knowledge of methods of design, construction, improvement and application of medical-technical and bioengineering products, devices and systems in compliance with technical requirements, as well as to support their operation.
- PLO 17** - Analysis and solution of complex medical-engineering and bioengineering problems with the use of mathematical methods and information technologies
- PLO 18** - Creation and improvement of means, methods and technologies of biomedical engineering for comprehensive research and development of bioengineering objects and systems of medical and technical purpose.
- PLO 19** - Development, planning, use and substantiation of innovative projects of bioengineering facilities and systems for medical-technical purposes, taking into account engineering, medical, legal, economic, environmental and social aspects, the implementation of their information and methodological support.
- PLO 20** - Evaluation of biological and technical aspects and consequences of interaction of engineering and bioengineering objects with biological systems, anticipation of their mutual influence, legal, deontological and moral and ethical consequences of use.
- PLO 21** - Solving in practice the tasks of biomedical engineering with awareness of their own ethical and social responsibility in personal activities and / or in a team.

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

The discipline "Scientific work on the topic of master's dissertation" belongs to the cycle of professional training and has an interdisciplinary nature. basic requirements for the design of scientific results, to introduce elements of scientific creativity in professionally oriented disciplines, to form a scientific culture of students.

It integrates according to its subject knowledge from other disciplines: The content of the discipline "Fundamentals of Scientific Research" is based on the knowledge acquired by students in the previous year on the basics of economics, philosophy, mathematics, computer science, statistics.

The acquired practical skills and acquired theoretical knowledge during the study of the discipline "Fundamentals of Scientific Research" can be used in the future during the undergraduate practice and preparation of a master's thesis.

3. The content of the discipline

- Topic 1.** *Science as a productive force. Definition of science, its significance for mankind. Science as a system of knowledge. Functions of science. Classification of sciences. Organization of research activities in Ukraine. Classification of scientific research*
- Topic 2.** *Types, stages and justification of the feasibility of scientific research Categorical apparatus of scientific research. The essence, purpose, object and subject of scientific research. Types and stages of scientific research. Stages of research work. Formulation of the research topic. Defining the subject, object, purpose and objectives of the study. The order of scientific research.*
- Topic 3.** *Research methods The concept and typology of research methods. The essence, purpose, functions of scientific experiment. Scientific forecasting as a research method: content, main types and*

technologies of implementation. *Economic and mathematical methods in scientific research. System approach in scientific research.*

Topic 4. *Information support of scientific research The concept of scientific information and its role in scientific research. Types of information sources. Information support of scientific research. Rules for compiling a bibliographic description for a list of references. Rules for quoting and bibliographic references in the texts of scientific papers. Information support of scientific research*

Topic 5. *Ethics of scientific activity. Concepts and main components of ethics of scientific activity Principles and rules of scientific ethics. Scientific honesty. Scientific work in the team. Conflict of scientific interests Incorrect use of scientific literary sources. Signs of plagiarism.*

4. Training materials and resources

Basic literature:

1. *Bielik lukáš Methodology of science an introduction /Comenius university in Bratislava, · 2019.-216 p*
https://fphil.uniba.sk/fileadmin/fif/katedry_pracoviska/klmv/bielik/Bielik-Methodology_of_Science.pdf
2. *Marguerite G. Lodico, Dean T. Spaulding, Katherine H. Marguerite G. Methods in educational research : from theory to practice / Marguerite G. Lodico, Dean T. Spaulding, and Katherine H. Voegtle, 2006.-399 p.*
http://stikespanritahusada.ac.id/wp-content/uploads/2017/04/Marguerite_G._Lodico_Dean_T._Spaulding_KatherinBookFi.pdf
3. *Kothari C.R. Methods Research, 2016.-156 p.*
[https://www.cusb.ac.in/images/cusb-iles/2020/el/cbs/MCCOM2003C04%20\(Business%20Research%20](https://www.cusb.ac.in/images/cusb-iles/2020/el/cbs/MCCOM2003C04%20(Business%20Research%20)
5. *Pandey Prabhat , Pandey Meenu Mishra RESEARCH METHODOLOGY: TOOLS AND TECHNIQUES Bridge Center, 2015.- 118*
https://www.researchgate.net/publication/270956555_CHAPTER_3_-_RESEARCH_METHODODOLOGY_Data_collection_method_and_Research_tools/link/54ba36e00cf253b50e2ad17f/download
4. *Ranjit Kumar RESEARCH METHODOLOGY a step-by-step guide for beginners*
Typeset by C&M Digitals (P) Ltd, Chennai, India Printed and bound in Great Britain by TJ International Ltd, Padstow, Cornwall Printed on paper from sustainable resources 2019.- 336 p.
http://www.sociology.kpi.ua/wp-content/uploads/2014/06/Ranjit_Kumar-Research_Methodology_A_Step-by-Step_G.pdf
5. *Richard D. Jarrard Scientific methods: an online book Publisher: free at*
<http://emotionalcompetency.com/sci/booktoc.html>, 2001, -228
https://www.researchgate.net/publication/41432580_Scientific_methods_an_online_book
6. *Важинський С.Е., Щербак Т.І. Методика та організація наукових досліджень : Навч. посіб. / С. Е. Важинський, Т.І. Щербак. – Суми: СумДПУ імені А. С. Макаренка, 2016. – 260 с*
<https://nuczu.edu.ua/sciencearchive/Articles/gornostal/vajinskii%20posibnyk.pdf>
7. *Каламбет С.В. Методологія наукових досліджень: Навч. посіб. / С.В. Каламбет, С.І. Іванов, Ю.В. Півняк Ю.В. – Дн-вськ: Вид-во Маковецький, 2015. – 191 с.*
<https://pgasa.dp.ua/wp-content/uploads/2017/10/3-1.pdf>

