Syllabus

Departments: "Medical Biophysics and Information Technologies",
"Social health insurance and public health"
Work program of the subject "Introduction to scientific research"
Educational program 6B10115 "Medicine"

1.	General information about the subject		
1.1	Subject codes: ISR 2212	1.6	Academic year: 2024-2025
1.2	Subject name: Introduction to scientific research	1.7	Year: 2
1.3	Prerequisites: ICT, introduction to specialty	1.8	Semester: 4
1.4	Postrequisites: Hygiene and Epidemiology, Mandatory Social Health Insurance and Medical Law	1.9	Number of credits (ECTS): 6
1.5	Cycle: BD	1.10	Component: UC

2.	Subject description
Integrated Discipline: study of public health policies in the Republic of Kazakhstan. Examination of international and national healthcare structures, the role, and responsibility of the healthcare system in addressing issues of medical care delivery to the population. Application of healthcare regulatory acts in practical activities. Development of practical skills in using methods of descriptive statistics and hypothesis testing theory in biomedical research, as well as processing statistical data using specialized software.	

3.	Summative assessment form		
3.1	Testing (MCQs) ✅	3.5	Coursework
3.2	Writing	3.6	Essay
3.3	Oral	3.7	Project
3.4	OSPE (objective structured practical exam) ✅	3.8	Other (specify)

4.	Subject objectives
Formation of theoretical knowledge in biostatistics and public health – strategies and policies, medical ethics, and ethics of scientific research. Development of skills in applying basic ethical principles in professional activities, fundamentals of medical legislation, methods of statistical processing of medical data, working with application software, as well as skills in scientific analysis, critical thinking, and their practical application.	

5.	Subject learning outcomes	
LO1.	Demonstrates knowledge of organization, planning, and management in public health, applying rules for organizing international cooperation in healthcare and methods of biostatistics.	
LO2.	Applies knowledge of the fundamentals of scientific research for formulating hypotheses, setting research goals and objectives, selecting research methods, and conducting information searches to prepare a literature review.	
LO3.	Selects the most appropriate statistical procedures for describing medical research data.	
LO4.	Uses statistical methods, including the STATISTICA software package, to describe medical data on morbidity, disability, and mortality, considering demographic and population health indicators.	
LO5.	Integrates knowledge of deontological principles with medical legislation, effectively applying the principles of ethics in relationships between patients and healthcare professionals.	
5.1	Subject LO	The subject learning outcomes linked with educational program learning outcomes
	LO 1 LO 4	LO 1. Applies in practice fundamental knowledge in the field of biomedical, clinical, epidemiological and socio-behavioral sciences.
	LO 5	LO 3. Carries out its activities within the framework of the legislation of the Republic of Kazakhstan in the field of healthcare to ensure high-quality medical care.
	LO 3	LO 7. Complies with the norms of public health protection, sanitary and hygienic regime and labor safety standards in healthcare organizations, epidemiological safety of the environment.
	LO 2	LO 9. It works in the electronic databases of the healthcare system of the Republic of

		Kazakhstan, providing documentation of the processes of providing medical services.
6.	**Detailed about subjects**	
6.1	**Biostatistics** Venue: South Kazakhstan Medical Academy, main building, Department of Medical Biophysics and Information Technologies. Al-Farabi Square - 1, 5th floor, rooms No. 500-511. Phone 39-57-57, add 1063. **Public health** Venue: South Kazakhstan Medical Academy, 4th building, Department of Social Health Insurance and Public Health. Al-Farabi Square - 3b, 2nd floor, rooms No. 1-9. Phone 121, 122.	

6.2

Number of hours	Lectures	Practical classes	SIWT	SIW
Biostatistics	6	24	9	51
Public health	6	24	9	51

6.3 Subject study plan

#	Week / day	Classroom lessons				Subject name
		Lectures	Pract. classes	SIWT	SIW	
1	1st day 1st week	1	3	1	6	Biostatistics
2	2nd day 1st week	1	3	1	6	Biostatistics
3	3rd day 1st week	1	3	1	6	Biostatistics
4	4th day 1st week	1	3	1	6	Biostatistics
5	5th day 1st week	1	3	1	6	Biostatistics
6	6th day 2nd week	1	3	1	7	Biostatistics
7	7th day 2nd week	-	3	2	7	Biostatistics
8	8th day 2nd week	-	3	1	7	Biostatistics
9	9th day 2nd week	1	3	1	6	Public health
10	10th day 2nd week	1	3	1	6	Public health
11	11th day 3rd week	1	3	1	6	Public health
12	12th day 3rd week	1	3	1	6	Public health
13	13th day 3rd week	1	3	1	6	Public health
14	14th day 3rd week	1	3	1	7	Public health
15	15th day 3rd week	-	3	2	7	Public health
16	16th day 4th week	-	3	1	7	Public health

7. Information about teachers

№	Full name	Degrees, Position	Email
	Department "Medical Biophysics and Information Technologies"		
1.	Ivanova Marina Borisovna	PhD, Professor	marina-iv@mail.ru
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3.	Berdieva Meruert Aimambetovna	PhD	meruert_berdieva@mail.ru
4.	Maulenova Akmaral Aitbekovna	Master degree, Senior teacher	maral_tasken@mail.ru
5.	Imanbaeva Maral Amanbaevna	Maste degree r, Senior teacher	maral_81_19@mail.ru
	Department "Social Medical Insurance and Public Health"		
1.	Magay Luybov Nikolaevna	Senior teacher, master degree	magai_luybov@mail.ru
2.	Kudyarova Saltanat Abatovna	teacher, master degree	salta.deva@mail.ru
3.	Aidar Aliya	teacher, master degree	turaidar_aa@mail.ru

8. Thematic plan

Day	Topic	Brief content	Subject LO	Number of hours	Forms/ Methods/ Technologies of learning	Forms/ Methods of assessment
1.	**Lecture** Introduction to biostatistics. Stages of statistical research.	Introduction to biostatistics. Definition of biostatistics. The role of biostatistics in medicine. Stages of statistical research.	LO 1	1	Lecture-information / Presentation	Feedback (quick questioning)

		Research program and plan. Data collection. Data processing. Analysis, conclusions, suggestions.				
	Practical class Introduction to biostatistics.	Basic concepts and definitions. Types of statistical data. Basic types of measuring scales. Stages of statistical research.	LO 1 LO 3	3	Practice	Oral questioning. Practical work. (assessment using a checklist).
	SIWT/SIW Consultation on the implementation of an individual task 1 / History of the development of biostatistics / *Organizing project groups, selection project topics, discussing PjBL methodological recommendations, organizing a Trello workspace*	Stages of the formation of science. Famous scientists in the field of biostatistics.	LO 1	1/5	Individual task 1 *PjBL Round table, brainstorming*	Logical flowchart (assessment using a checklist)
2.	**Lecture** Descriptive statistics.	Introduction to descriptive statistics. Frequency distribution. Histograms. **"**Stem and leaf". Measures of central tendency and dispersion. Data visualization. "Box and Whiskers".	LO 1	1	Lecture-information / Presentation	Feedback (quick questioning)
	Practical class Frequency distribution.	Frequency distribution and its numerical characteristics. Graphical representation of frequency distribution. Introduction to the STATISTICA program (the "Descriptive statistics" procedure)	LO 1 LO 3	3	Computer-based work / Solving situational tasks.	Oral questioning. Practical work. (assessment using a checklist).
	SIWT/SIW Consultation on the implementation of an individual task 2 / Creating an interval frequency distribution / *Stage 1. Goal setting. Definition (specification) of the problem, setting goals, objectives, hypotheses, choosing a project product*	Calculation of the number of intervals, their width and limits. Sorting data. Frequency analysis.	LO 4	1/5	Individual task 2 *PjBL "Round table", brainstorming, SWOT-analysis*	Solving problems (assessment using a checklist) *Monitoring project progress on a Trello*
3.	**Lecture**	The specifics of the occurrence of	LO 1	1	Lecture-	Feedback

