MINISTRY OF HEALTH PROTECTION OF UKRAINE

ODESSA NATIONAL MEDICAL UNIVERSITY

Department of general and clinical epidemiology and biosafety

I APPROVE

Vice-rector for scientific and pedagogical work

_____ Eduard BURIACHKIVSKYI

September 1, 2023

WORKING PROGRAM OF EDUCATIONAL DISCIPLINE "SCIENTIFIC RESEARCH DESIGN"

Level of higher education: second (master's)

Branch of knowledge: 22 "Health care"

Specialty: 222 "Medicine"

Educational and professional program: Medicine

2023

The work program is compiled on the basis of the educational and professional program "Medicine" for the training of specialists of the second (master's) level of higher education in the specialty 222 "Medicine" of the field of knowledge 22 "Health care", approved by the Scientific Council of ONMedU (protocol No. 8 of June 29, 2023).

Developers:
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The work program was approved at the meeting of the department of general and clinical epidemiology and biosafety
Protocol No. 1 dated August 28, 2023.

Head of the department _____ Mykola GOLUBYATNYKOV

Agreed with the guarantor of the OPP _____ Valery MARICHEREDA

Approved by the subject cycle commission for medical and biological disciplines of ONMedU
Protocol No.___ of "___"_____2023.

Head of the subject cycle methodical commission for medical and biological disciplines of ONMedU

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Reviewed and approved at the meeting of the department of general and clinical epidemiology and biosafety with course of microbiology and virology
Protocol No. 1 of "1" September 20__

Head of the department _____ Mykola GOLUBYATNYKOV
(signature) *(First Name Surname)*

Reviewed and approved at the meeting of the department _____

Protocol No. ___ of "___" _____ 20__

Head of Department _____ _____
(signature) *(First Name Surname)*

1. Description of the academic discipline:

Name of indicators	Field of knowledge, specialty, specialization, level of higher education	Characteristics of the academic discipline	
The total number of: Credits - 3 Hours - 90 Content subdivisions - 1	Branch of knowledge 22 "Health care" Specialty 222 "Medicine" Level of higher education second (master's)	*Full-time education* *Elective discipline*	
		A year of training	*5*
		Semester	*IX-X*
		Lectures	*0*
		Practical	*30 hours*
		Independent work	*60 hours*
		Including individual tasks	*0*
		Final control form	*Test*

2. The purpose and tasks of the educational discipline, competences, program learning outcomes.

Goal:the formation of future specialists of a holistic view of science as a system of knowledge and a tool of cognition, scientifically based views on the methodology of scientific cognition, the essence of general scientific and special methods and principles of conducting research and design of the obtained results, their use in practical activities.

Task:

-creating a holistic idea of the specifics of scientific knowledge, carrying out scientific work;

- familiarization with the subject and essence of science and its main functions, classification of sciences, scientific and technical potential of Ukraine;
- mastering the principles of scientific research organization;
- familiarization with the information base of scientific research;
- study and ability to apply general and applied methods of scientific research;
- assimilation of issues of the formation of a scientist as a person and the regime of his work;
- mastering the methods of presenting the results of scientific research.

The process of studying the discipline is aimed at forming elements of the following competencies:

IR. The ability to solve typical and complex problems, including those of a research and innovation nature in the field of medicine. Ability to continue learning with a high degree of autonomy.

General (GC):

GC1. Ability to abstract thinking, analysis and synthesis
GC3. Ability to apply knowledge in practical situations
GC4. Knowledge and understanding of the subject area and understanding of professional activity
GC5. Ability to adapt and act in a new situation
GC6. Ability to make informed decisions
GC7. Ability to work in a team
GC8. Ability to interpersonal interaction
GC10. Ability to use information and communication technologies
GC11. Ability to search, process and analyze information from various sources
GC16. The ability to evaluate and ensure the quality of the work performed

Special (SC):

SC21. The ability to clearly and unambiguously convey one's own knowledge, conclusions and arguments on health care problems and related issues to specialists and non-specialists, in particular to people who are studying
SC23. Ability to develop and implement scientific and applied projects in the field of health care

SC25. Adherence to professional and academic integrity, to be responsible for the reliability of the obtained scientific results

Program learning outcomes (PLO):

PLO1. Have thorough knowledge of the structure of professional activity. To be able to carry out professional activities that require updating and integration of knowledge. To be responsible for professional development, the ability for further professional training with a high level of autonomy.

PLO2. Understanding and knowledge of fundamental and clinical biomedical sciences, at a level sufficient for solving professional tasks in the field of health care.

PLO3. Specialized conceptual knowledge, which includes scientific achievements in the field of health care and is the basis for conducting research, critical understanding of problems in the field of medicine and related interdisciplinary problems.