Additional literature:

1. Bright Wilson E. An Introduction to Scientific Research
<https://pdfs.semanticscholar.org/f885/7ef1851b6a1b4d7c8d2cc6b4a54c2b475743.pdf>
2. Introduction to Scientific Research, Eleventh Edition 2011
https://kupdf.net/download/introduction-to-scientific-research_5c0a2190e2b6f5604066dd36_pdf
3. Introduction to Scientific Research 2010.- 27 p.
<https://www.pearsonhighered.com/assets/samplechapter/0/2/0/5/0205701655.pdf>
4. Introduction to Scientific Research 2010.-27 p.
<https://www.pearsonhighered.com/assets/samplechapter/0/2/0/5/0205701655.pdf>
5. HANDBOOK OF RESEARCH METHODOLOGY, Publisher: Educreation, 2017. – 234 p.
https://www.researchgate.net/publication/319207471_HANDBOOK_OF_RESEARCH_METHODODOLOGY
6. RESEARCH METHODOLOGY, 2014.- 41 p.
http://www.ihmgwalior.net/pdf/research_methodology.pdf
7. Бірта Г. О. Методологія і організація наукових досліджень. [текст] : навч. посіб. / Г. О. Бірта, Ю.Г. Бургу– К. : «Центр учбової літератури», 2014. – 142 с.
https://shron1.chtyvo.org.ua/Burhu_Yurii/Metodolohiia_i_orhanizatsiia_naukovykh_doslidzhen.pdf
8. Краус Н.М. К78 Методологія та організація наукових досліджень: навчально-методичний посібник. – Полтава: Оріяна, 2012. – 183 с.
<http://dspace.puet.edu.ua/bitstream/123456789/5104/1/Посібник%20МОНД%20Краус%20Н.М.pdf>

Educational content

5. Methods of mastering the discipline (educational component)

№ s/n	Subject	Program learning outcomes	The main tasks	
			Control measure	Термін виконання
<i>Autumn semester, 2 ECTS credits / 60 hours</i>				
1.	<i>The concept of science and research. Classification of scientific research</i>	<i>PLO 1 PLO 10 PLO 11 PLO 20</i>	<i>Practical work 1</i>	<i>1st week</i>
2.	<i>Categorical apparatus of science.</i>	<i>PLO 1 PLO 2 PLO 8 PLO 10 PLO 11 PLO 12 PLO 13 PLO 20</i>	<i>Practical work 2</i>	<i>3rd week</i>
3.	<i>The concept and general characteristics of research methods. System analysis as a method of scientific foaming</i>	<i>PLO 3 PLO 4 PLO 8 PLO 13 PLO 16 PLO 19</i>	<i>Practical work 3</i>	<i>5th week</i>
4.	<i>Organization of scientific research.</i>	<i>PLO 2 PLO 8</i>	<i>Practical work 4</i>	<i>7th week</i>

