



MINISTRY OF HEALTH PROTECTION 'OF UKRAINE
NATIONAL PHARMACEUTICAL UNIVERSITY
Faculty pharmaceutical
Department pharmaceutical technology of drugs

MODELING OF SCIENTIFIC RESEARCH

(name of educational component)

EDUCATIONAL WORK PROGRAM
of educational component

training __second master's level_____

(name of higher education level)

in specialty __226 Pharmacy, industrial pharmacy_____

(code and specialty name)

field of knowledge __22 Public Health_____

(code and name of field of knowledge)

of educational program __Pharmacy (for foreign students)_____

in specialization(s)_____

(name of specialization, if available)

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year of creation

CONSIDERED AND APPROVED: NATIONAL UNIVERSITY OF PHARMACY

EDUCATIONAL COURSE TEAM:

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The work program was reviewed and approved at the meeting of the pharmaceutical technology of drugs

Record No. 1 from "_ 1_" of September 2023

Head of the department  _____ prof. Liliia VYSHNEVSKA

The work program was approved at a meeting of the specialized methodological commission for technological disciplines

Record No. 1 from 1 September 2023

Head of the specialized commission  _____ prof. Olena RUBAN

INTRODUCTION

The educational component study program "Modeling of scientific research" is compiled in accordance with the Standard of Higher Education of Ukraine (hereinafter - the Standard) / Educational (educational-professional, educational-scientific) program second (master's) level fields of knowledge 22 Health care specialties 226 Pharmacy, industrial pharmacy educational program "Pharmacy"

Description of the educational component (abstract) The optional educational component "Modeling of scientific research" is an important component of the training of a future specialist and a part of general human culture. The study of this educational component contributes not only to increasing the professional level of conducting scientific research activities, but also to increasing the culture of thinking, the culture of mental activity in general, which helps a person to better understand and evaluate reality.

The subject of study of the educational component "Modeling of scientific research" is mastering methodological approaches to conducting scientific research, analysis of theoretical and empirical research methods, rational organization of the scientific research process, rules for searching scientific literature, classification and rules for working with sources of scientific information, main stages, planning and writing the final qualification paper.

Interdisciplinary connections. "Modeling of scientific research" as an educational component is based on studies by students of higher education admission to pharmacy, philosophy, logic, statistics, sociology, mathematics, fundamentals of scientific research, ethics and deontology, professional ethics of higher education, fundamentals of system analysis, information technology in science, computer technology in pharmacy.

1. Purpose and tasks educational component

1.1. The purpose of the educational component "Modeling of scientific research" is the acquisition of knowledge and skills related to the application of the laws of scientific knowledge, the principles and methods of scientific research, the basic principles of conducting scientific research in the pharmaceutical industry, as well as the form of presenting the results of scientific research.

1.2. The main tasks of the educational component "Modeling of scientific research" are the mastery of the basic concepts, content and functions of science and methodology, the classification of sciences and the system of training scientific personnel in Ukraine, the classification of scientific research methods, the definition and mastery of the main stages of the scientific organization of the research process, the mastery of the systematization of primary sources of scientific information and their use; concepts, functions and main types of scientific publications; structures of theses and scientific articles; methodical methods of presentation of scientific material, mastering the sequence of completion of the final qualification work, rules for working on its text and preparing for the defense.

1.3. Competencies and planned learning outcomes, the formation of which is facilitated by the educational component (relationship with the normative content of the training of higher education applicants, formulated in terms of learning outcomes in the Standard).

According to the requirements of the standard, the educational component ensures the acquisition of higher education

competencies :

integral:

the ability to solve complex problems of pharmaceutical education and science, professional and research-innovative activities in the field of pharmacy based on rethinking existing and creating new integral theoretical and practical knowledge and professional pharmaceutical practice.

general competences:

- Integral competences: the ability to solve complex problems of pharmaceutical education and science, professional and research-innovative activities in the field of pharmacy based on

rethinking existing and creating new integral theoretical and practical knowledge and professional pharmaceutical practice.