PLO21. Search for the necessary information in the professional literature and databases of other sources, analyze, evaluate and apply this information.

PLO22. Apply modern digital technologies, specialized software, statistical methods of data analysis to solve complex healthcare problems

PLO25. It is clear and unambiguous to convey one's own knowledge, conclusions and arguments on health care problems and related issues to specialists and non-specialists.

As a result of studying the academic discipline, the student of higher education must:

Know:

- the subject and essence of science and its main functions;
- basic provisions of scientific design;
- organizational and legal principles of scientific activity, principles of organization and functioning of the scientific community;
- peculiarities of scientific work and principles of organization of scientific research;
- information base of scientific research;
- general and special methods of scientific research;
- the stages of the formation of a scientist as a personality and the regime of his work.

Be able:

- organize your scientific activity;
- use modern information bases and their algorithms

application in planning and conducting scientific research;
- use general and special methods of scientific research;
- prepare the results of research work (dissertation, article, theses, report).

Master the skills:

- conducting scientific research;
- processing and analysis of received scientific results;
- formulate reasonable conclusions

3. Content of the academic discipline:

***Content module I.*Design of scientific research**

Topic 1. The role of science in the development of society. Scientific product and its types.

Topic 2. Organization of the scientist's work. Organization of work in scientific activity. The effectiveness of the scientist's work. The main features of a scientist.

Topic 3. Scientific and research work of acquirers. Tasks of the group of the Scientific and Research Unit on work with acquirers. Participation of recipients in scientific research.

Topic 4. Selection of direction and planning of research work. Formation of the topic, planning, analysis of theoretical and experimental research and formulation of conclusions.

Topic 5. Medical and social scientific research. Forms, types, methods of obtaining statistical information. Stages of statistical research.

Topic 6. The first stage of medical and social research. Determination of the purpose and task of the research. Development of a plan and program, choice of object and subject, research base. Unit selection and sample size of the study.

Topic 7. Statistical tables. Layouts. Rules for their filling. Requirements for design of illustrations.

Topic 8. The second stage of medical and social research. Collection of statistical material. Definition of screening tests and their classification. Definition of anamnestic technologies. Filling out account cards. Checking the obtained results.

Topic 9. The third stage of medical and social research. Data processing and compilation using modern mathematical, statistical methods and information tools. Statistical grouping of the obtained results.

Topic 10. Data entry, processing and visualization using Microsoft Excel.

Topic 11. The fourth stage of medical and social research. Analysis of the obtained results. Formulation of evidentiary conclusions. Development of practical recommendations. Literary and graphic presentation of the results of statistical and sociological research. Requirements for drawing up a list of used sources.

Topic 12. Epidemiological analysis as a component of scientific research. Purpose, objectives and design. Types and features of epidemiological studies. Purpose and tasks.

Topic 13. Implementation of the results of scientific research and assessment of their effectiveness. Implementation of completed research into practice, effectiveness of scientific research.

Topic 14. Scientific publications as a form of publicizing the results of scientific research. Preparation and general requirements for writing, designing and defending a scientific product.

Topic 15. Methods and types of visualization of the results of scientific research. General ideas about the presentation, its purpose and structure. Presentation requirements and elements.

4. Structure of the academic discipline:

No	Topic name	Number of hours		
		In total	software	ISW
1	The role of science in the development of society.	6	2	4
2	Organization of the scientist's work	6	2	4
3	Scientific and research work of acquirers	6	2	4
4	Selection of direction and planning of research work	6	2	4
5	Medical and social scientific research	6	2	4
6	The first stage of medical and social research	6	2	4
7	Statistical tables.	6	2	4
8	The second stage of medical and social research.	6	2	4
9	The third stage of medical and social research.	6	2	4
10	Data entry, processing and visualization using Microsoft Excel.	6	2	4
11	The fourth stage of medical and social research.	6	2	4
12	Epidemiological analysis as a component of scientific research	6	2	4
13	Implementation of the results of scientific research and assessment of their effectiveness.	6	2	4
14	Scientific publications as a form of publicizing the results of scientific research.	6	2	4
15	Methods and types of visualization of the results of scientific research.	6	2	4
Total hours per chapter		**90**	**30**	**60**

5. Topics of lectures / seminars / practical / laboratory classes

5.1. Topics of lectures

Lectures are not provided.