	Normal distribution. Basics of the theory of statistical hypothesis testing. Goodness-of-fit tests.	normal distribution in the context of biology and medicine. Properties of normal distribution. Key concepts and definitions of the theory of statistical hypothesis testing. Procedure for testing statistical hypotheses. Types of errors in hypothesis testing. Pearson's goodness-of-fit test. Kolmogorov-Smirnov's goodness-of-fit test.			information / Presentation	(quick questioning)
	Practical class Basics of the theory of statistical hypothesis testing. Goodness-of-fit tests.	Hypothesis testing of the normal distribution of a sample. Pearson's goodness-of-fit test. Kolmogorov-Smirnov's goodness-of-fit test. Hypothesis testing of the normal distribution of a sample in the STATISTICA program.	LO 1 LO 3 LO 4	3	Computer-based work / Solving situational tasks.	Oral questioning. Practical work. (assessment using a checklist).
	SIWT/SIW Acceptance of SIW1 /Consultation on the implementation of an individual task 3 / Calculation of numerical characteristics of an interval frequency distribution, its graphical representation. / *Stage 2. Planning. Planning the implementation of the project, describing the required product that satisfies the set goals, searching for means of implementing the project*	Calculation of numerical characteristics of an interval frequency distribution (mean, variance, standard deviation, range, coefficient of variation), its graphical representation (polygon, histogram, box plot, stem-and-leaf plot).	LO 4	1/5	Individual task 3 *PjBL Brainstorming, responsibility distribution matrix, Gantt chart, "road map"*	Solving problems (assessment using a checklist) *Monitoring project progress on a Trello*
4.	**Lecture** Parametric methods of comparative statistics	Difference between parametric and nonparametric statistical tests. Fisher test. Two-sample t-test. Paired Student's t test. One sample t-test. One-way analysis of variance.	LO 1	1	Lecture-information / Presentation	Feedback (quick questioning)
	Practical class Parametric methods of comparative statistics	Fisher's F-test (comparison of two sample variances). Hypothesis testing for the equality of two means using the t-test for independent samples. One-sample t-test. Hypothesis testing for the equality of two means using the t-test for dependent samples. Implementation of the t-test in the STATISTICA program.	LO 1 LO 3 LO 4	3	Computer-based work / Solving situational tasks.	Oral questioning. Practical work. (assessment using a checklist).

	SIWT/SIW Acceptance of SIW 2 / Consultation on the implementation of an individual task 4 / Goodness-of-fit tests / *Stage 3. Project implementation. Working with information sources*	Hypothesis testing of the normal distribution of a sample. Pearson's goodness-of-fit test. Kolmogorov-Smirnov's goodness-of-fit test.	LO 1 LO 3 LO 4	1/5	Individual task 4 *PjBL Excursion to the library-information center. Literature review, individual and group consultations*	Solving problems (assessment using a checklist) *Monitoring project progress on a Trello*
5	**Lecture** Nonparametric methods of comparative statistics	Advantages and disadvantages of nonparametric tests. Mann-Whitney test. Wilcoxon test. Kruskal-Wallis test.	LO 1	1	Lecture-information / Presentation	Feedback (quick questioning)
	Practical class Nonparametric methods of comparative statistics	Mann-Whitney test. Wilcoxon test. Implementation of nonparametric tests in the STATISTICA program.	LO 1 LO 3 LO 4	3	Computer-based work / Solving situational tasks.	Oral questioning. Practical work. (assessment using a checklist).
	SIWT/SIW Consultation on the implementation of an individual task 5 / Testing the hypothesis of equality of two means using Student's t-test for paired samples./ *Stage 3. Project implementation. Development of questionnaires, survey, primary analysis of the obtained data*	Testing the hypothesis of equality of two means using Student's t-test for paired samples. Implementation of Student's t-test in the STATISTICA software.	LO 1 LO 3 LO 4	1/5	Individual task 5 *PjBL Computer practical work with Google Forms, MS Excel*	Solving problems (assessment using a checklist) *Monitoring project progress on a Trello*
6.	**Lecture** Analysis of qualitative variables.	Definition of qualitative variables. Importance of analyzing qualitative variables in medical research. Types of qualitative variables (binary, nominal, ordinal). Construction of contingency tables of size 2x2 and size r x s. Pearson's chi-square test. Fisher's exact test. McNemar's chi-square test.	LO 1	1	Lecture-information / Presentation	Feedback (quick questioning)
	Practical class	2x2 contingency tables. Pearson's	LO 1	3	Computer-	Oral

	Analysis of qualitative variables.	chi-square test (2x2). Yates' correction. Fisher's exact test. McNemar's chi-square test. Contingency tables of size mxn. Pearson's chi-square test (r x s). Construction of contingency tables and implementation of chi-square tests in the STATISTICA program.	LO 3 LO 4		based work / Solving situational tasks.	questioning. Practical work. (assessment using a checklist).
	SIWT/SIW Consultation on the implementation of an individual task 6/ One-way analysis of variance (ANOVA). /*Stage 3. Project implementation. Statistical analysis of the obtained data*	One-way analysis of variance (ANOVA). Conditions for application. Implementation of ANOVA in the STATISTICA program.	LO 1 LO 3 LO 4	1/5	Individual task 6 *PjBL Computer practical work with MS Excel, Statistica 12*	Solving problems (assessment using a checklist) *Monitoring project progress on a Trello*
7.	**Practical class** Correlation analysis.	Introduction to correlation analysis. Pearson correlation coefficient. Interpretation of the correlation coefficient. Assessment of the significance of the correlation coefficient. Spearman's rank correlation coefficient. Implementation of correlation analysis in the STATISTICA program.	LO 1 LO 3 LO 4	3	Computer-based work / Solving situational tasks.	Oral questioning. Practical work. (assessment using a checklist).
	SIWT/SIW Consultation on the implementation of an individual task 6/ One-way analysis of variance (ANOVA). / *Stage 3. Project implementation. Statistical analysis of the obtained data*	Application scheme. Kruskal-Wallis test.	LO 1 LO 3 LO 4	2/6	Individual task 6 *PjBL Computer practical work with Google Docs, Canva*	Solving problems (assessment using a checklist) *Monitoring project progress on a Trello*
	Midterm control 1	Assessment of students' knowledge and skills based on the material covered in lectures, practical classes, and SIWT for topics 1–6.			Computer testing, MCQs	100-point scale assessment
8.	**Practical class** Regression analysis.	Estimation of linear regression parameters using the least squares method. Hypothesis testing for the significance of regression coefficients. Hypothesis testing for the significance of regression equation. Coefficient of determination. Implementation of regression analysis in the	LO 1 LO 3 LO 4	3	Computer-based work / Solving situational tasks.	Oral questioning. Practical work. (assessment using a checklist).

		STATISTICA program.				
	SIWT/SIW Acceptance of SIW 3/ Consultation on the completion of individual assignment 7 / Summarizing the material using logical flowchart. / *Stage 4. Project presentation*	Odds ratio and relative risk.	LO 3	1/6	Individual task 7 *PjBL "Round table", public presentation*	Logical flowchart (assessment using a checklist) *Assessment according to checklist*
9.	**Lecture.** Public health and healthcare as a science. Introduction to scientific research.	The main task of public health and healthcare. Modern problems of population health in the countries of the world.The concept of the term "Science" and its classification. Defining the purpose of science in cognition "Public health and healthcare".	LO2	1	Introductory	Feedback questions
	Practical class Healthcare systems in Kazakhstan. Internati-onal cooperation in healthcare.	Health care in Kazakhstan. Structure of the health care system. Code of the Republic of Kazakhstan. On the health of the people and the health care system	LO3	3	Training cases, question and answer	Assessment using a check list
	SIW/SIWT Priority areas of public health protection.	Priorities in health care. The strategy "Kazakhstan-2050".	LO5	1/5	Report, presentation, preparation of test tasks	Evaluation criteria for SIW/SIWT
10.	**Lecture** Modern problems of demography in the Republic of Kazakhstan.	Demographic situation in Kazakhstan. Factors affecting demographic indicators. Population construction.	LO1 LO5	1	Thematic	Feedback questions
	Practical class Methodology of calcu-lation and analysis of medical and demogra-phic indicators.	Indicators of natural population movement. Special demographic indicators.	LO4	3	Training cases, case-study	Assessment interview using a checklist
	SIWT/SIW Demographic development of Kazakhstan.	Demographic security of Kazakhstan. Socio-demographic problems in Kazakhstan. Statistical processing of data.	LO1 LO3	1/5	Report, presentation, quizzes and tests	Evaluation criteria for SIW/SIWT
11.	**Lecture** Population health, morbidity and methods of their study.	Indicators of morbidity. Methods of studying morbidity. Health index.	LO4	1	Overview	Feedback questions
	Practical class Modern medical and social problems, health promotion issues.	Disease prevention. Dispenserisation. Screening.	LO5	3	Educ ational cases, case-study	Assessment using a check list

