Syllabus

Departments: "Medical Biophysics and Information Technologies",
Department of "Microbiology , Allergology and Immunology"
Work program of the subject "Project Activities and biostatistics"
Educational program 6B10115 "Medicine"

1.	**General information about the subject**		
1.1	Subject codes: PAB 2303	1.6	Academic year: 2025-2026
1.2	Subject name: Project Activities and biostatistics	1.7	Year: 2
1.3	Prerequisites: Legal, financial, environmental and scientific knowledge, ICT	1.8	Semester: 4
1.4	Postrequisites: Experimental research work, Hygiene and Epidemiology	1.9	Number of credits (ECTS): 5
1.5	Cycle: BD	1.10	Component: UC
2.	**Subject description**		
Integrated discipline: Development of knowledge about methods and tools of project management in medicine; practical skills in applying descriptive statistics methods and hypothesis testing theory in medical and biological research for the analysis of diagnosis and treatment; as well as processing statistical data using advanced technologies to identify patterns and predict risks.			
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**		
To develop students' competencies in project activities and biostatistics aimed at the design, planning, and implementation of scientific and practice-oriented projects in the field of healthcare, using statistical analysis methods to justify decisions, assess the effectiveness of medical interventions, and interpret biomedical data.			
5.	**Subject learning outcomes**		
LO1	Develops and implements medical and scientific-practical projects, taking into account current problems and needs of the healthcare system, in accordance with the stages of project activity.		
LO2	Applies basic and advanced biostatistical methods to analyze medical, clinical, and epidemiological data within professional practice.		
LO3	Works effectively in a team within project activities, distributes professional roles, and applies planning, organization, and evaluation skills in medical projects.		
LO4	Interprets biomedical data and draws well-grounded conclusions, using the results of quantitative analysis to support clinical and organizational decision-making.		
LO5	Uses modern digital tools (e.g., Excel, Statistica, etc.) for statistical processing of medical data and for presenting results in the form of tables, graphs, and scientific reports.		
5.1	Subject LO	The subject learning outcomes linked with educational program learning outcomes	
	LO1	LO3. Carries out professional activities in accordance with the legislation of the Republic of Kazakhstan in the field of healthcare to ensure high-quality medical services.	
	LO2 LO3	LO11. Analyzes the effectiveness of diagnostic procedures and treatment outcomes, applying the principles of personalized medicine.	
	LO4 LO5	LO13. Assesses population health indicators and their physical, radiological, chemical, and biological-environmental determinants, using advanced technologies to identify hidden patterns and predict risks.	
6.	**Detailed about subjects**		

6.1 **Project activity**

"South Kazakhstan Medical Academy" JSC, Department of "Microbiology , Allergology and Immunology". Al-Farabi Area-3, Educational Building No. 2, 1st floor, Classrooms No. 110, 112, 123a, 123b, 117, 119b.Telephone v/n:402

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.

6.2

Number of hours	Lectures	Practical classes	SIWT	SIW
Project activity-30	-	10	3	17
Biostatistics - 90	8	32	12	68

6.3 Subject study plan

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

7. Information about teachers

№	Full name	Degrees, Position	Email
	Department of "Microbiology, Allergology and Immunology"		
1.	Seitkhanova Bibigul Tolegenovna	Head of the department; Doctor of Medical Sciences, professor	dmn_bibigul@mail.ru
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6.	Sadybek Uldana Abilkyzy	Senior lecturer	sadybek.uldana@mail.ru
7.	Dzhakupova Janat Erikovna	Senior lecturer	zhanat.dzhakupova@inbox.ru
	Department "Medical Biophysics and Information Technologies"		
1.	Ivanova Marina Borisovna	PhD, Professor	marina-iv@mail.ru
2.	Ormanov Nurlan Kerimbekovich	PhD, Professor	nurlanormanov2@gmail.com
3.	Berdieva Meruert Aimambetovna	PhD	meruert_berdieva@mail.ru

