SLC. MS.040. LSO9001. 1693

SYLLABUS

INTERNATIONAL EUROPEAN UNIVERSITY

PROGRESSIO ET HUMANITAS

SCHOOL OF MEDICINE

PRINCIPLES OF EVIDENCE-BASED MEDICINE AND RESEARCH METHODOLOGY

2023

SYLLABUS

Discipline	Principles of evidence-based medicine and research methodology
Teacher(s)	Professor Anna Moiseeva Associate Professor of the Department Sherman Zoya Oleksandrivna
Profile of the teacher(s)	https://medicine.ieu.edu.ua/pro-yemsh/kafedry/kafedra-fundamentalnykh-dystsyplin
Consultations	
Face-to-face consultations	Fourth Tuesday of the month from 15:00-16:00
Onlime consultation	Second Friday of the month from 15:00- 16:00
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Page disciplines	https://medicine.ieu.edu.ua/pro-yemsh/kafedry/kafedra-fundamentalnykh-dystsyplin

Form of final control	test	differentiated test	exam
	☐	☒	☐

SYLLABUS

1 Brief summary of the discipline

The subject of the discipline is the mastery of the principles of evidence-based medicine, theoretical and methodological foundations of biostatistics, mastering modern knowledge in the field of research preparation in compliance with moral and ethical standards of behaviour that form a culture of academic integrity in higher education institutions.

2 Prerequisite for the course

For successful mastering of the discipline, a higher education student needs knowledge gained in the process of studying the disciplines of fundamental training. The discipline provides the ability to solve complex problems, including research and innovation in the field of medicine. Ability to continue learning with a high degree of autonomy.

3 Purpose and objectives of the discipline

The purpose of studying the discipline "Principles of Evidence-based Medicine and Research Methodology" is to

- mastery of the necessary knowledge, skills and acquisition of competencies in the basics and modern principles of evidence-based medicine and biostatistics;
- analysis of the main biostatistical indicators and criteria; methodological and theoretical foundations of the formation of statistical aggregates for their further adequate analysis;
- evaluation of research results according to individual criteria and in relation to the factors that influence them acquisition of constructive, fundamental thinking and modern knowledge and professional skills in formulating the purpose and objectives of scientific research in medicine, developing a design and plan of scientific research and its implementation in scientific work, using the acquired skills in the performance of professional duties.

4 Learning outcomes

PLO 1	Have a thorough knowledge of the structure of professional activity. Be able to carry out professional activities that require updating and integrating knowledge. To be responsible for professional development, the ability to further professional and the ability to further professional learning with a high level of autonomy.
PLO 2	Understanding and knowledge of basic and clinical biomedical sciences at a level sufficient to solve professional problems in the field of healthcare.
PLO 3	Specialised conceptual knowledge that includes scientific achievements in the field of healthcare and is the basis for research, critical thinking in the field of medicine and related interdisciplinary issues.
PLO 20	Analyse the epidemiological situation and implement measures for mass individual, general and local prevention of infectious diseases
PLO 21	Find the necessary information in professional literature and databases of other sources, analyse, evaluate and apply this information

SYLLABUS

4 Learning outcomes

ПРН 22	Apply modern digital technologies, specialised software, statistical methods of data analysis to solve complex healthcare problems.
ПРН 23	Evaluate the impact of the environment on human health to assess the state of morbidity of the population.
ПРН 25	Clearly and unambiguously communicate own knowledge, conclusions and arguments on healthcare and related issues to specialists and non-specialists.
ПРН 28	Make effective decisions on healthcare issues, assess the resources required, and consider social, economic and ethical implications.

5 ECTS Credits

5 ECTS credits / 150 academic hours, of which 16 are lectures, 62 are practical classes, and 72 are independent work.

6 Structure of the discipline

№	Topic titles	Total of hours			
		Total	Among them		
			Lection	Practice	Individual
SECTION 1. BASICS OF EVIDENCE-BASED MEDICINE. BIOSTATISTICS					
Table of contents section 1. Methodological basis for organising statistical surveys					
1	Basic principles of evidence-based medicine	5	1	2	2
2	Methodological foundations of statistical research. Types of data of data. Methods of collecting statistical material.	5	1	2	2
3	Organisation and planning of statistical research.	5	-	2	3
4	Preparation of statistical research programmes.	4	-	2	2
5	Relative values.	4	-	2	2
6	Graphical methods of analysis.	4	-	2	2
7	Average values and indicators of variation.	4	-	2	2
8	Method of standardisation.	5	-	2	3
9	Assessment of the reliability of the research results. Characterisation and analysis of statistical errors.	4		2	2
10	Parametric methods of probability estimation.	5	-	2	3
11	Non-parametric methods of probability estimation.	5	-	2	3
12	Correlation and regression analysis.	4	-	2	2
13	Time series and their analysis.	4	-	2	2
Content section 2. Methodology of scientific research in healthcare					Content section 2. Metho