	SIWT/SIW Current trends in morbidity of the population of Kazakhstan.	Current state of morbidity. The main causes of diseases.	LO4	1/5	Report, presentation, preparation of test tasks	Evaluation criteria for SIW/SIWT
12	**Lecture** Disability and its types.	Types of disability. Features ofdifferent types of disability.	LO2	1	Overview	Feedback questions
	Practical class Organisation and conduct of medical and social expertise (MSE).	Composition of the medical and social commission. Rules for conducting the medical and labour expert commission (VTEK). The rules of organisation of MSE and its stages.	LO1 LO5	3	Training cases, case-study	Assessment interview using a checklist
	SIWT/SIW Socially significant diseases and their control	Classification of *socially* significant diseases. Combating socially significant diseases.	LO2	1/5	Report, presentation, quizzes and tests	Evaluation criteria for SIWT/SIW
13.	**Lecture.** Organization of medical care for the population.	Types of medical activities. Levels of medical care. Forms of medical care.	LO1	1	Overview	Feedback questions
	Practical class Medical care and its types.	Types of medical care. Forms of medical care. Organization of specialized medical care.	LO5	3	Educational cases, case study	Assessment using a check list
	SIW/SIWT Medical and social aspects of a healthy lifestyle.	Models of a healthy lifestyle: medical, educational, radical political models.	LO1	1/5	Report, presentation, preparation of test tasks	Evaluation criteria for SIW/SIWT
14.	**Lecture.** Ethics. Medical and ethical aspects of health and disease.	Ethics - goals, objectives and types. Medical and ethical aspects of health. Medical and ethical aspects of the disease.	LO5	1	Thematic	Feedback questions
	Practical class Medical secrecy.	Definitions of the concept of "medical secrecy". Objects of medical secrecy.	LO5	3	Training cases	Assessment using a check list
	SIW/SIWT Ethical aspects of immunoprophylaxis of diseases.	Ethics of planning and conducting research in the field of vaccine prevention. The ethics of vaccination.	LO3	1/5	Report, presentation, preparation of test tasks	Evaluation criteria for SIW/SIWT
15.	**Practical class** The universality of the ethical norm and the uniqueness of moral choice.	The principle of justice. The concept of universality of the ethical norm. Moral choice and morality. The uniqueness of moral choice in medicine.	LO5	3	Educ ational cases, case-study	Assessment using a check list
	SIWT/SIW Confidentiality and communication with the patient's relatives.	The principle of confidentiality. Basic communication skills. The principle of the patient-centered approach. Iatrogeny and the principle of confidentiality.	LO5	2/6	Report, presentation, preparation of test tasks	Evaluation criteria for SIW/SIWT
	Acceptance of the boundary control 2	Assessment of students' knowledge and skills based on the materials of			Testing	Assessment according to

		lectures, practical exercises and slings of 9-15 topics.				the checklist
16.	**Practical task** Ethical regulations.	The rights and obligations of medical workers and patients. The Helsinki Declaration, the Nuremberg Code, the Geneva Convention, etc.	LO5	3	Educ ational cases, case-study	Assessment using a check list
	SIW/SIWT Moral, legal and organizational aspects of transplantation.	Transplantation: history and modernity. Moral problems of transplantation. Legal models of organ harvesting from cadaveric donors. The legal basis of transplantation of human organs and tissues in the Republic of Kazakhstan.	LO1 LO5	1/6	Report, presentation, preparation of test tasks	Evaluation criteria for SIW/SIWT
Exam preparation and conducting				18		

9.	**Teaching methods and controls forms**	
9.1	Lectures	**Biostatistics** Lecture-information / Presentation / Quick survey **Public health** Introductory. Overview. Thematic. Problematic.
9.2	Practical classes	**Biostatistics** Computer-based work / Solving situational tasks / Oral questioning. Practical work. (assessment using a checklist). **Public health** Training cases, TBL case-study, question-and-answer, Assessment interview using a checklist
9.3	SIWT/SIW	**Biostatistics** Individual task / Logic flowchart. Solving problems (assessment using a checklist) *Project-Based learning* *- "Round table", brainstorming, SWOT-analysis, responsibility distribution matrix, Gantt chart, "road map", excursion to the library-information center. Literature review, individual and group consultations;* *- Monitoring project progress on a Trello;* *- Computer practical work;* *- Public presentation (assessment according to checklist)* **Public health** Report, presentation, test preparation, Evaluation Criteria for SIWT/SIW
9.4	Midterm control	**Midterm control 1 - Biostatistics** Computer testing, MCQs (100-point scale assessment) **Midterm control 1 - Public health** testing
10.	**Evaluation Criteria**	
10.1.	**Criteria for evaluating module learning outcomes**	

LO	Name of learning outcomes	Unsatisfactory	Satisfactory	Good	Excellent
1	Demonstrates knowledge of the organization, planning and management in public health,	1) it is difficult to define basic terms; 2) does not formulate management principles; 3) can't tell the types	1) can define basic terms; 2) formulates the principles of management; 3) can't tell the types	1) formulates the basic terminology; 2) formulates the principles of management; 3) can tell the types	1) formulates the basic terminology; 2) formulates the principles of management; 3) can tell the types

	applying the rules of the organization of international cooperation in the field of health and biostatistics methods.	of planning; 4) does not formulate some methods of visual representation of data;	of planning; 4) does not formulate some methods of visual representation of data; 5) does not formulate the basic principles of working with the ASP “STATISTICA”	of planning; 4) does not formulate some methods of visual representation of data; 5) formulates the main methods of comparative statistics and communication assessment; 6) does not formulate the basic principles of working with the ASP «STATISTICA»	of planning; 4) formulates some methods of visual representation of data; 5) formulates the main methods of comparative statistics and communication assessment; 6) formulates the basic principles of working with the ASP «STATISTICA»
2	Operates with knowledge of the basics of scientific research to formulate a hypothesis, set goals and objectives of research, choosing methods of scientific research and searching for information to compile a literary review.	1) does not formulate a research hypothesis; 2) does not know how to search for information to compile a literary review; 3) does not know how to formulate the basic requirements for the formulation of a scientific research hypothesis;	1) is able to search for information to compile a literary review; 2) does not know how to formulate a research hypothesis; 3) does not formulate the types of research; 4) it is difficult to answer about the basic requirements for the formulation of a scientific research hypothesis.	1) interprets what scientific research methods exist; 2) explains the main stages of scientific research; 3) formulates a scientific research hypothesis; 4) does not know how to use traditional library catalogs and databases, as well as perform online searches.	1) is able to search for information to compile a literary review; 2) formulates hypotheses by choosing methods of scientific research; 3) formulates the basic requirements for the formulation of a scientific research hypothesis; 4) can competently use traditional library catalogs and databases without logical conflicts and speech errors.
3	Selects the most appropriate statistical procedures for describing medical research data.	1) makes mistakes when choosing statistical indicators and parameters to describe statistical aggregates; 2) makes mistakes when choosing methods for visual representation of data; 3) it is difficult to choose the necessary method to solve a specific problem;	1) selects some statistical indicators and parameters to describe statistical aggregates; 2) defines some methods of visual representation of data; 3) does not classify parametric and nonparametric methods for estimating the relationship between variables	1) selects the main statistical indicators and parameters for describing statistical aggregates; 2) defines the main methods of visual representation of data; 3) formulates an algorithm for choosing the necessary method to solve a specific problem; 4) Classifies parametric and nonparametric methods of	1) selects all the necessary statistical indicators and parameters to describe statistical aggregates; 2) defines various methods of visual representation of data; 3) formulates an algorithm for choosing the necessary method to solve a specific problem; 4) Classifies parametric and nonparametric methods of

