MINISTRY OF HEALTH OF UKRAINE
DANYLO HALYTSKY LVIV NATIONAL MEDICAL UNIVERSITY

SYLLABUS

for the discipline

" DENTAL ASPECTS OF BIOSTATISTICS "

VB 1.62

preparation of the 4-year students of the second (master`s) level of higher education,

branch of knowledge 22 "Health care",

specialty 221 "Dentistry"

2023

1. General information	
Faculty	Foreign Students
Educational program	22 Healthcare, 221 Dentistry, second (master's) level of higher education
Academic year	2023-2024
Name of discipline, code	Dental aspects of biostatistics ВВ 1.62 https://new.meduniv.lviv.ua/kafedry/kafedra-sotsialnoyi-medytsyny-ekonomiky-ta-organizatsiyi-ohorony-zdorov-ya/
Department	Department of social medicine, economics and organization of health care Address: Zelena, 12 tel. +38 032 276-81-67 e-mail: kaf_socmed@meduniv.lviv.ua
Head of the department	Associate professor Taras Gutor taras_gutor@ukr.net
Year of study	4 year of study
Term	7 or 8 terms
Type of discipline / module	Selective
Teachers	Associate Professor Taras Gutor taras_gutor@ukr.net Associate Professor Oksana Kovalska oksanaromkov@ukr.net Assistant of the department Iryna Hupalo irahup@gmail.com Senior teacher of the department Natalia Timchenko timchenkonataliaf@ukr.net Associate Professor Natalia Zaremba natalyazaremba@gmail.com Assistant of the department Roman Lysyuk socmed_ES@i.ua
Erasmus	no
The person responsible for the syllabus	Assistant of the department Iryna Hupalo
Number of ECTS credits	2 credits
Number of academic hours	60 hours (0 hours of lectures, 30 hours of practical classes, 30 hours of self-guided study of students)
Language of study	English
Information on consultations	Consultations - according to the schedule for the course once a week from 3.30 p.m. till 5.00 p.m.
Address, telephone and regulations of the clinical base, office	Clinical base is not provided

2. Short description to the course

• The educational discipline "Dental aspects of biostatistics" provides in-depth knowledge of the basics of biostatistics, which includes the definition and analysis of important biostatistical indicators and criteria based on the principles of evidence-based medicine and used in the assessment of dental health

3. The purpose and objectives of the course

The purpose of the course "Dental aspects of biostatistics" is to acquire the necessary knowledge, skills and competences related to research, analysis and evaluation of public health indicators, which will allow to develop from the standpoint of evidence-based medicine recommendations for the prevention and elimination of the harmful effects of factors on the dental health of the population.

Learning goals:
• mastering the theoretical foundations of biostatistics;
• familiarization with methods of definition and analysis of basic biostatistical indicators and criteria;

• assimilation of patterns of formation and methods of assessment of population health indicators, including dental, the influence of medical and social, economic, environmental factors, conditions and lifestyle on it;
• mastering the methods of determining, analyzing and evaluating the main indicators of population health according to separate criteria and in relation to the factors affecting it.

Competences and learning outcomes of the discipline:

• *General competences (GC):*

GC-1 – Ability to abstract thinking, analysis and synthesis.

GC-2 – Knowledge and understanding of the subject area and understanding of professional activity.

GC-3 – Ability to apply knowledge in practice.

GC-4 – Ability to communicate in the state language orally and in writing

GC-5 – Ability to communicate in English

GC-6 – Skills in the use of information and communication technologies.

GC-7 – Ability to search, process and analyze information from various sources.

GC-8 – Ability to adapt and act in a new situation.

GC-9 – Ability to identify, pose and solve problems.

GC-10 – Ability to be critical and self-critical.

GC-11 – Ability to work in a team.

GC-12 – The desire to preserve the environment.

GC-13 – Ability to act socially responsibly and consciously.

GC-14 – Ability to exercise their rights and responsibilities as a member of society, to realize the values of civil (free democratic) society and the need for its sustainable development, the rule of law, human and civil rights and freedoms in Ukraine.

GC-15 – Ability to preserve and increase moral, cultural, scientific values and achievements of society based on understanding the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, technology and technology, use different types and forms of physical activity for active recreation and a healthy lifestyle.

• *Special (professional, objective) competences (PC):*

PC-1 – Ability to collect medical information about the patient and analyze clinical data.

PC-2 – Ability to interpret the results of laboratory and instrumental research.

PC-4 – Ability to plan and implement measures for the prevention of diseases of organs and tissues of the oral cavity and maxillofacial area.

PC-5 – Ability to design the process of providing medical care: to determine approaches, plan, types and principles of treatment of diseases of organs and tissues of the oral cavity and maxillofacial area.