					dol ogy of scie ntif ic res ear ch in hea lthc are
14	Epidemiological studies in health care, their classification. Empirical and experimental studies.	6	1	2	3
15	Design of epidemiological studies: case-control, cohort, randomised clinical trials.	5	1	2	2
16	Screening. Methods for assessing the sensitivity and specificity of of screening tests.	5	-	2	3

6 Structure of the discipline

17	Risk factors. Methodology for calculating risk indicators and their assessment	4	-	2	2
18	Overview of modern methods of statistical analysis (variance, multivariate, cluster).	5	-	2	3
19	Information support for epidemiological and clinical studies. Systematic reviews and meta-analyses.	5	1	2	2
20	Medical statistics, its role in the analysis of population health and and healthcare system performance. Electronic document management.	5	1	2	2
21	Databases on public health. Organisation and conduct of statistical research in public health.	5	-	2	3
SECTION 2. ORGANISATION AND CONDUCT OF THE RESEARCH					
Content section 2. Preparing and conducting an independent scientific research					
22	Preparation of a research project. Choosing a research method, determining the relevance of the selected research. Work with literature sources. Thematic review.	6	2	4	2
23	Participation in the preparation of the Concept for the evaluation of research results of scientific activity.	4		2	2
24	Conducting your own research: collecting information and material, work with databases. Application of selected research methods.	4		2	2
25	Evaluation of the research results and formulation of conclusions.	4		2	2
26	Publication of research results. Scientific publication: concept, functions, main types.	6	2	2	2
27	Scientometrics and the scientist's brand. The brand of a scientist. Scientific profile of a scientist. Creating and maintaining digital profiles. Scientometrics. The essence of the h-index.	6	2	2	2
Content section 3. Academic integrity in research activities					Content section 3. Academic integrity in research activities
28	Culture of academic integrity	6	2	2	2
29	Manifestations of academic dishonesty			2	2
30	Ways to prevent academic plagiarism	6	2	2	2
Total hours		**150**	**16**	**62**	**72**

7 Mandatory tasks

1. Biostatistics as a methodological basis for analysing and assessing the health of the population and the healthcare system
health care system.
2. Methodological basis for the organisation of statistical research. Types of data. Methods of collecting statistical material.
3. Organisation and planning of statistical research.
4. Preparation of statistical research programmes.
5. Relative values.
6. Graphical methods of analysis.
7. Average values and indicators of variation.
8. Method of standardisation.
9. Parametric methods of probability estimation.

7 Mandatory tasks

10. Non-parametric methods of probability estimation.
12. Correlation and regression analysis.
13. Series of dynamics and their analysis.
14. Epidemiological studies in health care, their classification. Empirical and experimental studies.
15. Design of epidemiological studies: case-control, cohort, randomised clinical trials.
16. Risk factors. Methods of calculating risk indicators and their evaluation
17. Screening. Methods for assessing the sensitivity and specificity of screening tests.
18. Overview of modern methods of statistical analysis (variance, multivariate, cluster).
19. Information support for epidemiological and clinical studies. Systematic reviews and meta-analysis.
20. Medical statistics, role in the analysis of public health and health care system activities. Electronic document management.
21. Databases on public health. Organisation and conduct of statistical research in public health.
22. Preparation of an independent research project. Choosing a research method, determining the relevance of the selected research. Work with literature sources. Thematic review.
23. Conducting your own research: collecting information, material, working with databases. Application of selected research methods.
24. Evaluation of the research results and drawing conclusions
25. Publication of research results. Scientific publication: concept, functions, main types
26. Scientometrics and the scientist's brand. Scientist's brand. Scientific profile of a scientist. Creating and maintaining digital profiles. Scientometrics. The essence of the h-index.
27. Culture of academic integrity, manifestations of academic dishonesty, ways to prevent academic plagiarism.