				comparative statistics; 5) does not classify parametric and nonparametric methods for estimating the relationship between variables	comparative statistics; 5) Classifies parametric and nonparametric methods for estimating the relationship between variables
4	It uses statistical methods, including the STATISTICA software package, to describe medical data on morbidity, disability and mortality, taking into account demographic and health indicators of the population.	1) does not formulate how to calculate demographic and health indicators of the population; 2) makes gross mistakes in calculating and evaluating indicators and parameters of statistical aggregates 3) has no skills to work with the program STATISTICA	1) formulates how to calculate demographic and health indicators of the population; 2) makes mistakes in calculating and evaluating indicators and parameters of statistical aggregates 3) it is difficult to answer about morbidity, disability 4) knows how to work with the program STATISTICA 5) makes mistakes in interpreting the results of the decision	1) formulates how to calculate demographic and health indicators of the population; 2) makes mistakes in calculating and evaluating indicators and parameters of statistical aggregates 3) can answer about morbidity, disability 4) knows how to work with the program STATISTICA 5) interprets the results of the decision	1) is able to calculate demographic and health indicators of the population; 2) is able to calculate and evaluate indicators and parameters of statistical aggregates 3) can answer about morbidity, disability 4) knows how to work with the program STATISTICA 5)interprets the results of the decision
5	Integrates knowledge of the principles of deontology with medical legislation, effectively applying the principles of ethics of the relationship between the patient and healthcare professionals.	1) it is difficult to answer about the difference between medical ethics and deontology; 2) does not know how to formulate the principles of medical ethics; 3) cannot apply the principles of ethics of the relationship between the patient and employees;	1) formulates about the difference between medical ethics and deontology. 2) interprets the basic principles of medical ethics and deontology; 3) cannot integrate knowledge of the principles of deontology with medical legislation and apply the principles of ethics; 4) does not formulate the principles of medical ethics	1) can list the principles of medical ethics; 2) formulates about ethical principles; 3) formulates a code of ethics for healthcare; 4) knows about the difference between medical ethics and deontology. 5) cannot integrate knowledge of the principles of deontology with medical legislation and apply the principles of ethics;	1) formulates what is included in the concept of health ethics; 2) formulates the basic principles of medical ethics and deontology; 3) formulates a code of ethics for healthcare; 4) can integrate knowledge of the principles of deontology with medical legislation and apply the principles of ethics; 5) applies the princi-ples of ethics of the relationship between the patient and the

					employee

10.2. Assessment Criteria of teaching methods and technologies

Biostatistics

Checklist for practical class

№	Assessment Criteria	Points	Mark
	1. Oral survey	**Max 20**	
1	- Knows the basic terms and definitions on the topic under consideration. - Knows the basic formulas or algorithm of a certain statistical procedure. - Able to determine the relationship of the topic under consideration with the future profession, gives specific practical examples.		
	- Refers to additional literary sources when answering, has an additional summary, analyzes medical publications.	18-20	Excellent
2	- Knows the basic terms and definitions on the topic under consideration. - Knows the basic formulas or algorithm of a certain statistical procedure. - Able to determine the relationship of the topic under consideration with the future profession, gives specific practical examples.	15-17	Good
3	- Knows the basic terms and definitions on the topic under consideration. - Knows the basic formulas or algorithm of a certain statistical procedure.	10-14	Satisfactory
4	- Does not know the terms and definitions on the topic under consideration. - Does not know formulas on the topic under consideration	0-9	Unsatisfactory
	2. Solving situational problems	**Max 40**	
1	- Correctly chooses the statistical method for the solution. - Properly groups data. - Correctly chooses formulas for calculations. - Compiles calculation tables correctly. - Makes calculations correctly. - Correctly interprets the result.	35-40	Excellent
2	- Correctly chooses the statistical method for the solution. - Properly groups data. - Correctly chooses formulas for calculations. - Compiles calculation tables correctly. - Makes minor errors in calculations. - Makes minor errors when interpreting results.	30-34	Good
3	- Correctly chooses the statistical method for the solution. - Makes mistakes when grouping data. - Correctly chooses formulas for calculations. - Compiles calculation tables correctly. - Makes mistakes in calculations. - Makes minor errors when interpreting results.	15-29	Satisfactory
4	- Incorrectly chooses the statistical method for the solution. - Makes mistakes when grouping data. - Makes mistakes when compiling calculation tables. - Makes mistakes in calculations. - Doesn't know how to interpret the result.	0-14	Unsatisfactory
	3. Practical work	**Max 40**	
1	- Creates a spreadsheet of the right size. - Correctly enters data into a spreadsheet. - Correctly selects statistical procedures and conducts analysis. - Correctly interprets the result. - Correctly saves the spreadsheet and workbook.	35-40	Excellent
2	- Creates a spreadsheet of the right size. - Correctly enters data into a spreadsheet.	30-34	Good

	- Correctly selects statistical procedures and conducts analysis. - Finds it difficult to interpret the result. - Correctly saves the spreadsheet and workbook.		
3	- Creates a spreadsheet of the right size. - Correctly enters data into a spreadsheet. - Finds it difficult to choose a statistical procedure and conduct an analysis. - Finds it difficult to interpret the result. - Correctly saves the spreadsheet and workbook.	15-29	Satisfactory
4	- Finds it difficult to create a spreadsheet of the right size. - Makes mistakes when entering data into a spreadsheet. - Finds it difficult to choose a statistical procedure and conduct an analysis. - Finds it difficult to interpret the result. - Does not distinguish between saving a workbook and a spreadsheet.	0-14	Unsatisfactory
Checklist for SIW			
№	Assessment Criteria	Points	Mark
	SIW 1		
Individual task 1. Logic flowchart[1]		**Max 20**	
1.	- The flowchart is simple and concise, placed on one page; - Basic and sufficient concepts on the topic (section) are selected as elements of the flowchart; - Elements of the flowchart are located so that their hierarchy is clear (for example, general and specific - in the center, on the periphery - auxiliary); - Logical connections are established between the elements of the flowchart (inside the flowchart and external, i.e. interconnection with adjacent flowcharts); - The flowchart is visual (easy to read): symbols, graphic material, color shades, tables, illustrated material are used.	18-20	Excellent
2.	- The flowchart is placed on one page; - Basic and sufficient concepts on the topic are selected as elements of the flowchart; - The hierarchy of the elements of the flowchart is not traced, the material is presented chaotically; - Logical connections are established between the elements of the flowchart (inside the flowchart and external, i.e. interconnection with adjacent flowcharts); - The flowchart is not illustrative.	11-17	Good
3.	- The flowchart is located on more than one page; - Elements of the flowchart are not basic and sufficient concepts on the topic; - The hierarchy of the elements of the flowchart is not traced, the material is presented chaotically; - No logical ones are installed between the elements of the flowchart; - The flowchart is not illustrative.	1-10	Satisfactory

[1] ***Logic flowchart***

The purpose of drawing up a logic flowchart is to form the integrity, consistency and consistency of knowledge.

Algorithm for constructing the logic flowchart:

- reading the topic (section);
- analysis of the text, select the main and secondary thoughts and concepts. Write out the basic concepts and categories;
- repeated revision of the text in order to select the links between concepts and categories;
- selection of the most general concepts and categories;
- construction of a flowchart taking into account the identified relationships;
- final review of the text in order to compare it with the received scheme;
- final clarification of the scheme.

