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INTERNATIONAL EUROPEAN UNIVERSITY

SYLLABUS

INTERNATIONAL EUROPEAN UNIVERSITY

SCHOOL OF MEDICINE

PRINCIPLES OF EVIDENCE-BASED MEDICINE AND RESEARCH METHODOLOGY

2023

SYLLABUS

Course Name	PRINCIPLES OF EVIDENCE-BASED MEDICINE AND RESEARCH METHODOLOGY
Lecturer (s)	Professor Hanna Moiseieva Associate professor Zoia Sherman
Lecturer's profile	https://medicine.ieu.edu.ua/pro-yemsh/kafedry/ kafedra-fundamentalnykh-dystsyplin
Consultations	
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Form of final control	test	def. test	exam
	☐	☒	☐

SYLLABUS

1 Brief discipline annotation

Subject matter of the academic discipline: to learn the principles of evidence-based medicine, theoretical and methodical foundations of biostatistics, to acquire contemporary knowledge in preparing scientific research in compliance with moral and ethical standards of behavior that establish the culture of academic integrity at higher education institutions.

2 Background for studying discipline

To successfully learn the discipline, students require the knowledge obtained while studying fundamental disciplines. The academic discipline provides the ability to solve complex problems, including research and innovation in medicine. The ability to continue learning with a high degree of autonomy.

3 Goal and objectives of the discipline

The goal of the Principles of evidence-based medicine and research methodology discipline:

- to acquire the necessary knowledge, skills and competencies in basics and modern principles of evidence-based medicine and biostatistics;
- to analyze the main biostatistical indicators and criteria; methodical and theoretical foundations of the formation of statistical aggregates for their further adequate analysis;
- to assess the research findings by individual criteria and in correlation with factors affecting them; to acquire constructive, fundamental thinking and obtain modern knowledge and professional skills in formulating the purpose and objectives of scientific research in medicine, developing the design and plan of scientific research and its implementation in scientific work, to use the acquired skills in the performance of professional duties.

4 Learning outcomes

	Program learning outcomes (PLO)
PLO 1	To have comprehensive knowledge of the structure of professional activities. To be able to carry out professional activities requiring updating and integration of knowledge. To be responsible for professional development, ability to further professional training with a high level of autonomy.
PLO 2	To understand and know fundamental and clinical biomedical sciences at the level sufficient to solve professional tasks in the healthcare sector.
PLO 3	Specialized conceptual knowledge that includes healthcare scientific achievements and is the foundation for research; critical comprehension of medical issues and related interdisciplinary problems.
PLO 20	To analyze the epidemiological state and conduct mass and individual, general and local prevention of infectious diseases.
PLO 21	To find necessary information in professional literature, databases and other sources; to analyze, assess and apply this information.
PLO 22	To apply cutting-edge digital technologies, specialized software and statistical methods of data analysis to solve complicated healthcare problems.
PLO 23	To assess the environmental impact on human health to define the incidence rate of the population.
PLO 25	To render your knowledge, conclusions and arguments about health and related issues to specialists and non-specialists in a clear and unambiguous manner.
PLO 28	To make efficient decisions about healthcare problems, assess the required resources; to take into account social, economic and ethical consequences.

5 ECTS credits

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

6 Course Content

No.	Topics	Amount of hours			
		Total	Including		
			Lectures	Practical classes	Independent work
SECTION 1. FUNDAMENTALS OF EVIDENCE-BASED MEDICINE.					
Content section 1. Methodical foundations of statistical research organization					
1	Basic principles of evidence-based medicine	5	1	2	2
2	Methodical foundations of statistical research organization. Types of data. Methods of collecting statistical material.	5	1	2	2
3	Organization and planning of statistical research.	5	-	2	3
4	Compilation of statistical research programs.	4	-	2	2
5	Relative values.	4	-	2	2
6	Graphical methods of analysis.	4	-	2	2
7	Average values and characteristics of variation.	4	-	2	2
8	Method of standardization.	5	-	2	3
9	Estimation of probability of research findings. Characteristics 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	Series of dynamics and their analysis.	4	-	2	2
Content section 2. Methodology of scientific research in healthcare					
14	Epidemiological studies in healthcare, their classification. Empirical and experimental studies.	6	1	2	3
15	Design of epidemiological studies: case-control, cohort, randomized clinical trials.	5	1	2	2
16	Screening. Methods for assessing the sensitivity and specificity of screening tests.	5	-	2	3
17	Risk factors. Methods of calculation of risk indicators and their evaluation.	4	-	2	2
18	Review of modern methods of statistical analysis (dispersion, multivariate, cluster).	5	-	2	3
19	Information support of epidemiologic and clinical studies. Systematic reviews and meta-analysis.	5	1	2	2
20	Medical statistics, role in analyzing the health of the population and the activities of the healthcare system. Electronic document management.	5	1	2	2
21	Public health databases. Organization and conducting of statistical studies of public health.	5	-	2	3
SECTION 2. ORGANIZATION AND CONDUCTING OF SCIENTIFIC RESEARCH					
Content section 2: Preparing and conducting an independent scientific study					
22	Preparation of the research project. Choosing the research method, determining the relevance of the chosen research. Working with literary sources. Thematic review.	6	2	4	2