5.2. Topics of seminar classes
Seminar classes are not provided.

5.3. Topics of practical classes

No	TOPIC	Number of hours
1	The role of science in the development of society.	2
2	Organization of the scientist's work	2
3	Scientific and research work of acquirers	2
4	Selection of direction and planning of research work	2
5	Medical and social scientific research	2
6	The first stage of medical and social research	2
7	Statistical tables.	2
8	The second stage of medical and social research.	2
9	The third stage of medical and social research.	2
10	Data entry, processing and visualization using Microsoft Excel.	2
11	The fourth stage of medical and social research.	2
12	Epidemiological analysis as a component of scientific research: purpose, tasks and design.	2
13	Implementation of the results of scientific research and assessment of their	2
14	Scientific publications as a form of publicizing the results of scientific research.	2
15	Methods and types of visualization of the results of scientific research.	2
In total		**30**

5.4. Topics of laboratory classes
Laboratory classes are not provided.

6. Independent work of a student of higher education

No	TOPIC	hours
1	The role of science in the development of society.	4
2	Organization of the scientist's work	4
3	Scientific and research work of acquirers	4
4	Selection of direction and planning of research work	4
5	Medical and social scientific research	4
6	The first stage of medical and social research	4
7	Statistical tables.	4
8	The second stage of medical and social research.	4
9	The third stage of medical and social research.	4
10	Data entry, processing and visualization using Microsoft Excel.	4
11	The fourth stage of medical and social research.	4
12	Epidemiological analysis as a component of scientific research: purpose, tasks and design.	4
13	Implementation of the results of scientific research and assessment of their effectiveness.	4

14	Scientific publications as a form of publicizing the results of scientific research.	4
15	Methods and types of visualization of the results of scientific research.	4
In total		**60**

7. Teaching methods

Practical training:conversation, solving situational problems, practicing skills for working with medical documentation.

Independent work:independent work with the textbook, independent work with the bank of test tasks Step-2, independent solution of situational tasks.

8. Forms of control and assessment methods (including criteria for evaluating learning outcomes)

Current control:oral survey, testing, assessment of performance of practical skills, solution of situational tasks, assessment of activity in class.

Final control: balance

Evaluation of the current educational activity in a practical session:

1. Evaluation of theoretical knowledge on the subject of the lesson:
- methods: survey, solving a situational problem;
- the maximum score is 5, the minimum score is 3, the unsatisfactory score is 2.
2. Evaluation of practical skills and manipulations on the subject of the lesson:
- methods: assessment of the correctness of the performance of practical skills
- the maximum score is 5, the minimum score is 3, the unsatisfactory score is 2.

The grade for one seminar session is the arithmetic average of all components and can only have a whole value (5, 4, 3, 2), which is rounded according to the statistical method.

Current assessment criteria for practical training:

Rating	Evaluation criteria
Perfectly "5"	It is presented to the applicant when he shows deep, solid and systematic knowledge in the scope of the curriculum, answers all questions without mistakes, reasonably formulates conclusions, using materials presented for independent work of the applicant, competently and consistently, with knowledge of the methodology, completed practical work ; using scientific terms and concepts correctly.
Fine "4"	The acquirer reveals the main content of the educational material; gives incomplete definitions of concepts; admits inaccuracies when using scientific terms, vaguely formulates conclusions, performed practical work, but made minor mistakes during the research.
Satisfactorily "3"	The applicant reproduces the basic educational material, but makes significant mistakes when presenting it, gives simple examples, definitions of concepts are insufficient, characterizes general issues of social medicine.
Unsatisfactorily "2"	The applicant discloses the content of the educational material fragmentarily, makes gross mistakes in the definition of concepts and when using terminology, did not complete the practical work.

Credit is given to the applicant who completed all tasks of the work program of the academic discipline, took an active part in practical classes, completed and defended an individual assignment and has an average current grade of at least 3.0 and has no academic debt.

Assessment is carried out in the last class before the beginning of the examination session (with the tape system of learning. The grade for the assessment is the arithmetic mean of all components on a

traditional four-point scale and has a value that is rounded to 2 (two) decimal places using the statistical method.

9. Distribution of points received by students of higher education

The obtained average score for the academic discipline for applicants who have successfully mastered the work program of the academic discipline is converted from a traditional four-point scale to points on a 200-point scale, as shown in the table:

Conversion table of a traditional assessment into a multi-point scale

Traditional four-point scale	Multipoint 200-point scale
Excellent ("5")	185 - 200
Good ("4")	151 - 184
Satisfactory ("3")	120-150
Unsatisfactory ("2")	Below 120

A multi-point scale (200-point scale) characterizes the actual success of each applicant in learning the educational component. The conversion of the traditional grade (average score for the academic discipline) into a 200-point grade is performed by the information and technical department of the University.

According to the obtained points on a 200-point scale, the achievements of the applicants are evaluated according to the ECTS rating scale. Further ranking according to the ECTS rating scale allows you to evaluate the achievements of students from the educational component who are studying in the same course of the same specialty, according to the points they received.