4.	- The flowchart has not been completed.	0	Unsatisfactory
Individual task 2.		**Max 40**	
1.	- The number of intervals is correctly determined; - The width and initial value of the first interval are correctly determined; - The data is grouped correctly by intervals; - The interval frequency distribution is correctly constructed; - Frequency analysis has been carried out.	36-40	Excellent
2.	- The number of intervals is correctly determined; - The width and initial value of the first interval are correctly determined; - Errors were made when grouping data by intervals; - The interval frequency distribution was constructed with minor errors. - Frequency analysis has been carried out.	30-35	Good
3.	- The number of intervals is incorrectly determined; - The width and initial value of the first interval were incorrectly determined; - Errors were made when grouping data by intervals; - An interval frequency distribution has been built; - Frequency analysis was carried out incorrectly.	1-29	Satisfactory
4.	- The task was not completed.	0	Unsatisfactory
Individual task 3.		**Max 40**	
1.	- Numerical characteristics of the frequency distribution (mean, variance, standard deviation, range, coefficient of variation) are calculated correctly; - The interval frequency distribution is correctly presented graphically: a polygon, a histogram, a “box with whiskers”, a “stem with leaves” are constructed; - The solution was checked in the STATISTICA program, a screenshot is attached.	36-40	Excellent
2.	- When calculating the numerical characteristics of the frequency distribution, minor errors were made, which were corrected by the student during testing; - Errors were made when constructing some graphs; - The solution was checked in the STATISTICA program, a screenshot is attached.	30-35	Good
3.	- When calculating the numerical characteristics of the frequency distribution, gross errors were made; - The graphs were built with errors; - There is no screenshot of the solution in the STATISTICA program.	1-29	Satisfactory
4.	- The task was not completed.	0	Unsatisfactory
SIW 2			
Individual task 4.		**Max 100**	
1.	- The probabilities of hitting a random variable in the intervals are correctly determined; - A calculation table was created to determine the calculated value of Pearson's $\chi 2$-goodness-of-fit test; - The hypothesis about the normal distribution of the sample was tested in accordance with the algorithm of Pearson's $\chi 2$- goodness-of-fit test; - The result of the decision is interpreted correctly. - The values of the theoretical distribution function of a random variable are correctly determined; - A calculation table was created to determine the calculated value of Kolmogorov-Smirnov’s λ- goodness-of-fit test; - The hypothesis about the normal distribution of the sample was tested in accordance with the algorithm of Kolmogorov-Smirnov’s λ- goodness-of-fit test; - The result of the decision is interpreted correctly.	90-100	Excellent
2.	- Minor mistakes were made in determining the probabilities of a random variable falling into intervals; - The calculation table for determining the calculated value of Pearson's $\chi 2$- goodness-of-fit test contains minor mistakes;	70-89	Good

	- The hypothesis about the normal distribution of the sample was tested in accordance with the algorithm of Pearson's χ2-goodness-of-fit test; - The result of the decision is interpreted correctly. - Minor mistakes were made when calculating the values of the theoretical distribution function of a random variable; - The calculation table for determining the calculated value of the Kolmogorov-Smirnov λ- goodness-of-fit test contains minor mistakes; - The hypothesis about the normal distribution of the sample was tested in accordance with the algorithm of Kolmogorov-Smirnov's λ-goodness-of-fit test; - The result of the decision is interpreted correctly.		
3.	- Mistakes were made in determining the probabilities of a random variable falling into intervals; - The calculation table for determining the calculated value of Pearson's χ2- goodness-of-fit test contains mistakes; - The hypothesis about the normal distribution of the sample according to Pearson's χ2-goodness-of-fit test is tested incorrectly; - The result of the solution is interpreted incorrectly; - Mistakes were made when calculating the values of the theoretical distribution function of a random variable; - The calculation table for determining the calculated value of Kolmogorov-Smirnov's λ-goodness-of-fit test contains mistakes; - The hypothesis about the normal distribution of the sample according to Kolmogorov-Smirnov's χ2-goodness-of-fit test is tested incorrectly; - The result of the solution is interpreted incorrectly;	1-69	Satisfactory
4.	- The hypothesis about the normal distribution of the sample was not tested using the Pearson and Kolmogorov-Smirnov goodness-of-fit tests.	0	Unsatisfactory
	SIW 3		
Individual task 5.		**Max 40**	
1	- The null and alternative hypotheses are correctly formulated; - The calculated value of the Student's t-test for dependent samples was calculated correctly; - The hypothesis was tested according to the Student's t-test algorithm for dependent samples; - The result of the decision is interpreted correctly; - The solution was checked in the STATISTICA program, a screenshot is attached.	36-40	Excellent
2	- The null and alternative hypotheses are correctly formulated; - The calculated value of the Student's t-test for dependent samples was calculated correctly; - The hypothesis was tested according to the Student's t-test algorithm for dependent samples; - The result of the decision is interpreted correctly.	30-35	Good
3	- The null and alternative hypotheses are correctly formulated; - Errors were made in calculating the calculated value of the Student's t-test for dependent samples; - The hypothesis was tested according to the Student's t-test algorithm for dependent samples; - The result of the decision is interpreted incorrectly.	1-29	Satisfactory
4	- The hypothesis of the equality of the two averages was incorrectly tested using the Student's t-test for dependent samples.	0	Unsatisfactory
Individual task 6.		**Max 40**	
1	- Correctly formulated null and alternative hypotheses; - Correctly calculated factor and residual variances;	36-40	Excellent

	- The hypothesis was tested according to the Fisher F-test algorithm; - The result of the decision is interpreted correctly; - The solution was checked in the STATISTICA program, a screenshot was attached; - The hypothesis was tested according to the Kruskal-Wallis algorithm; - The result of the decision is interpreted correctly; - The solution was checked in the STATISTICA program, a screenshot is attached.		
2	- Correctly formulated null and alternative hypotheses; - Correctly calculated factor and residual variances; - The hypothesis was tested according to the Fisher F-test algorithm; - The result of the decision is interpreted correctly; - The hypothesis was tested according to the Kruskal-Wallis algorithm; - The result of the decision is interpreted correctly;	30-35	Good
3	- Correctly formulated null and alternative hypotheses; - Errors were made when calculating factor and residual variance; - The hypothesis was tested according to the Fisher F-criterion algorithm; - The result of the decision is interpreted correctly; - The hypothesis was tested according to the Kruskal-Wallis algorithm; - The result of the decision was interpreted correctly.	1-29	Satisfactory
4	- The task was not completed.	0	Unsatisfactory
Individual task 7. Logic flowchart		**Max 20**	
1.	- The flowchart is simple and concise, placed on one page; - Basic and sufficient concepts on the topic (section) are selected as elements of the flowchart; - Elements of the flowchart are located so that their hierarchy is clear (for example, general and specific - in the center, on the periphery - auxiliary); - Logical connections are established between the elements of the flowchart (inside the flowchart and external, i.e. interconnection with adjacent flowcharts); - The flowchart is visual (easy to read): symbols, graphic material, color shades, tables, illustrated material are used.	18-20	Excellent
2.	- The flowchart is placed on one page; - Basic and sufficient concepts on the topic are selected as elements of the flowchart; - The hierarchy of the elements of the flowchart is not traced, the material is presented chaotically; - Logical connections are established between the elements of the flowchart (inside the flowchart and external, i.e. interconnection with adjacent flowcharts); - The flowchart is not illustrative.	11-17	Good
3.	- The flowchart is located on more than one page; - Elements of the flowchart are not basic and sufficient concepts on the topic; - The hierarchy of the elements of the flowchart is not traced, the material is presented chaotically; - No logical ones are installed between the elements of the flowchart; - The flowchart is not illustrative.	1-10	Satisfactory
4.	- The flowchart has not been completed.	0	Unsatisfactory

Checklist for evaluating project work

Interim evaluation of the project work			**Max 100**
№	**Criteria**	**Description**	**mark**
1	Determination of the problem situation and relevance of the study	The problems are clearly formulated, scientifically substantiated and integrated. The relevance of the research topic is well-reasoned.	15-20
		The problems are formulated and justified. The relevance of the research topic is well-reasoned.	10-14
		The problems are partially formulated, not substantiated. The relevance of the research topic is partially reasoned.	5-9