		PLO 10 PLO 16 PLO 19		
5.	<i>Information sources in research work. Sources. Types of information sources. Classification of scientific publications.</i>	PLO 11 PLO 13 PLO 16 PLO 19	<i>Practical work 5</i>	<i>9-ий тиждень</i>
6.	<i>Ethical norms of scientific work</i>	PLO 11 PLO 12 PLO 19 PLO 21	<i>Practical work 6</i>	<i>11th week</i>
7	<i>Work on writing scientific articles, scientific reports and reports</i>	PLO 3 PLO 4 PLO 8 PLO10 PLO 11 PLO 12 PLO 16 PLO 17 PLO 20 PLO 21 PLO 22	<i>Practical work 7</i>	<i>13th week</i>
8	<i>Module test</i>		<i>Practical work 8</i>	<i>15th week</i>
9	<i>Final Test</i>		<i>Practical work 9 Final Test Pass</i>	<i>18th week</i>
<i>Spring semester, 2 ECTS credits / 60 hours</i>				
11.	<i>Analytical review</i>	PLO 1 PLO 2 PLO 8 PLO 10 PLO 11 PLO 12 PLO 13 PLO 19 PLO 20	<i>Practical work 1-2</i>	<i>3rd week</i>
12.	<i>Defining the purpose, object and subject of research</i>	PLO 1 PLO 2 PLO 3 PLO 8 PLO 10 PLO 13 PLO 16 PLO 17	<i>Practical work 3</i>	<i>5th week</i>
13.	<i>Calendar plan of the master's dissertation</i>	PLO 2 PLO 3 PLO PLO 8 PLO 10	<i>Practical work 4</i>	<i>9th week</i>

		PLO 13 PLO 16		
14.	Startup of the master's dissertation	PLO 2 PLO 3 PLO 4 PLO 8 PLO 10 PLO 11 PLO 12 PLO 13 PLO 16 PLO 17 PLO 18 PLO 19 PLO 20 PLO 1 PLO 22	Practical work 5	13 th week
15.	Research results	PLO 2 PLO 3 PLO 4 PLO 8 PLO13 PLO 16 PLO 17 PLO 18 PLO 19 PLO 20 PLO 22	Practical work 6-8	17 th week
16.	Final Test		Practical work 9 Final Test Pass	18 th week

6. Self-study

Approximate subject of reports:

One of the main types of semester control during the mastering of the discipline "Scientific work on the topic of the master's dissertation" is the implementation of creative scientific tasks on the topic of qualifying work. The work is performed in accordance with the requirements, within the period specified by the teacher.

The main purpose of creative tasks is to solve a practical problem using the materials learned in lectures and independently, and to master the practical skills necessary for research and preparation of a master's thesis.

Formulate the purpose and objectives of scientific work, subject and object of research

2. Formulate an annotation to the scientific work

3. Identify and explain the subject and object of research

4. Formulate the relevance and novelty of scientific work

5. Identify the engineering, creative and scientific component of scientific work

6. Write abstracts

7. Write a review of a scientific article

8. Make a report (5 minutes)

9. Conduct a discussion on a scientific thesis
- 10 To conduct a controversy on a scientific thesis
11. Conduct a debate on the scientific thesis
12. Conduct a debate on a scientific thesis

Deadline for submission of creative tasks for testing: 13-14th week of study.

Creative work is not tested for plagiarism, but must meet the requirements of academic integrity. In case of academic dishonesty, the work is canceled and not checked.

Policy and control

7. Policy of academic discipline (educational component)

Attending classes

Attendance at lectures is optional. Attending practical classes is desirable, as they are used to write express tests / tests, as well as to defend practical work.

The grading system is focused on obtaining points for student activity, as well as performing tasks that are able to develop practical skills and abilities.

Control measures missed

Missed control measures (defense of practical work) must be practiced in the next classes, provided that the task is scheduled for the current lesson, or in consultations.

Omissions of writing a module test and express test are not fulfilled.

Calculation and graphic work, which is submitted for inspection in violation of the deadline is evaluated with a decrease in the number of weight points.

Violation of deadlines and incentive points

Encouragement points		Penalty points *	
Criterion	Weight points	Criterion	Weight points
Improving creative tasks	2 points (for each creative tasks)	Untimely performance and protection of creative tasks	From -0.5 points to -5 points (depending on the delivery date)
preparation of scientific work for participation in the competition of student scientific works	5 points		
Registration of scientific work for participation in the competition of student scientific works	5 points		
Active classes work	2 points		

* if the control measure was missed for a good reason (illness, which is confirmed by a certificate of the established sample) - penalty points are not accrued.

Academic integrity

The policy and principles of academic integrity are defined in Section 3 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". Read more: <https://kpi.ua/code>.

Norms of ethical behavior

Normative principles of behavior of students and employees, defined in sections 2 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". Read more: <https://kpi.ua/code>.