7 List of obligayory tasks

1. Biostatistics as a methodological basis for analyzing and assessing public health and the healthcare system.
2. Methodical foundations of statistical research organization. Types of data. Methods of collecting statistical material.
3. Organization and planning of statistical research.
4. Compilation of statistical research programs.
5. Relative values.
6. Graphical methods of analysis.
7. Average values and characteristics of variation.
8. Method of standardization.
9. Parametric methods of probability estimation.
10. Non-parametric methods of probability estimation.
11. Correlation and regression analysis.
12. Series of dynamics and their analysis.
13. Epidemiological studies in healthcare, their classification. Empirical and experimental studies.
14. Design of epidemiological studies: case-control, cohort, randomized clinical trials.
15. Risk factors. Methods of calculation of risk indicators and their evaluation.
16. Screening. Methods for assessing the sensitivity and specificity of screening tests.
17. Review of modern methods of statistical analysis (dispersion, multivariate, cluster).
18. Information support of epidemiologic and clinical studies. Systematic reviews and meta-analysis.
19. Medical statistics, role in analyzing the health of the population and the activities of the healthcare system. Electronic document management.
20. Public health databases. Organization and conducting of statistical studies of public health.
21. Preparation of the research project. Choosing the research method, determining the relevance of the chosen research. Working with literary sources. Thematic review.
22. Conducting one's own research: collecting information, material, working with databases. The use of selected research methods.
23. Evaluation of the obtained research findings and drawing conclusions.
24. Publication of the research findings. Scientific publication: concept, functions, main types.
25. Science metrics and the scientist's brand. The scientist's brand. Scientific profile of a scientist. Creation and maintenance of digital profiles. Science metrics. The essence of the h-index.
26. The culture of academic integrity, manifestations of academic dishonesty, ways to prevent academic plagiarism.

8 List of selective tasks

1. Pointwise estimation of linear regression parameters by the least squares method.
2. Testing the hypothesis of a linear correlation relationship.
3. Interval estimates of linear regression and regression band characteristics.
4. Curvilinear regression models. Testing 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. The average level of the series of dynamics.
11. Series of dynamics. Equalization of time series by averaging. Exponential equalization.
12. Analysis of expert evaluations. Scales of measurement. Ranking of characteristics.

8 List of selective tasks

13. Analysis of expert evaluations. Spearman's correlation coefficient.
14. Theory of mass service. General structure of a service system.
15. Theory of mass service. Simple order flow.
16. Theory of mass service. Distribution law of the time interval between two consecutive orders of a simple flow.

9 Discipline features

Period of teaching	Semester	International disciplinary integration	Year of study	Courses: general training/ professional training/elective
1 semester	5 semester	available	3	Professional training

10 Assessment system and requirements. General system of discipline assessment

General assessment system of the discipline:
Current student performance is assessed according to the 4-point scale (2; 3; 4; 5) during every practical (seminar, laboratory) class.
The final control of knowledge in the Principles of evidence-based medicine and research methodology discipline is conducted in the form of a graded test. The graded test is carried out in the form of a written control work with individual options, each one containing 3 theoretical questions and one task.
Requirements for written work:
Practical class assignments should be in writing and submitted to the lecturer for review for grading.

11 Assessment system and requirements. General system of discipline assessment

Students are allowed to the final control if they do not have missed or undone practical classes and if their average current grade is at least 3 points due to the 4-point scale \ 120 points due to the 200-point scale.
https://ieu.edu.ua/docs/rate-of-study.pdf

12 Admission to final control

The policy of the academic discipline is determined by the requirements that scientific and practical workers make to students in the study of clinical discipline. The condition for a successful educational process is personal compliance of each student of a higher education institution with the rules of behavior adopted both at the university and in society. A future doctor must have a high level of behavioral culture, behave with dignity, tact, and self-control.
The student must be on time for classes and wear academic medical uniform (white coat or surgical suit). The student must adhere to the schedule of the educational process, come to class prepared on the topic of the class. During the class, the student should not leave the classroom without the permission of the teacher; use a cell phone and other means of communication and information without the permission of the teacher, engage in outside activities, distract other students. When writing different types of papers, students must adhere to the rules of academic integrity.
The teacher must adhere to the curriculum, objectively assess the knowledge and skills of students. During the educational process, the teacher must be aware of anti-corruption measures and not engage in corrupt activities.