		The problems are not formulated or superficially formulated. The relevance of the topic is not reflected.	0-4
2	Setting a project goal and defining tasks to achieve it	The goal is formulated clearly and concisely. The objectives of the study are fully consistent with the goal.	15-20
		The goal is formulated, but described in too much detail. The objectives of the study correspond to the goal.	10-14
		The goal is vaguely formulated. The objectives of the study partially correspond to the goal.	5-9
		The goal is vaguely formulated or not formulated. The objectives of the study do not correspond to the goal.	0-4
3	Selection and use of literature	The most relevant publications/studies published in full-text databases and in reputable publications are indicated. The links are listed in the text sequentially with the numbers.	15-20
		The publications/studies published in full-text databases from a limited number of sources are indicated. The links in the text are listed sequentially with numbers.	10-14
		The same type of publications/research published in open access on the Internet are indicated. Full-text databases and reputable publications are practically not used. Most of the sources do not relate to the topic of the project. The links are not specified in the text.	5-9
		Full-text databases and reputable publications are practically not used. Most of the sources do not relate to the topic of the project. The links are not specified in the text.	0-4
4	Timely presentation of interim results	Systematic publication of the results of the project work on the Trello board. The interim results of the project are presented on time.	15-20
		Periodic publication of the results of the project work on the Trello board. The interim results of the project are presented on time.	10-14
		Periodic publication of the results of the project work on the Trello board. The interim results of the project are not presented on time.	5-9
		The results of the project work were not published on the Trello board. The interim results of the project are not presented on time.	0-4
5	Personal involvement, creative approach to work	According to the interim results, there is a collective creative approach to solving problems, an even distribution of functions and well-coordinated work	15-20
		According to the interim results, there is an even distribution of functions in the team, well-coordinated work	10-14
		According to the interim results, there is an uneven distribution of functions in the team, well-coordinated work	5-9
		According to the interim results, there is a formal attitude of the participants to the work performed, there is no collective interaction	0-4
Checklist for project work			**Max 100**
1	Depth of disclosure of the project topic	The topic of the project is fully disclosed, during the presentation of the project, deep knowledge was demonstrated that goes beyond the scope of the program being studied. The research methods are described, the ways of achieving the goals are substantiated. Scientific terms are used, there is a free operation with them. Modern research methods are used.	15-20
		The topic of the project is disclosed, during the presentation of the project, residual knowledge was demonstrated within the framework of the program being studied. The research methods are described, the ways of achieving the goals are substantiated. Scientific terms are not used enough. The text is presented in a logical sequence.	10-14
		The theme of the project is partially disclosed. The description of the project is not complete. Scientific terms are not used. The text is presented randomly.	5-9
		The theme of the project is not disclosed. The description of the project is not	0-4

		complete. Scientific terms are not used. The text is presented randomly.	
2	Objectivity and reliability of the obtained results, their practical significance	The results fully cover the research, they are objective, reliable. Tables, figures, formulas are given. The applicability of the research results, the target consumers of the results are indicated.	15-20
		The results fully cover the research, they are objective, reliable. Tables, figures, formulas are given. The applicability of the research results, the target consumers of the results are not indicated.	10-14
		The results partially cover the research, they are objective, reliable. Tables, figures, formulas are given in insufficient quantity.	5-9
		The results do not cover research, they are not objective, not reliable. Tables, figures, formulas are not given or insufficiently given.	0-4
3	Formulation of conclusions	The conclusions are formulated correctly, argued and fully cover the results of the research.	15-20
		The conclusions are formulated correctly, argued, but partially cover the results of the research.	10-14
		The conclusions are formulated incompletely, not sufficiently substantiated and partially cover the results of the research.	5-9
		The conclusions are formulated incorrectly, not substantiated and partially cover or do not cover the results of the research.	0-4
4	Achievement of the project goal and solution of the set tasks	The goal of the project has been achieved. All assigned tasks have been completed.	15-20
		The goal of the project as a whole has been achieved. Tasks have not been fully resolved.	10-14
		The goal of the project was partially achieved. Not all tasks have been completed.	5-9
		The goal of the project has not been achieved. The tasks set have been partially solved or not solved.	0-4
5	The project and presentation are designed in accordance with the requirements	The project covers and discloses all sections. The text is presented in a logical sequence, concisely, competently. The technical requirements for the design of the project are observed. The presentation is visual. During the presentation speaker demonstrates professional awareness and artistry.	15-20
		The project covers and discloses all sections. The text is presented in a logical sequence. There are minor grammatical and stylistic mistakes. Technical requirements for the design of the project are not fully met. The presentation is not visual. During the presentation speaker demonstrates professional awareness and artistry.	10-14
		All sections are covered in the project. The logical sequence of the presentation of the material is not always observed. There are grammar and stylistic mistakes. Technical requirements for the design of the project are not met. The presentation is not visual. During the presentation speaker does not demonstrate a deep knowledge of the topic, is constrained.	5-9
		Not all sections are covered in the project. The logical sequence of presentation of the material is not respected. There are grammatical and stylistic errors. Technical requirements for the design of the project are not met. The presentation is not visual. During the presentation speaker does not demonstrate a deep knowledge of the topic, finds it difficult to answer questions, is constrained.	0-4

Checklist for Midterm control		**Max 100**	
1	MCQs is carried out in electronic form.	90-100	Excellent
2	The test contains 50 questions.	70-89	Good
3	A 100-point scale is used for evaluation.	50-69	Satisfactory
4	Testing time is determined by the teacher (no more than 50 minutes)	<50	Unsatisfactory

Public health

Checklist for practical classes

The form control	Mark	Criteria for evaluation
Oral answer	Excellent A (95-100%); A- (90-94%)	It is put in the event that the student did not make any mistakes, inaccuracies during the answer. He orients himself in theories, concepts and directions in the discipline under study and gives them a critical assessment, uses the scientific achievements of other disciplines.
	Good B+ (85-89%); B (80-84%); B- (75-79%); C+ (70-74%)	It is put in the event that the student during the answer did not make gross errors in the answer, made unprincipled inaccuracies or fundamental errors corrected by the student himself, managed to systematize the program material with the help of the teacher.
	Satisfactory C (65-69%); C- (60-64%); D+ (50-54%)	It is put in the event that the student made inaccuracies and unprincipled mistakes during the answer, limited himself only to the educational literature indicated by the teacher, experienced great difficulties in systematizing the material.
	Unsatisfactory FX (25-49%); F (0-24%).	It is put in the event that the student made fundamental mistakes during the answer, did not work through the main literature on the topic of the lesson; does not know how to use the scientific terminology of the discipline, answers with gross stylistic and logical errors.

Evaluation criteria	Level			
	Great	Good	Satisfac-tion	Dissatis-faction
	90 – 100	70-89	50-69	<50
Oral interview	35-40	25-34	20-24	< 20
Knowledge of the basic terms and definitions of the topic under consideration	10-10	7-9	7	<6
Knowledge of the basic principles of medical services	10-10	7-10	7	<6
The ability to determine the relationship of the topic under consideration with the future profession, to give specific practical examples	10-10	7-10	4-6	<6
Links to additional literary sources in the response, additional summary, analysis of medical publications	5-10	4-5	2-4	0-2
Solving problems or completing tasks	27-30	23-26	20-22	< 20
The ability to analyze data	9-10	8-9	7-8	<7
Ability to work with regulatory documents	9-10	8-9	6-7	<6
The ability to draw conclusions	9-10	7-8	7-7	<7
Testing	28 – 30	22-27	10 – 21	< 10

Checklist for SIW

The form control	Mark	Criteria for evaluation
Topic presentation	Excellent A (95-100%); A- (90-94%)	The presentation was made independently, on time, with a volume of at least 20 slides. At least 5 literary sources were used. The slides are informative and concise. During the defense, the author demonstrates deep knowledge on the topic. Does not make mistakes when answering questions during the discussion.
	Good B+ (85-89%); B (80-84%); B- (75-79%); C+ (70-74%)	The presentation was made independently, on time, with a volume of at least 15 slides. At least 4 literary sources were used. The slides are informative and concise. During the defense, the author demonstrates good knowledge on the topic. Makes minor mistakes when answering questions that he corrects.
	Satisfactory C (65-69%); C- (60-64%);	The presentation was made independently, on time, with a volume of at least 10 slides. At least 3 literary sources were used. The slides are not meaningful. When defending, the author makes fundamental mistakes when answering questions.