- General competences:

GC 1. The ability to act socially responsibly and civically.

GC 2. Ability to apply knowledge in practical situations, make informed decisions.

GC 4. Ability to think abstractly, analyze and synthesize, learn and be modernly trained.

GC 5. The ability to show initiative and entrepreneurship.

GC 9. Skills in using information and communication technologies.

GC 12. Ability to conduct research at the appropriate level.

- Professional competences:

PC 5. The ability to monitor the effectiveness and safety of the use of medicinal products by the population according to the data on their clinical and pharmaceutical characteristics, as well as taking into account subjective signs and objective clinical, laboratory and instrumental criteria of the patient's examination.

PC 13. The ability to demonstrate and apply in practical activities communicative communication skills, fundamental principles of pharmaceutical ethics and deontology, based on moral obligations and values, ethical standards of professional behavior and responsibility in accordance with the Code of Ethics of pharmaceutical workers of Ukraine and WHO guidelines.

PC 15. The ability to organize and participate in the production of medicines in the conditions of pharmaceutical enterprises, including the selection and justification of the technological process, equipment in accordance with the requirements of Good Manufacturing Practice (GMP) with the appropriate development and preparation of the necessary documentation. Determine the stability of medicines

Integrative final *program learning outcomes* (PLO), the formation of which is facilitated by the educational component:

PLO1. To carry out professional activities in social interaction based on humanistic and ethical principles; to identify future professional activity as socially significant for human health.

PLO4. Demonstrate the ability to independently search, analyze and synthesize information from various sources and use these results to solve typical and complex specialized tasks of professional activity.

PLO6. Argue information for decision-making, bear responsibility for them in standard and non-standard professional situations; adhere to the principles of deontology and ethics in professional activity.

PLO7. Perform professional activities using creative methods and approaches.

PLO12. Analyze information obtained as a result of scientific research, generalize, systematize and use it in professional activities.

As a result of studying the educational component, the student must

know:

- basic concepts, content and functions of science, classification of sciences and the system of training scientific personnel in Ukraine;
- concept, content and functions of the methodology; classification of scientific research methods;
- the main stages of the scientific organization of the research process;
- concepts, functions and main types of scientific publications; structure of thesis and scientific article;
- methodical methods of presentation of scientific material;
- the sequence of completion of the graduation qualification work, the rules of working on its text and preparation for the defense

be able to:

- navigate the main sections of science and know their characteristics;

- be able to plan a working day and organize a scientist's workplace;
- to navigate in the main methods of scientific knowledge;
- find scientific information;
- analyze and use scientific information;
- compile a bibliography of literary sources;
- determine the type of scientific publication;
- conduct a structural and methodological analysis of a scientific article;
- use methodical methods of presentation of scientific material;
- orient yourself in the sequence of completion of the graduation qualification work;
- formulate general requirements for the structure of scientific work;
- prepare and present the final qualification work

possess:

- methodical methods of presentation of scientific material;
- rules of preparation for publication of scientific publications;
- methods of searching for scientific information;

knowledge of the structure and requirements of the graduation qualification work.

2. Information content of the educational component

90 hours of 3 ECTS credits are allocated to the study of the educational component

Content module 1. Modeling of scientific research

Topic 1. Science as a sphere of human activity

The history of the development of science. The main periods of its development. Science: purpose, functions, tasks. Basic concepts of science: scientific idea, hypothesis, theory, law, scientific concept, principle, concept, scientific fact, judgment, inference, postulate, category. Classification of sciences. Academic degrees that exist in Ukraine. Academic titles that exist in Ukraine.

Topic 2. Methods of scientific research.

Definition and classification of methods of scientific knowledge. Philosophical (general) methods – dialectic, metaphysics, eclecticism, sophistry, formal-logical method, formal logic. Methods of empirical research - observation, description, comparison, measurement, experiment. Methods of theoretical knowledge. Research methods at the empirical and theoretical levels (general). Modeling method (definition, purpose of the method, types). Partial (special) research methods.