8 Selective tasks

1. Pointwise estimation of linear regression parameters using the least squares method.
2. Testing the hypothesis of a linear correlation.
3. Interval estimation of linear regression parameters and regression line.
4. Curvilinear regression models. Checking the adequacy of the linear model.
5. General consideration of curvilinear regression models.
6. Polynomial regression function.
7. Logarithmic regression function.
8. Exponential regression function.
9. Hyperbolic regression function.
10. Series of dynamics. Classification of time series.
11. Series of dynamics. The average level of the time series.
12. Dynamics series. Alignment of a time series by averaging. Exponential levelling.
13. Analysis of expert opinions. Scales of measurement. Ranking of indicators.
14. Analysis of expert opinions. Spearman's correlation coefficient.
15. Theory of mass service.General structure of the service system.
16. Theory of mass service. Simple order flow.

8 Selective tasks

17.The theory of queuing. The law of distribution of the time interval between two consecutive orders of a simple flow.
18.The theory of queuing. Exponential distribution of service time and waiting time in the queue.
19.The theory of queuing. Stationary mode of the service system.
20.Service system with an unlimited queue.
21.Service system with failure.
22.Service system with a limited queue.

9 Ознаки дисципліни

Term of Teaching	Semester	International disciplinary integration	Course (year of study)	Cycles: general training/ vocational training/ free choice
1 semester	V	Yes	3st	Vocational training

10 Grading System and Requirements

General assessment system of the discipline:
The current performance of students is assessed on a 4-point scale (2; 3; 4; 5) at each practical (seminar, laboratory) lesson.
The final control of knowledge in the discipline "Medical and Biological Physics" is carried out in the form of a differentiated test. A differentiated test in the discipline is conducted in the form of a written test with individual options, each of which contains 3 theoretical questions and one task.
Requirements for written work:
The tasks of practical classes must be completed in writing and submitted to the teacher for review for the purpose of their assessment.

11 Conditions for admission to the final control

A condition for student admission to the final control is the absence of missed or uncompleted practical classes, as well as an average current grade of at least 3 points on a 4-point scale \120 points on a 200-point scale.
https://ieu.edu.ua/docs/rate-of-study.pdf

12 Discipline policy

The study of the discipline "Principles of Evidence-Based Medicine and Research Methodology" requires compliance with the rules that ensure effective mastery of the subject, both in theory and in practice, namely
- regular attendance at lectures and practical classes without absences
- the presence of the teacher and students in the classroom in accordance with the schedule and the established time regulations of classes
- the teacher and students attend classes neatly dressed in appropriate clothing, namely a white coat
- full presentation of the course by the teacher in accordance with the programme of the discipline
- students keep lecture notes and notes on practical classes

12 Discipline policy

- the study of the discipline is based on collegiality, cooperation and solidarity of the teacher and students
- discussion of educational issues takes place in the form of a discussion between the teacher and students, and students among themselves
- lectures and practical classes, with the exception of the final control of knowledge, involve independent work of students using information technology and means of processing, storing and transmitting information, including computers, personal gadgets and other electronic devices, as well as textbooks, manuals, methodological developments, etc.
- scientific search and research work of students
- participation in a project, conducting research and writing a scientific publication are part of the mandatory tasks
- writing essays from the list of topics of optional assignments is desirable and mandatory if a student wants to improve his or her grade
- the topics of the discipline are considered in terms of their practical application and bioethical capacity
- the mutual behaviour of the teacher and students, and students among themselves in the classroom and out of class time complies with generally accepted norms and role models of behaviour that provide for mutual respect and collegiality of relationships, and exclude religious, racial, ethnic, cultural, age, gender, social, political and other prejudices and prejudices, as well as bullying, sexual harassment, and other manifestations and forms of intolerance and humiliation of human dignity
- any manifestations of corruption in the educational process, both on the part of the teacher and students, are unacceptable.