	D+ (50-54%)	
	Unsatisfactory FX (25-49%); F (0-24%).	The presentation was not delivered on time, the volume is less than 8 slides. Less than 3 literary sources were used. The slides are not meaningful. When defending, the author makes gross mistakes when answering questions. Does not focus on own material.
Preparation and defense of the report	Excellent A (95-100%); A- (90-94%)	The report was made accurately and delivered on time, written independently on at least 15 typewritten pages, using at least 5 literary sources. Schemes, tables and figures corresponding to the topic of the abstract are given. When defending a report, the text does not read, but tells. Confidently and accurately answers all questions asked.
	Good B+ (85-89%); B (80-84%); B- (75-79%); C+ (70-74%)	The report was made accurately and delivered on time, written independently on at least 10 typewritten pages, using at least 4 literary sources. Schemes, tables and figures corresponding to the topic of the abstract are given. When defending a report, the text does not read, but tells. When answering questions, he makes minor mistakes.
	Satisfactory C (65-69%); C- (60-64%); D+ (50-54%)	The report was made accurately and delivered on time, written independently on at least 8 typewritten pages, using at least 3 literary sources. When protecting the report, the text is read. Uncertainty answers questions, makes fundamental mistakes.
	Unsatisfactory FX (25-49%); F (0-24%).	The abstract was not drawn up in detail, it was not submitted before the deadline. The topic does not show figures, tables. Read during the defense of the report. Made serious mistakes in answering the questions asked.
Preparation of test tasks	Great A (95-100%); A- (90-94%).	The test tasks contain at least 20 questions. Delivered on time. The basis of the test is substantial. The test tasks are formulated clearly, correctly, and concretely. Similar and adequate answers. There is a response algorithm. The correct answers are marked correctly.
	Good B+ (85-89%); B (80-84%); B- (75-79%); C+ (70-74%).	The test tasks contain at least 18 questions. Delivered on time. The basis of the test is substantial. The test tasks are formulated clearly, correctly, and concretely. There are different types of answers. There is a response algorithm. The correct answers are marked correctly.
	Satisfactory C (65-69%); C- (60-64%); D+ (50-54%).	The test tasks contain at least 15 questions. Delivered on time. The basis of the test is not meaningful. There are test tasks that are formulated vaguely, incorrectly, and incompletely. There are different types of answers. There is a response algorithm. Not all correct answers are marked correctly.
	Unsatisfactory FX (25-49%); F (0-24%).	The test tasks contain at least 10 questions. The basis of the text is not meaningful, the question is unclear. There are different types of answers. There is no response algorithm. More than 50% of the correct answers are incorrectly marked.

Evaluation criteria	90-100	70-89	50-69	<50
Deadline for delivery of SIW (on time, 1-2 days delay, 3 days delay, more than 4 days)	25-25	18-24	17-23	<13-16
The form of delivery of the SIW (number of pages / slides, number of test tasks) according to the requirements of the syllabus.	25-25	18-24	17-23	<13-16
Visibility (type and font size, use of graphics tools, image shapes, color differences, etc.)	20-25	17-24	10-16	<9-10
The use of literary sources	20-25	17	6-7	<4-5

Checklist for intermediate certification

Border control/ Oral, situational	Great A (95-100%); A- (90-94%).	It is set if the student did not make any mistakes or inaccuracies during the response. He is guided by theories, concepts and directions in the studied discipline and gives them a critical assessment, uses scientific achievements of other disciplines. 90-100% correct answers on the tests

problem solving	Good B+ (85-89%); B (80-84%); B- (75-79%); C+ (70-74%).	It is put in the event that the student did not make gross mistakes during the answer, made unprincipled inaccuracies or fundamental errors corrected by the student himself, managed to systematize the program material with the help of a teacher. 75-89% correct answers on tests
	Satisfactory C (65-69%); C- (60-64%); D+ (55-59%); D (50-54%).	It is posed if the student made inaccuracies and unprincipled mistakes during the answer, limited himself only to the educational literature indicated by the teacher, and experienced great difficulties in systematizing the material. 50-74% correct answers on tests
	Unsatisfactory FX (25-49%); F (0-24%).	It is put in the event that the student made fundamental mistakes during the answer, did not work out the main literature on the topic of the lesson; does not know how to use the scientific terminology of the discipline, answers with gross stylistic and logical errors. Less than 50% of the correct answers on the tests.

Final examination

Mark by letter system	Numeric equivalent of points	Percentage	Mark by traditional system
A	4,0	95-100	Excellent
A -	3,67	90-94	
B +	3,33	85-89	Good
B	3,0	80-84	
B -	2,67	75-79	
C +	2,33	70-74	
C	2,0	65-69	Satisfactorily
C -	1,67	60-64	
D+	1,33	55-59	
D-	1,0	50-54	
FX	0,5	25-49	Unsatisfactory
F	0	0-24	

11. Learning resources

Electronic resources, including, but not limited to: databases, animation simulators, professional blogs, websites, other electronic reference materials (video, audio, digests)

Statistical online calculators	Statistics online - checks assumptions, interprets results (statskingdom.com)
Video-lectures	Т-критерий Стьюдента https://media.skma.edu.kz/video/ppppppppppp
	Корреляционный анализ https://media.skma.edu.kz/video/ppppppppppp

Electronic databases

№	Title	Link
1	SKMA Electronic Library	https://e-lib.skma.edu.kz/genres
2	Republican Interuniversity Electronic Library	http://rmebrk.kz/
3	«Aknurpress» Digital Library	https://www.aknurpress.kz/
4	Electronic library "Epigraph"	http://www.elib.kz/
5	Epigraph - portal of multimedia textbooks	https://mbook.kz/ru/index/
6	Information and legal system "Zan"	https://zan.kz/ru
7	ЭБС IPR SMART	https://www.iprbookshop.ru/auth
8	Cochrane Library	https://www.cochranelibrary.com/

Electronic textbooks

1. Биостатистика [Электронный ресурс]: оқулық /Қ.Ж. Құдабаев [ж/б.].- Электрон. текстовые дан. (85,7Мб). - Шымкент: ОҚМФА, 2015. - 185 бет. эл. опт. диск (CD-ROM)
2. Биостатистика [Электронный ресурс]: учебник /К.Ж. Кудабаев [и др.].- Электрон. текстовые дан. (85,7Мб).- Шымкент: ЮКГФА, 2015. – 187с. эл. опт. диск (CD-ROM)
3. Биологиялық статистика. Раманқұлова А.А. 2019 https://aknurpress.kz/reader/web/1068

4. Медициналық-биологиялық деректерді статистикалық талдауда excel және spss statistics бағдарламаларын қолдану. Чудиновских В.Р., Каипова А.Ш., Алтаева А.У., Абдикадыр Ж.Н. https://aknurpress.kz/reader/web/1341
5. Медициналық-биологиялық зерттеулердегі статистикалық жорамалдарды тексеруге арналған компьютерлік бағдарламаларды қолдану. Чудиновских В.Р., Абдикадыр Ж.Н., Каипова А.Ш. https://aknurpress.kz/reader/web/1343
6. Койчубеков Б.К., Сорокина М.А., Букеева А.С., Такуадина А.И. БИОСТАТИСТИКА в примерах и задачах: Учебно-метод. посо-бие/– Алматы ТОО «Эверо», 2020. – 80 с. https://elib.kz/ru/search/read_book/870/
7. Б.К. Койчубеков және т.б. Биостатистикаға кіріспе курсы: оқу құралы/ Б.К.Койчубеков, Абдыкешова Д.Т., Алибиева Д.Т.– Алматы: «Эверо» баспасы, 2020. – 102 б. https://elib.kz/ru/search/read_book/868/
8. Койчубеков Б.К., Букеева А.С., Такуадина А.И.,Жунусова Г.Т., Абдыкешова Д.Т. Мысалдар мен тапсырмалардағы биостатистика. Оқу-әдістемелік құрал – Алматы, Эверо, 2020.- 108 б. https://elib.kz/ru/search/read_book/869/
9. Койчубеков Б.К. Биостатистика: Учебное пособие – Издательство «Эверо», Алматы, 2020, 154 с. https://elib.kz/ru/search/read_book/867/
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Public health

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Software

1.MS Excel
2.STATISTICA

Literature

Biostatistics

Main

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Public health

Main

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Additional

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3. Спандияров Е. Основы научных исследований и инновации [Текст]: практическое пособие / Е. Спандияров; М-во образования и науки РК. - Алматы: Эверо, 2013. - 136 с.