The ECTS scale is a relative-comparative rating, which establishes the applicant's belonging to the group of better or worse among the reference group of fellow students (faculty, specialty). An "A" grade on the ECTS scale cannot be equal to an "excellent" grade, a "B" grade to a "good" grade, etc. When converting from a multi-point scale, the limits of grades "A", "B", "C", "D", "E" according to the ECTS scale do not coincide with the limits of grades "5", "4", "3" according to the traditional scale. Acquirers who have received grades of "FX" and "F" ("2") are not included in the list of ranked acquirers. The grade "FX" is awarded to students who have obtained the minimum number of points for the current learning activity, but who have not passed the final examination. A grade of "F" is assigned to students who have attended all classes in the discipline, but have not achieved a grade point average (3.00) for the current academic activity and are not admitted to the final examination.

Applicants who study in one course (one specialty), based on the number of points scored in the discipline, are ranked on the ECTS scale as follows:

Conversion of the traditional grade from the discipline and the sum of points on the ECTS scale

Evaluation on the ECTS scale	Statistical indicator
A	Top 10% achievers
B	The next 25% of earners
C	The next 30% of earners
D	The next 25% of earners
E	The next 10% of earners

10. Methodological support:

- Working program of the academic discipline
- Syllabus of the academic discipline
- Multimedia presentations

- Methodical developments for practical classes

11. Questions for final control:

1. Definition of science, purpose and tasks of science. The role and importance of science in the state science and technology policy.
2. The scientist and his role in conducting scientific research. Organization of his work.
3. What is reflected in the individual plan of a scientist? Who approves this plan?
4. What is the rational organization of a scientist's work in scientific research based on? What defines a research program?
5. What parts does a scientist's work schedule consist of? Who approves this schedule?
6. Name the principles of work organization in scientific activity? What is the collective nature of work?
7. What is the systematization of scientific research results?
8. Requirements for the culture, ethics and skill of a scientific researcher.
9. Requirements for the performance of scientific work. Requirements for the design of a scientific work.
10. What is the essence of the report when revealing the essence of research work?
11. Planning of research work.
12. In what sequence are medical and social studies carried out?
13. Stages of statistical research.
14. Name the elements of the first stage of statistical research.
15. What elements are provided by the research program and the collection program during the first stage of scientific research?
16. Statistical tables, basic concepts and elements. Name the advantages of the tabular method.
17. Composition of statistical tables. The rules of their construction.
18. Types of statistical tables. Describe the group table.
19. What stages does the process of building a complete statistical table consist of? Describe the second stage.
20. Describe the third stage of scientific research.
21. Describe the fourth stage of scientific research.
22. How are statistical tables of the fourth stage constructed? What forms the table predicate?
23. What is the purpose of the study?
24. What is a research plan, its main elements?
25. What is a research program, its types?
26. What are the types of effectiveness of research works?
27. What is the economic effect of research work?
28. Epidemiological analysis. Its purpose and tasks.
29. Name the stages of the process of course work.
30. Diploma work, its main tasks and general requirements.

12. Recommended literature

Main:

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.

Additional:

1. Bhattacherji A. Methodology and organization of scientific research:

research in socio-economic sciences / A. Bhattacherdzhi, N. I. Sytnyk.: studies Manual - K., 2016. - 159p.
2. Ermakov O. Yu. Fundamentals of scientific research in economics: educational manual. K.: Comprint, 2015. 177 p.
3. Law of Ukraine "On Higher Education". https://zakon.rada.gov.ua/laws/show/1556-18#Text
4. Law of Ukraine "On scientific and scientific and technical activity". https://zakon.rada.gov.ua/laws/show/848-19#Text
5. Ministry of Education and Science of Ukraine. Order dated 12.01.2017 No. 40 "About approval of the requirements for the preparation of the dissertation" https://zakon.rada.gov.ua/laws/show/z0155-17#Text
6. Marcyn V.S. Basics of scientific research: teaching. manual [Electronic resource] / V. S. Marcyn, N. G. Mitsenko, O. A Danylenko. – Access mode: http://www.infolibrary. com.ua/books-book-162.html

13. Electronic information resources

- World Health Organization www.who.int
- Cochrane Center for Evidence-Based Medicine www.cebm.net
- Cochrane Library www.cochrane.org
- US National Library of Medicine - MEDLINE www.ncbi.nlm.nih.gov/PubMed
- Canadian Center for Evidence in Health Care www.cche.net
- Center for Disease Control and Prevention www.cdc.gov
- Public Health Center of the Ministry of Health of Ukraine www.phc.org.ua
- Ukrainian database of medical and statistical information "Health for all": http://medstat.gov.ua/ukr/news.html?id=203
- British Medical Journal www.bmj.com
- Journal of Evidence-Based Medicine www.evidence-basedmedicine.com