PC-10 – Ability to organize and conduct medical and evacuation measures.

PC-12 – Ability to organize and conduct screening examinations in dentistry.

PC-13 – Ability to assess the impact of the environment on the health of the population (individual, family, population).

PC-14 – Ability to maintain regulatory medical records.

PC-15 – Processing of state, social and medical information.

PC-16 – Ability to organize and conduct rehabilitation activities and care for patients with diseases of the oral cavity and maxillofacial area.

PC-17 – Ability to legally support one's own professional activity.

4. Prerequisites of the course

" Dental aspects of biostatistics " as an educational discipline:

- is based on students' study of academic disciplines: history of medicine, medical informatics and computer technologies, ethics, hygiene and ecology, epidemiology, sociology and medical sociology, fundamentals of economic theories;

- contributes to the formation of the preventive direction of activities of future dentists, taking into account the possible impact on the health of the population of factors of various origins, risk assessment in the development of complex medical and social measures in interaction with the public health system;

- contributes to the formation of an economic worldview and basic competence characteristics regarding the methodology of economic analysis of the activity of dental institutions in modern conditions.

5. Program learning outcomes/ results
List of learning outcomes /results

Codes of	Description of the learning outcome	Reference to the

Learning Outcomes			code of the competence matrix of the program learning outcome in the Standard of higher education
Knowledge -1	Specialized conceptual knowledge acquired in the process of study and/or professional activity at the level of the latest achievements, which is the basis for original thinking and innovative activity, in particular in the context of research work		*PR-6, PR-7, PR-12, PR-16*
Knowledge -1	Critical understanding of problems in education and/or professional activity and at the border of subject areas		*PR-12, PR-14, PR-15, PR-20*
Skills -1	Solving complex tasks and problems that requires updating and integrating knowledge, often in conditions of incomplete/insufficient information and conflicting requirements		*PR-15, PR-17, PR-18, PR-19*
Skills -2	Conducting research and/or innovative activities		*PR-12, PR-14, PR-15, PR-20*
Communication -1	Clear and unambiguous presentation of one's own conclusions, as well as the knowledge and explanations that justify them, to specialists and non-specialists, in particular to persons who are studying		*PR-7, PR-14, PR-15, PR-17, PR-18*
Communication -2	Use of foreign languages in professional activities		*PR-15, PR-17, PR-18, PR-19*
Autonomy and responsibility -1	Making decisions in difficult and unpredictable conditions, which requires the application of new approaches and forecasting		*PR-6, PR-7, PR-12, PR-16*
Autonomy and responsibility -2	Responsibility for the development of professional knowledge and practices, assessment of the team's strategic development		*PR-12, PR-14, PR-15, PR-20*

6. Format and scope of the course

Course Format	**full-time**	
Type of academic classes	Number of hours	Number of groups
lectures	**0**	-
practical	**30**	-
seminars	**0**	-
self-study	**30**	-

7. Topics and description of the course

Code of occupation type	Topic	Content of learning	Code of learning outcome	Teacher
P-1	Concept and role of biostatistics in dentistry. The history of its development and significance for practical health care	Definition of the terms "biostatistics", "clinical epidemiology". The main stages of the development of biostatistics. Outstanding scientists and their contribution to the development of biostatistics.	PR-6, PR-7, PR-12, PR-14, PR-15	according to the schedule of groups
P-2	Clinical epidemiology as a science and a subject of its teaching. Implications for health care practice	Classification of epidemiological studies. Comparative characteristics of various types of research, assessment of the degree of evidence of their results. Retrospective and prospective studies. Empirical studies (descriptive and analytical). Descriptive epidemiology	PR-7, PR-14, PR-15, PR-17, PR-18	according to the schedule of groups
P-3	Dynamic series and fundamentals of forecasting	Types of dynamics series. The main indicators of dynamic series analysis. The main methods of processing a dynamic series in order to determine the trend. Dynamic series alignment methods. Forecasting based on extrapolation of dynamics series.	PR-7, PR-14, PR-15, PR-17, PR-18	according to the schedule of groups
P-4	Survival analysis. Lethality	The concept of univariate and multivariate analysis. Patient survival	PR-7,	according to the schedule