Procedure for appealing the results of control measures

Students have the opportunity to raise any issue related to the control procedure and expect it to be addressed according to predefined procedures.

The student has the right to appeal the results of the control measure according to the approved provision on appeals in the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" (approved by the order №NON/128/2021 from 20.05.2021) - <https://osvita.kpi.ua/index.php/node/182>

Inclusive education

The discipline "Scientific work on the topic of the master's dissertation" can be taught to most students with special educational needs, except for students with severe visual impairments who do not allow to perform tasks using personal computers, laptops and / or other technical means.

Distance learning

Distance learning takes place through the Sikorsky Distance learning Platform «Sikorsky».

Distance learning through additional online courses on certain topics is allowed subject to agreement with students. If a small number of students wish to take an online course on a specific topic, studying the material with such courses is allowed, but students must complete all the tasks provided in the discipline.

The list of courses is offered by the teacher after the students have expressed a desire (because the bank of available courses is updated almost every month).

The student provides a document confirming the completion of the distance course (in the case of a full course) or provides practical tasks from the distance course and subject to an oral interview with the teacher on the topics can receive grades for control measures provided for the studied topics (express control / test tasks, practical work).

Performance of practical works, and also performance of settlement and graphic work, is carried out during independent work of students in a remote mode (with a possibility of consultation with the teacher through e-mail, social networks).

Learning a foreign language

Teaching in English is carried out only for foreign students.

At the request of students, it is allowed to study the material with the help of English-language online courses on topics that correspond to the topics of specific classes.

8. Monitor and evaluate the system of evaluation of learning outcomes (Rating System of Evaluation)

Evaluation system (current control):

1. Autumn semester, 4 ECTS credits / 120 hours

No s/n	Control measure	%	Weight points	Number	Total
1.	Express control works		2	6	12
2.	Active work on a practical classes (Performing creative tasks)		4	12	48
3.	Answers to practical classes		3	5	15
4.	Modular control work (MCW)		30	1	25
5.	Test work ¹	100	100	1	100
	Total				100

2. Spring semester, 4 ECTS credits / 120 hours

№ з/п	Контрольний захід	%	Ваговий бал	Кіл-ть	Всього
1.	Practical lessons	100	12,5	8	100
	Всього				100

The applicant receives a positive credit score for the results of the semester, if he has a final rating for the semester of at least 60 points and has met the conditions of admission to the semester control, which are determined by the RSE (Rating System of Evaluation).

With applicants who have met all the conditions of admission to the test and have a rating of less than 60 points, as well as with those applicants who want to increase their rating, in the last scheduled lesson in the semester, the teacher conducts semester control in the form of test or interviews.

After performing the test, if the score for the test is higher than the rating, the applicant receives a score based on the results of the test.

If the grade for the test is lower than the rating, a "hard" RSE is used - the previous rating of the applicant (except for points for the semester individual task) is canceled and he receives a grade based on the results of the test. This option forms a responsible attitude of the applicant to the decision to perform the test, forces him to critically assess the level of his training and carefully prepare for the test.

Calendar control (CC) - is performed twice a semester as monitoring of the current state of compliance with syllabus requirements.

The purpose of calendar control is to improve the quality of student learning and monitor the implementation of the schedule of the educational process by students.

Criterion		The first CC	The second CC
Термін календарних контролів		8-ий тиждень	14-ий тиждень
Поточний рейтинг		≥ 24 балів	≥ 40 балів
Conditions for obtaining a positive result from the calendar control	Execution creative tasks	№ 1- 5	+
		№ 5-10	-
	Execution practical work	№ 1- 2	+
		№ 5- 7	-
	Express control works	At least 3 of any lectures	+
		At least 5 of any lectures	-
	Modular control work	Estimated MCW	-

In case of detection of academic poor quality during training - the control measure is not credited.

Semester certification of students

<i>Mandatory condition for admission to the test</i>		<i>Criterion</i>
1	<i>Current rating</i>	<i>RD ≥ 42</i>
2	<i>Obtaining a positive assessment for the performed MCR</i>	<i>Більше 12 балів</i>
3	<i>All creative works are protected</i>	<i>Більше 24 балів</i>
3	<i>Writing at least 5 express tests</i>	<i>Більше 5 балів</i>
4	<i>Execution of at least 6 practical works</i>	<i>Більше 40 балів</i>

The results are announced to each student separately in the presence or remotely (by e-mail). Also recorded in the system "Electronic Campus".