Topic 3. Organization and conduct of scientific research

Procedure for organization of research work. The organizational stage of the research process. Experimental stage of the research process. The stage of generalization, approval and implementation of research results.

Topic 4. Documentary information and its types.

The role of information in scientific research, its essence. Documentary information and its types. Classification of scientific documents. Types of secondary information and its characteristics. Published and unpublished documents.

Topic 5. Search and analysis of scientific information

Library and information activity. Electronic search of scientific information on the Internet. Scientometric databases. Search systems of scientific information. Analysis of scientific information.

Topic 6. Scientific publication: concepts, functions, main types.

Concept and functions of scientific publication. The concept of a scientific article, its structure. Methodical methods of presentation of scientific material. Scientific report: concepts, types.

Topic 7. Organization of the completion of the final qualification (master's) work

The sequence of the master's thesis. Preparatory stage of work. Work on the text of the final qualification (master's) thesis. Preparation for the defense and defense of the final qualification (master's) work.

Topic 8. Scientific research at the National Pharmaceutical University

Research activities of the National Pharmaceutical University. Research directions of chemical departments (pharmacognosy, pharmaceutical chemistry, chemistry of natural compounds and nutraceuticals, medicinal chemistry). Research directions of economic and management departments (pharmaceutical marketing and management, organization and economy of pharmacy, social pharmacy). Research directions of medical and biological departments (clinical pharmacology and clinical pharmacy). Research directions of technological departments (plant technology of drugs, pharmacy technology of drugs, technology of pharmaceutical preparations, technology of drugs).

The content module is conducted in order to check the level of assimilation of the theoretical material. Theoretical knowledge is monitored by means of a written survey based on cards.

3. Form of semester control of success teaching

Semester assessment

4. Methodological support

1. Educational work program.
2. Working program.
3. Calendar plan of lectures and practical classes.
4. Teaching aids.
5. Multimedia texts of lectures.
6. Methodical recommendations for classroom work of students of higher education.
7. Methodical provision of knowledge control of higher education students (control, situational tasks and tests), their evaluation criteria, situational standards of answers.
8. Tickets for content module control.
9. Technical training.

6. Recommended Books

The main reading suggestions

1. Yarnykh T. G., Pul-Luzan V. V., Rukhmakova O. A., Buryak M. V., Orlovetskaya N. F., Dankevich O. S., Kotenko O. M., Yurieva G. B., Herasymova I. V., Kovalov V. V., Levachkova Yu. V., Zhivora N. V., Oliinyk S. V., Sahaidak-Nikitiuk R. V. Modeling of scientific research [URL] : A tutorial for extracurricular activities for applicants for higher pharmaceutical education / ed. prof. T. G. Yarnykh. – Kharkiv : NUPh, 2022. – 140 p.
2. Yarnykh T. G., Rukhmakova O. A., Kotenko O. M., Sahaidak-Nikitiuk R. V., Levachkova Y. V., Kovalov V. V., Buryak M. V., Zhivora N. V., Pul-Luzan V. V., Oliinyk S. V. Modeling of scientific research : Guidelines for conducting practical classes ; 2 Ed. / under the editorship of prof. T. G. Yarnykh. – Kharkiv : NUPh, 2023. – 50 p.