		analysis (Kaplan-Meier method). Concept of cluster analysis	PR-14, PR-15, PR-17, PR-18	of groups
P-5	Methods of conducting sociological research in dental practice	Methods of collecting statistical material. Types of questionnaires, their characteristics. Marketing and sociological surveys, types of questions in questionnaires, problems of organizing surveys in health care	PR-7, PR-14, PR-15, PR-17, PR-18	according to the schedule of groups
P-6	Effectiveness of diagnostic tests	Screening. Assessment of screening results. Requirements for screening tests. Sensitivity and specificity of the screening test. Relationship between sensitivity and specificity. Accuracy, PPV, NPV	PR-7, PR-14, PR-15, PR-17, PR-18	according to the schedule of groups
P-7	Grouping values in the table. Graphic representation of statistical data	Types of diagrams, rules for their construction, correctness of use. Modern methods of graphic representation, infographics, diagram animation, interactive diagrams	PR-7, PR-14, PR-15, PR-18	according to the schedule of groups
P-8	Power analysis	The concept of univariate and multivariate analysis. Patient survival analysis (Kaplan-Meier method). Concept of cluster analysis	PR-6, PR-7, PR-12, PR-14, PR-15	according to the schedule of groups
P-9	Types of errors in clinical research	Typical mistakes at the stages of conducting research. Random and systematic error.	PR-16, PR-17, PR-18, PR-19, PR-20	according to the schedule of groups
P-10	Statistical research design	The essence and stages of the scientific research process. Research design when preparing a research program. Classification of design types in sociological research	PR-7, PR-14, PR-15, PR-18	according to the schedule of groups
IWS-1	Analysis of the general theoretical and methodological foundations of the formation and development of biostatistics as an independent science	Medical information: its components, problems of information search. Databases of literature, medical libraries. Generalization of clinical research results. Analytical reviews.	PR-6, PR-7, PR-12, PR-14, PR-15	according to the schedule of groups
IWS-2	Processing of medical information. Use of standard procedures, including modern computer information technologies, for processing medical information.	Program for the development and compilation of statistical material. Data entry from medical documentation, processing of medical and social information using standard procedures, including modern computer information resources.	PR-7, PR-14, PR-15, PR-18	according to the schedule of groups
IWS-3	Sources of statistical information in the work of a dentist.	Study of sources of statistical information. Methodological foundations, forms and methods of data collection.	PR-6, PR-7, PR-12, PR-14, PR-15	according to the schedule of groups
IWS-4	Methods of statistical research by time and degree of coverage.	Accuracy of observations. Types, stages, research design, methods of sampling, methods of calculating the volume of samples	PR-7, PR-14, PR-15,	according to the schedule of groups

			PR-17, PR-18	
IWS-5	Average values in the activity of a dentist, their types, practical significance, calculation methods	Average values: their types, methods of calculation, features of use. The concept of variation, its meaning. The rule of "three sigma", its practical use	PR-16, PR-17, PR-18, PR-19, PR-20	according to the schedule of groups
IWS-6	Method of standardization. The essence, meaning and application of the method in dental practice	Types of standardization methods: direct, indirect, reverse. Characteristics of the stages of the standardization method. Selection and calculation of the standard. Calculation of expected numbers. Calculation of standardized indicators.	PR-7, PR-14, PR-15, PR-17, PR-18	according to the schedule of groups
IWS-7	The main methods of processing a dynamic series in order to determine the trend of dental morbidity	Types of dynamics series. The main indicators of dynamic series analysis. The main methods of processing a dynamic series in order to determine the trend. Dynamic series alignment methods. Forecasting based on extrapolation of dynamics series.	PR-6, PR-7, PR-12, PR-14, PR-15	according to the schedule of groups
IWS-8	Estimation of the probability of difference.	Hypotheses null, alternative, errors of relative and average value.	PR-7, PR-14, PR-15, PR-17, PR-18	according to the schedule of groups
IWS-9	Student's criterion, calculation method, its evaluation, typical errors of use	Calculation and interpretation for n>30 and n<30, Student's tables	PR-16, PR-17, PR-18, PR-19, PR-20	according to the schedule of groups
IWS-10	Correlation-regression analysis of the relationships between factors and outcome measures in dental research	Studying the relationship between quantitative variables. The concept of functional and correlational connection. Strength and direction of communication. Types of correlation coefficients. Pearson's linear correlation coefficient, its evaluation, characteristics. Spearman's rank correlation coefficient.	PR-7, PR-14, PR-15, PR-17, PR-18	according to the schedule of groups

8. Verification of learning outcomes

Current control

is carried out during academic classes and aims to check the knowledge of learning material by students. Forms of assessment of current educational activities include control of theoretical and practical skills. The final grade for the current academic activity is based on a 4-point (national) scale

Code of learning outcome	Code of occupation type	Method of verifying learning outcomes / results	Evaluation criteria
AR-1, AR-2	*P-1-10*	Checking of a written task for extracurricular self-preparation for practical lesson	passed / not passed
AR-1, AR-2,	*IWS-1-10*	Checking of a written task for self-study	passed / not passed
Kn-1, Kn-2, S-1, S-2, C-1, C-2	*P-1-10, IWS-1-10*	Oral survey at a practical lesson on the topic of practical lesson and independent work	"2" - <60% of correct answers; "3" - 60-69%, "4" - 70-89%, "5" - 90-100%.
Kn-1, Kn-2,	*P-1-10,*	Test control at a distance	"2" - <70% of correct