Optional conditions for admission to closure:

- 1. Activity in practical classes.*
- 2. Activity in laboratory classes.*
- 3. Positive result of the first attestation and the second attestation.*
- 4. Attending 50% of lectures.*

Table of translation of rating points to grades on a university scale:

<i>Number points</i>	<i>Assessment on the university scale</i>
<i>100-95</i>	<i>Perfectly / Відмінно</i>
<i>94-85</i>	<i>Very good / Дуже добре</i>
<i>84-75</i>	<i>Good / Добре</i>
<i>74-65</i>	<i>Satisfactorily / Задовільно</i>
<i>64-60</i>	<i>Satisfactorily Enough / Достатньо</i>
<i>Less 60</i>	<i>Unsatisfactorily / Незадовільно</i>
<i>Admission conditions are not met</i>	<i>Not allowed / Не допущено</i>

9. Additional information on the discipline (educational component)

The list of questions for preparation for modular control work, and also for preparation for credit is given in appendix 1.

Distance learning through additional online courses on certain topics is allowed subject to agreement with students. If a small number of students wish to take an online course on a specific topic, studying the material with such courses is allowed, but students must complete all the tasks provided in the discipline.

The list of courses is offered by the teacher after the students have expressed a desire (because the bank of available courses is updated almost every month).

The student provides a document confirming the completion of the distance course (in the case of a full course) or provides practical tasks from the distance course and subject to an oral interview with the teacher on the topics can receive grades for control measures provided for the studied topics (express control / test tasks, practical work).

Work program of the discipline (syllabus):

Compiled by PHD, Associate Professor of Department of BM, Larisa Kalashnikova.

Approved by the Department of Biomedical Engineering (protocol № ___ to _____)

Approved by the Methodical Commission of the Faculty of Biomedical Engineering (protocol № ___ to _____)

Appendix 1 to the syllabus of the discipline
"Scientific work on the topic of the master's dissertation"

***The list of questions for preparation for modular control work,
And also for preparation for test***

1. *Science as a form of human knowledge of the world. The ratio of scientific and everyday knowledge*
2. *Basic principles of scientific knowledge.*
3. *Functions of science in the society of information civilization.*
4. *The concept of method, the specifics of scientific research methods.*
5. *Research methodology, its levels.*
6. *Philosophy as a theoretical and methodological basis of scientific research*
7. *Classification of sciences: history and modernity.*
8. *The relationship between science and philosophy in positivism and neopositivism.*
9. *Features of classical science. Experimental science.*
10. *Non-classical science and problems of scientific knowledge. Relativism.*
11. *Post-classical science and the information revolution.*
12. *The problem of the criterion of scientificity in the philosophy of positivism and postpositivism.*
13. *Post-classical science in the modern era.*
14. *The role of facts in scientific research.*
15. *Scientific idea as a way of non-traditional explanation of phenomena.*
16. *Scientific hypothesis and its role in cognition*
17. *The concept of scientific theory, its essence and structure.*
18. *Scientific theory as the highest level of knowledge synthesis.*
19. *Typology of research methods: special and general scientific methods.*
20. *System analysis as a general scientific research method.*
21. *Synergetics as a theory of self-organization and development of separate integral systems.*
22. *Observations in scientific research.*
23. *The role of experiment in research.*
24. *Theoretical methods in scientific research. (hypothetical-deductive, axiomatic).*
25. *General methods in scientific research. Analysis and synthesis. Deduction and induction.*
26. *The ratio of historical and logical in scientific research.*
27. *The role of formalization in research.*
28. *The role of idealization in research.*
29. *Monograph as a form of scientific work.*
30. *Scientific article and review as forms of scientific work.*
31. *Synopsis and theses as forms of educational and scientific work.*
32. *General characteristics of course and diploma work.*
33. *The main stages of the organization of scientific research, their relationship.*
34. *The first stage of scientific research, related to the choice of topic.*
35. *Formulation of relevance and novelty of work.*
36. *Formulation of the purpose and objectives of the study.*
37. *Sources of information for research*
38. *The role of hypothesis in the process of scientific research.*
39. *Classification of types of disputes*
40. *Principles of scientific ethics*
41. *Violation of scientific ethics*
42. *The use of scientific terminology in the text.*
43. *The problem of copyright protection in the modern era.*

44. *Specialization and cooperation in scientific activity.*
45. *Scientific degrees and academic titles in the organization of scientific personnel.*
46. *Science and power. The problem of state regulation of science.*
47. *Rational organization of the researcher.*
48. *Mathematization and computerization as the leading trends in modern science.*
49. *Ethical dimensions of scientific activity.*
50. *The main problems of modern science in Ukraine.*