Supplementary reading suggestions

1. Textbook of lectures on “Methodology and logic of scientific reaserch”: A tutorial for extracurricular activities for applicants for higher pharmaceutical education / T. G. Yarnykh, O. A. Rukhmakova, M. V. Buryak, Yuryeva G. B., Herasymova I. V., Pul-Luzan V. V., Oliinyk S. V., Orlovetskaya N. F., Kotenko O. M., Dankevych O. S., Kovalev V. V., Levachkova Yu. V., Zhivora N. V., Chushenko V. M. / ed. prof. T. G. Yarnykh. – Kharkiv : NUPh, 2021. – 115 p.
2. Methodology and logic of scientific reaserch: Guidelines for practical classes for English-speaking applicants of higher pharmaceutical education / T. G. Yarnykh, O. A. Rukhmakova, M. V. Buryak, Yuryeva G. B., Herasymova I. V., Pul-Luzan V. V., Oliinyk S. V., Orlovetskaya N. F., Kotenko O. M., Dankevych O. S., Kovalev V. V., Levachkova Yu. V., Zhivora N. V., Chushenko V. M. / ed. prof. T. G. Yarnykh. – Kh : NUPh, 2021. – 42 c.

3. Methodological recommendations for preparation for the final modular control in the discipline "Methodology and logic of scientific research" / T. G. Yarnykh, O. A. Rukhmakova, M. V. Buryak, Yuryeva G. B., Herasymova I. V., Pul-Luzan V. V., Oliynyk S. V., Orlovetskaya N. F., Kotenko O. M., Dankevych O. S., Kovalev V. V., Levachkova Yu. V., Zhivora N. V., Chushenko V. M. / ed. prof. T. G. Yarnykh. – Kh .: NUPh, 2021. – 15 p.
4. Vovk N. Algorithm of user request in archival information and search systems / N. Vovk // Information, communication, society 2018: Materials of the 7th International Scientific Conference ICS -2018. – Lviv: Publishing House of Lviv Polytechnic, 2018. – P. 127-128.
5. Law of Ukraine "On Scientific and Scientific-Technical Activity" // Bulletin of the Verkhovna Rada of Ukraine. – 2007. – No. 2-3, Art. 20.
6. Zatserkovny V. I. Methodology of scientific research: teacher. manual / V. I. Zatserkovny , I. V. Tishaev , V. K. Demidov. – Nizhyn: NSU named after M. Gogol, 2017. – 236 p.
7. Methodology and organization of scientific research: research in social and economic sciences. Education manual 2nd ed., rev. and add. K.: NTUU "KPI named after Igor Sikorsky", 2022. 173 p.
8. Methods and organization of scientific research: Teaching. manual / S. E. Vazhynskyi, T. I. Shcherbak. – Sumy: A. S. Sumy SPU. Makarenko, 2016. – 260 p.
9. Methodology and organization of scientific research: teaching method. edition. / O.V. Galyan. Lutsk: Tower-Print, 2021. 26 p.
10. Methodology scientific studies : textbook / O. G. Danilyan , O. P. Dzoban . - Kharkiv : Pravo, 2019. - 368 p.
11. Danilyan O. G. Organization and methodology of scientific research: teaching. manual / O. G. Danilyan , O. P. Dzoban . - Kharkiv: Pravo, 2017. - 448 p.
12. Methodology and organization of scientific research: teaching manual / I. S. Dobronravova, O. V. Rudenko, L. I. Sydorenko and others. – Kyiv: "Kyiv University", 2018. – 607 p.
 Andriychuk V. G. The essential aspect of the methodology of scientific research / V. G. Andriychuk // Economics of AIC. – 2016. – no. 7. – P. 87-94.

15. Electronic resources, including the Internet

1. Ministry of Health of Ukraine [Electronic resource]: official website. - Access mode: www.moz.gov.ua - (access date 26.08.2023).
2. National Pharmaceutical University [Electronic resource]: Scientific library of the National Pharmaceutical University. – Access mode: <http://lib.nuph.edu.ua> (access date 26.08.2023).
3. National Pharmaceutical University. Department of Medicine Technology [Electronic resource]: website of the Department of Medicine Technology. – Access mode: <http://tl.nuph.edu.ua> (access date 26.08.2023).
4. Electronic archive of the library of the National Academy of Sciences of Ukraine. <http://lib.nuph.edu.ua>; e- mail library@nuph.edu.ua
5. Educational portal <http://pharmel.kharkiv.edu> - the center of distance technologies of the National Academy of Sciences