13 Policy on absences and late assignments

A student who, for valid reasons, confirmed by documentary evidence, was not subject to current control, has the right to pass the current control within two weeks after returning to study.
A student who was absent from classes without valid reasons, did not participate in current control activities, did not eliminate academic debt, is not allowed to take the final semester control of knowledge in this discipline, and on the day of the exam, the academic staff member assigns a grade of "not admitted" in the examination record.
Retaking the differentiated test in the discipline is assigned subject to the completion of all types of educational, independent (individual) work provided for in the working curriculum of the discipline and is carried out in accordance with the schedule of liquidation of academic debt approved by the directorate.
https://ieu.edu.ua/docs/050.pdf

14 Academic integrity policy

Participants in the educational process are guided by the principles of academic integrity
https://ieu.edu.ua/docs/011.pdf

15 Рекомендовані джерела інформації

Main literature:

1. Biostatistics: a textbook / [Gruzieva TS, Lekhan VM, Ognev VA, et al: Nova Knyha, 2020. 384 p.
2. Zdrowie publiczne / Marian Sygit. - Warszawa: Wolters Kluwer, 2017. 689 p..
3. Public health and behavioural economics / V.O. Kurganska, V.A. Smiyanov, O.I. Smiyanova. // Journal of Social Hygiene and Healthcare Organisation of Ukraine. - 2019. - №2 (80). - C. 33- 39.
4. Vykhrushch VO Methodology and methods of scientific research [Text] : a textbook / VO Vykhrushch, YM Kozlovsky, LI Kovalchuk ; National University "Lviv Polytechnic". - Lviv: Lviv

Polytechnic Publishing House, 2018. - 327 c.
5. Methods and organisation of scientific research: Study guide / S. E. Vazhynskyi, T. I. Shcherbak - Sumy: Sumy State Pedagogical University named after A. S. Makarenko, 2016. 260 p.
6. A Guide to Systems Research [Electronic resource]: Philosophy, Processes and Practice / edited by Mary C. Edson, Pamela Buckle Henning, Shankar Sankaran. - 1st ed. Singapore: Springer Singapore, 2017. - XV, 244 pp.

Additional literature:

1. Biostatistics: textbook / V.F.Moskalenko, O.P.Gulchii, M.V.Holubchykova and others. Edited by. V.F.Moskalenko. -K.: Book Plus, 2009. 184 p.
2. Methods of studying public health: Study guide for students of medical faculties / Agarkov V.I., Buteva L.V., Grishchenko S.V. and others - Donetsk: DonNMU, 2011. 106 p.
3. Healthcare of Ukraine: state, problems, prospects / L.A.Chepelevska, O.R.Sitenko, V.V.Bednyi and others; ed. Lazoryryshynets. - K.: 2014. - 607 p.
4. Health care in Ukraine: organisation and legislative support: monograph / A.I.Kozachenko, V.M.Pashkov, V.P.Lysak and others, under the editorship of V.P.Lysak. Edited by V.P. Lysak, V.M. Pashkov, I.A. Holovanova - K.: MORION, 2014. 335 p.
5. Practical guide to medical statistics: Textbook for medical universities / edited by V.I.Agarkov.- Donetsk: Knowledge, 2011.-276 p.
6. Semygina T.V. Health policy analysis: a textbook / T.M.Semygina.-Kyiv: NaUKMA, 2012.- 479 p.

Additional information resources:

7. Law of Ukraine "On Scientific and Scientific-Technical Activity". Access mode - https://zakon.rada.gov.ua/laws/show/848-19#Text.
8. Laws of Ukraine: "On Medicinal Products", "On Scientific and Scientific-Technical Activities", "On Scientific and Technical Information"; Guidelines "Medicinal Products. Good Clinical Practice". http://www.dec.gov.ua/index.php/ua/responsive/2013-12-12-17-11-38
9. Cochrane Centre for Evidence-based Medicine www.cebm.net
10.Cochrane Library www.cochrane.org
11.US National Library of Medicine - MEDLINE www.ncbi.nlm.nih.gov/PubMed
12.Canadian Centre for Evidence in Health Care www.cche.net
13.Ukrainian database of medical and statistical information "Health for All": http://medstat.gov.ua/ukr/news.html?id=203
14.British Medical Journal www.bmj.com
15.Journal of Evidence-Based Medicine www.evidence-basedmedicine.com
16.http: zakon3.rada.ua/lows
17.http: mozdocs.riev.ua
18.http: euro.who.inf
19.www.moz.gov.ua

16 Tips for successful studying on the course

Attendance at classes

Dialogue with the teacher on all issues of the curriculum Completion of assignments in accordance with the programme

Discussion of topics and assignments in groups outside of class time Use of online resources