12. Subject policy

Requirements for studying this course:
1. Do not miss classes without reason;
2. Do not be late for classes;
3. Come to classes in uniform;
4. To be active during the practical classes;
5. To prepare for lessons;
6. Take the students independent work and prepare it timely;
7. Not to do other things during lessons;
8. To be tolerant, polite and friendly to students and teachers;
9. Be careful to the department equipment and furniture.
10. Midterm control of students' knowledge in the "Biostatistics" section is carried out on the 7th day of theoretical training. The results of the midterm control being displayed in an electronic journal (Platonus), taking into account penalty points for skipping lectures (missing lectures in the form of penalty points are subtracted from the midterm control assessment). The penalty point for missing 1 lecture is 1.0 point. A student who does not appear for a midterm control without a serious reason is not allowed to take the exam in the subject. The results of the midterm control are provided to the dean's office in the form of a report.
Routine control of knowledge of students in the section "Public Health" is held on the 15th day of theoretical training with putting the results of the boundary control in the electronic journal, taking into account penalty points for missed lectures (missed lectures in the form of penalty points are deducted from the evaluation of the boundary control). The penalty point for missing 1 lecture is 2.0 points. The student who did not appear at the end-of-term control without a valid reason is not allowed to take the examination in the discipline. The results of the end-of-term control are submitted to the dean's office in the form of a report.
11. SIW marks are given at the SIWT lessons, according to the timetable, in the electronic journal (Platonus), taking into account the penalty points for missing SIWT lessons. The penalty point for missing 1 SIWT lesson is 2.0 points.

13. Academic policy based on the moral and ethical values of the academy

1. **Mission**

	To be a recognized leader in the field of training competitive personnel!
	The Student's Code of Honor: 1. The student strives to become a worthy citizen of the Republic of Kazakhstan, a professional in his chosen specialty, to develop the best qualities of a creative personality. 2. The student treats his elders with respect, does not allow rudeness towards others and shows empathy for socially vulnerable people and, as far as possible, takes care of them. 3. The student is a model of decency, culture and morality, is intolerant of immorality and does not allow discrimination based on gender, nationality or religion. 4. The student leads a healthy lifestyle and completely abandons bad habits. 5. The student respects the traditions of the university, protects its property, monitors cleanliness and order in the student dormitory. 6. The student recognizes the necessary and useful activities aimed at the development of creative activity (scientific, educational, sports, artistic, etc.), at improving the corporate culture and image of the university. 7. Outside the walls, the student always remembers that he is a representative of a higher school and makes every effort not to drop his honor and dignity. 8. The student considers it his duty to combat all types of academic dishonesty, including: cheating and asking others for help in passing knowledge control procedures; presenting any volume of ready-made educational materials (abstracts, term papers, tests, theses and other works), including online resources, as the results of his own work; circumvention Anti-plagiarism systems; the use of family or official ties to obtain a higher grade; absenteeism, tardiness and skipping classes without a valid reason. Registrar's Office AP 044/101-2022 Ed. No.4 14 p. of 67 Academic policy of SC "SKMA" 9. The student considers all the listed types of academic dishonesty as incompatible with obtaining a high-quality and competitive education worthy of the future economic, political and managerial elite of Kazakhstan
	Vision Effective system of medical and pharmaceutical education, based on the competence approach and the needs of practical public health and pharmaceutical industries, focused on the training of specialists that meet international quality and safety standards. **Basic ethical principles**, on which SKMA relies for the realization of its mission: **The principle of high professionalism the teaching staff of SKMA** – this is permanent improvement of their knowledge and skills, ensuring the provision of quality educational services for students at all levels of training. **The principle of quality in SKMA** – this is the realization of conception of modernization of Kazakhstan education, the main direction of which is to ensure the modern quality of education based on the preservation of its fundamental and compliance with the actual and prospective needs of the individual, society and state, which is ensured by the use in the educational process, scientific-research activities and consultative and diagnostic work of innovative technologies and new achievements of science and practice. **The principle of orientation training** – this is the implementation of a student-centered learning process on flexible path of educational programs, taking into account the rapidly changing economic conditions and current trends in the labor market, the creation of maximum effective conditions for their professional growth, development of motivation and monitoring of training outcomes, continuous renovation of educational programs, expanding the volume of knowledge and competence, necessary for effective professional activity.
2.	Academic policy http://surl.li/eroik
3.	Grading Policy *Student's final mark* (FM) is given at the end of the course, and calculate as a sum of the *admission rating mark* (ARM) and the *final control mark* (FCM) and is given according to the point-rating letter system. FM=ARM+FCM *Admission rating mark* (ARM) is equal to 60 points or 60% and includes: the *current control mark* (CCM) and *midterm control mark* (MCM). The *current control mark* (CCM) is the average score for practical lessons and SIW. The *midterm control mark* (MCM) is the average score of the two midterm controls. The *admission rating mark* (60 points) is calculated via the formula: $MCM_{average} \times 0.2 + CCM_{average} \times 0.4$ *Final control* (FC) is carried out in the form of testing and the student can get 40 points or 40% of the total mark. When testing, the student is asked 50 questions. Calculation of final control is carried out as follows: If the student correctly answered 45 questions out of 50, it will be 90%. 90 x 0.4 = 36 points.

The final mark is calculated if the student has positive marks both in the admission rating (AR) = 30 points or 30% or more, and in the final control (FC) = 20 points or 20% or more.

The final grade (100 points) = MCM $_{average}$ x 0.2+CCM $_{average}$ x 0.4+FC x 0.4

A student who has received an unsatisfactory mark for one of the types of controls (MK1, MK2, CC $_{average}$) is not allowed to the exam.

Penalty points are subtracted from the average score of the current control.

14. Approval and revision

Date of approval with the LIC	Protocol No.	Head of the LIC	Signature
«14» 06 2024 y.	№9	Derbicheva R.I.	
Approval date	**Protocol No.**	**Head of the Department Med.biophysics and IT**	**Signature**
«30» 05 2024 y.	№ 11	Ivanova M.B.	
Approval date	**Protocol No.**	**Head of the Department SHI and PH**	**Signature**
«___» ___202__ y.	№ ___	Sarsenbayeva G.Zh.	
Approval date	**Protocol No.**	**Chairman of the EPC**	**Signature**
«___» ___202__ y.	№ ___	Kalmenov N.D.	
Revision date	**Protocol No.**	**Head of the Department**	**Signature**
«___» ___202__ y.	№ ___		
Revision date	**Protocol No.**	**Head of the Department**	**Signature**
«___» ___202__ y.	№ ___		
Revision date	**Protocol No.**	**Chairman of the EPC**	**Signature**
«___» ___202__ y.	№ ___		

The protocol of coordination of the working curriculum of the discipline (Syllabus) with other disciplines for the 2024-2025 academic year.

Coordination Subjects	Suggestions for changes in the proportions of the material, the order of presentation, etc.	Protocol numbers and meeting dates of the coordinating departments
1	2	3
Postrequisites:		
Hygiene and epidemiology	1. The course "Introduction to scientific research", the section "Biostatistics" is devoted to the skills of applying methods of statistical processing of biomedical data and population health indicators to describe and interpret data and work with applied programs, skills of scientific analysis and their practical application. The content and sequence of presentation of the course material "Introduction to scientific research", the section "Biostatistics" is considered appropriate.	Department of Hygiene and Epidemiology Protocol № 10 dated 05/20/24 y.
Mandatory Social Health Insurance and Medical Law	2. The course "Introduction to scientific research", the section "Public Health" is devoted to legislative documents regulating the activities of healthcare organizations. Rights and obligations in the field of healthcare. Work in electronic databases of the healthcare system of the Republic of Kazakhstan. The content and sequence of presentation of the course material "Introduction to scientific research", the section "Public health" is considered appropriate.	Department of Social Health Insurance and Public Health Protocol № 15 dated 10/06/24 y.

Postrequisites:

Head of the Department of Hygiene and Epidemiology, Candidate of Medical Sciences, Acting Professor — Utepov P.D.

Head of the Department of Social Health Insurance and Public Health, Associate Professor — Sarsenbayeva G.Zh.