13 Discipline policy

- the discipline is based on team spirit, cooperation and solidarity of the lecturer and students
- academic issues are discussed in the form of a discussion between the lecturer and students and students among themselves
- holding lectures and practical classes, except for the final control of knowledge, involves independent work of students using information technologies and means of processing, storage and transmission of information, including computers, personal gadgets and other electronic devices, as well as textbooks, guides, methodical materials, etc.
- scientific exploration and research work of students
- study also includes participation in the project, conducting research and writing a scientific publication in the list of obligatory tasks
- writing abstracts on topics given in the list of selective tasks is desired and obligatory if students want to improve their grade
- topics of the academic discipline is considered in terms of their practical application and bioethical capability
- mutual behavior of the lecturer and students and students among themselves in and out of class time complies with generally accepted norms and role models of behavior, stipulating mutual respect and collegial nature of relationships, and excludes religious, racial, ethnic, cultural, age, gender, social, political and other 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 lecturers and students, are unacceptable.

14 Policy of absence and late task performance

Students who miss the current control for valid reasons confirmed by documents have the right to take current control within two weeks after returning to studying.
Students who have missed classes without valid reasons, have not participated in current control activities, have not liquidated academic failure are not admitted to the final semester control of this discipline. In this case, an academic staff member puts a mark ‘non-admission’ in the exam record.
Repeated taking of the exam in the discipline is appointed in case of accomplishing all types of educational, independent (individual) work stipulated by the working program of the academic discipline and is carried out according to the approved schedule of academic failure liquidation.
https://ieu.edu.ua/docs/050.pdf

15 Policy of absence and late task performance

Participants of the educational process rely on the academic integrity principles
https://ieu.edu.ua/docs/011.pdf

15 Recommended sources of information

Primary literature:

1. Biostatistics: textbook / [Hruzieva T.S., Lekhan V.M., Ohniev V.A., et al]; edited by Hruzieva T.S. – Vinnytsia: Nova Knyha, 2020. – 384 p.
2. Zdrowie publiczne / Marian Sygit. – Warszawa: Wolters Kluwer, 2017. – 689 p..
3. Public health and behavioral economics / V.O. Kurganska, V.A. Smiianov, O.I. Smiianova // Bulletin of Social Hygiene and HealthCare Organization of Ukraine. - 2019. – No. 2 (80). - P. 33-39.

15 Recommended sources of information

4. Vykhrushch V.O. Methodology and methods of scientific research [Text]: study guide / V.O. Vykhrushch, Y.M. Kozlovskyi, L.I. Kovalchuk; Lviv Polytechnic National University. - Lviv: Lviv Polytechnic Publishing House, 2018. - 327 p.
5. Methods and organization 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. 2017. — Singapore : Springer Singapore, 2017. — XV, 244 pc.

Additional literature:

1. Biostatistics: Textbook / V.F. Moskalenko, O.P. Hulchii, M.V. Holubchykova, et al. Edited by V.F. Moskalenko. - K.: Knyha Plus, 2009. - 184 p.
2. Methods of studying public health: Study guide for students of medical faculties / Aharkov V.I., Buteva L.V., Hryshchenko S.V., et al. - Donetsk: DonNMU, 2011. - 106 p.
3. Healthcare of Ukraine: condition, problems, prospects / L.A. Chepelevska, O.R. Sytenko, V.V. Bednyi, et al. Edited by Lazoryryshynets. - K.: 2014. - 607 p.
4. Healthcare in Ukraine: organization and legislative support: monograph / A.I. Kozachenko, V.M. Pashkov, V.P. Lysak, et al., edited by V.P. Lysak, V.M. Pashkov, I.A. Holovanova. - K.: MORION, 2014. - 335 p.
5. Practical guide to medical statistics: Study guide for medical universities / edited by V.I. Aharkov. - Donetsk: Knowledge. - 2011. - 276 p.
6. Semyhina T.V. Healthcare Policy Analysis: study guide / T.M. Semyhina. - K.: NaUKMA, 2012. - 479 p.

Additional sources of information:

7. Law of Ukraine On Scientific and Scientific-Technical Activities. Available at: 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 on Medicines. Good Clinical Practice. http://www.dec.gov.ua/index.php/ua/responsive/2013-12-12-17-11-38
9. The Centre for Evidence-Based Medicine: www.cebm.net
10. Cochrane Library: www.cochrane.org
11. US National Medical Library – MEDLINE: www.ncbi.nlm.nih.gov/PubMed
12. Canadian Center for Evidence in Healthcare: www.cche.net
13. Health for All Ukrainian database of medical and statistical information: http://medstat.gov.ua/ukr/news.html?id=203
14. British Medical Journal: www.bmj.com
15. Evidence-Based Medicine Journal: www.evidence-basedmedicine.com
16. http: zakon3.rada.ua/laws
17. http: mozdocs.riev.ua
18. http: euro.who.inf
19. www.moz.gov.ua

16 Tips on successful study during the course

If you want to be successful in this discipline, you need to:

1. Be active, persistent, inquisitive, consistent
2. Be neat and polite
3. Systematically prepare for practical classes
4. Perform tasks for independent work and defend them in class.
5. To be present in the classroom in a medical gown
6. To solve tests and tasks independently, to work actively in class.
7. Prepare presentations and crossword puzzles in the discipline. Participate in student scientific conferences and engage in research work in the department's scientific circles.

I wish you perseverance, dedication and motivation to learn. And then success will come to you! See you in class!

Don't forget your medical gowns!