S-1, S-2, C-1, C-2	*IWS-1-10*	practical lesson	answers; "3" - 70-79%, "4" - 80-89%, "5" - 90-100%.
Kn-1, Kn-2, S-1, S-2, C-1, C-2	*P-1-10, IWS-1-10*	Demonstration of the practical skill of calculating indicators	"2" - <60% of correct answers; "3" - 60-69%, "4" - 70-89%, "5" - 90-100%.
Kn-1, Kn-2, S-1, S-2, C-1, C-2	*P-1-10, IWS-1-10*	Demonstration of practical skills to evaluate and analyze research results	"2" - <60% of correct answers; "3" - 60-69%, "4" - 70-89%, "5" - 90-100%.

Final control		
General evaluation system	Academic performance during the semester - 100% on a 200-point scale	
Rating scales	Traditional 4-point scale, multi-point (200-point) scale, ECTS rating scale	
Conditions of admission to the final control	The student attended all practical (laboratory, seminar) classes and received at least 120 points for classroom academic performance	
Type of final control	Methods of final control	Criteria of Evaluation
Credit	Students have to pass all topics by the thematic schedule. Grades by the 4-point scale are converted into points on a multi-point (200-point) scale in accordance with the Regulation "Criteria, rules and procedures for evaluating the results of student academic performance"	*The maximum number of points is 200. The minimum number of points is 120*

The maximum number of points that a student can score for the current academic performance to pass a credit is 200 points.

The minimum number of points that a student has to score for the current academic performance to receive credit is 120 points.

The calculation of the number of points is based on the grades received by the student by a 4-point (national) scale during the course of the discipline, by calculating the arithmetic mean (A), rounded to two decimal places. The resulting value is converted into points on a multi-point scale as follows:

$$x = \frac{A \times 200}{5}$$

9. Course policy

During the course, teachers promote a policy of academic integrity.

10. Literature

Basic
1. Gruzheva T.S., Lekhan V.M., Ognev V.A., Galienko L.I., Kryachkova L.V., Palamar B.I., Grechishkina N.V., Litvynova L.O., Gutor T.G. [etc.]. Biostatistics: assistant. for the training of specialists of the second (master's) level of higher education / edited by Prof. T.S. Gruzeva. Vinnytsia: New book, 2020. 384 p.
2. Workshop for preparation for practical classes in the academic discipline "Public Health". Lviv, 2020.
3. Public health: textbook for students. higher med. education institutions Vinnytsia: "New book", ed. 3. 2013. 560 p.
4. Jekel's Epidemiology, Biostatistics, Preventive Medicine, and Public Health: With Student Consult. Joann G. Elmore, Dorothea Wild, Heidi D. Nelson, David L. Katz. Elsevier; 5th edition. 2020. 464 p.
5. Oxford Textbook of Global Public Health, 6th edition. / Edited by Rogers Detels, Martin Gulliford, Quarraisha Abdool Karim and Chorh Chuan Tan. Oxford University Press, 2018. 1728 p.
Additional
1. Gruzheva T.S., Lekhan V.M., Ognev V.A., Galienko L.I., Kryachkova L.V., Palamar B.I., Grechishkina N.V., Litvynova L.O., Gutor T.G. [etc.]. Biostatistics: assistant. for the training of specialists of the second (master's) level of higher education / edited by Prof. T.S. Gruzeva. Vinnytsia: New book, 2020. 384 p.
2. Workshop for preparation for practical classes in the academic discipline "Public Health". Lviv, 2020.
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5. Oxford Textbook of Global Public Health, 6th edition. / Edited by Rogers Detels, Martin Gulliford, Quarraisha Abdool Karim and Chorh Chuan Tan. Oxford University Press, 2018. 1728 p.

11. Equipment, logistics and software of the discipline / course

• Curriculum, thematic and calendar plans of practical classes and independent extracurricular work
• Educational and methodological developments on the topic of the lesson (theoretical presentation of the topic of the lesson, control questions, situational tasks for independent work and a list of recommended literature)
• Educational textbooks and manuals from the library
• Computer and multimedia projector

12. Additional information

All the necessary information for the educational process –thematic schedules of classes and extra classes, lecture materials, guidelines for practical classes, independent work of students, test control of knowledge is available in Misa: http://misa.meduniv.lviv.ua/course/view.php?id=4364

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