8. Thematic plan

Day	Topic	Brief content	Subject LO	Number of hours	Forms/ Methods/ Technologies of learning	Forms/ Methods of assessment
	Project activity					
1	**Practical lesson** Introduction. Concept of design	Basic concepts and definitions. Main types of projects. Project structure. Problem definition and	1LO 3LO	5	Practical work	Oral question and answer. Practical

	activity. Project stages.	goal setting.				work (according to the check sheet) (evaluation)
	Practical lesson Project planning phase.	Defining project goals and objectives. Analyzing and describing the project. Creating a project structure. Using *Trello, ChatGPT, Gantt chart* tools .	1LO 3LO		Practical work on a computer	Oral question and answer. Practical work (according to the check sheet) assessment)
	SIWT/SIW Stage 1 - execution. Criteria and requirements for selecting a project topic.	Stages of the formation of science. Outstanding scientists in the field of project activities.	1LO 3LO	1/5	Teamwork	By check sheet to be older
	OBJ /OBJ Stage 2 - execution. Project planning by topic.	Using *Trello, ChatGPT, Gantt chart tools.*	1LO 3LO		Teamwork	By check sheet assessment
2	**Practical lesson** Use of various digital tools in design activities.	Classification of digital tools. Use of digital tools in project management.	1LO 3LO	4	Practical work on a computer	Oral question and answer. Practical work on the check sheet assessment
	Practical lesson Analysis of literature sources in design activities. Assessment of project risks .	Determining criteria for selecting literature sources. Types of literature sources. Methods of searching and collecting information.	1LO 3LO		Practical work on a computer	Oral question and answer. Practical work (according to the check sheet) assessment
	SIWT/SIW Stage 3 - execution. Using various digital tools on the topic.	Using *Google* Forms and *Canva* tools .	1LO 3LO	1/5	Teamwork	By check sheet assessment
	OBZH /OBZH. Stage 4 - execution. Analysis of literary sources on the topic.	Databases (e.g. Google Scholar, JSTOR), libraries, specialized journals. Using keywords, filters, citation searching.	1LO 3LO		Teamwork	By check sheet assessment
	1-Intermediate control	Assessment of students' knowledge and skills on the topics of the practical lessons and the OBEC.			Project present	Rating on a 100-point scale
3	**Practical lesson** Project protection and evaluation.	Preparing for project defense. Making a presentation (slides, graphs, diagrams). Evaluation	1LO 3LO	1	Practical work on a computer	Oral question and answer. Practical

		criteria. Determining evaluation criteria (quality of execution, relevance, effectiveness, innovation).				work (according to the check sheet) assessment
	SIWT/SIW Stage 5 - execution. Project results and products.	Analysis of assessment results. Identification of project strengths and weaknesses. Project risk assessment (SWOT, SMART, GAP)	1LO 3LO	1/4	Teamwork	By check sheet assessment
	2-Intermediate control	Assessment of students' knowledge and skills on the topics of the practical lessons and the OBEC.			Testing	Rating on a 100-point scale
Preparation and conduct of intermediate certification (AAD)				3		
Biostatistics						
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. Research program and plan. Data collection. Data processing. Analysis, conclusions, suggestions.	LO 2	1	Informational	Feedback (quick questioning)
	Practical class Introduction to biostatistics.	Basic concepts and definitions. Types of statistical data. Basic types of measuring scales. Stages of statistical research.	LO 2 LO 3	3	Computer-based work	Oral questioning. Practical work. (assessment using a checklist).
	SIWT/SIW Consultation on the implementation of an individual task 1 / Creating an interval frequency distribution / *Organizing project groups, selection project topics, discussing PjBL methodological recommendations, organizing a Trello workspace*	Calculation of the number of intervals, their width and limits. Sorting data. Frequency analysis.	LO 2	1/6	Individual task 1 *PjBL Round table, brainstorming*	Solving problems (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 2	1	Informational	Feedback (quick questioning)
	Practical class	Frequency distribution and its	LO 2	3	Computer-	Oral

	Frequency distribution.	numerical characteristics. Graphical representation of frequency distribution. Introduction to the STATISTICA program (the "Descriptive statistics" procedure)	LO 4 LO 5		based work / Solving situational tasks.	questioning. Practical work. (assessment using a checklist).
	SIWT/SIW Consultation on the implementation of an individual task 2 / /Calculation of numerical characteristics of an interval frequency distribution, its graphical representation *Stage 1. Goal setting. Definition (specification) of the problem, setting goals, objectives, hypotheses, choosing a project product*	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	1/6	Individual task 2 *PjBL "Round table", brainstorming, SWOT-analysis*	Solving problems (assessment using a checklist) *Monitoring project progress on a Trello*
3.	**Lecture** Normal distribution. Basics of the theory of statistical hypothesis testing. Goodness-of-fit tests.	The specifics of the occurrence of 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.	LO 2	1	Informational	Feedback (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 2 LO 4 LO 5	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 / 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.	LO 4	1/6	Individual task 3 *PjBL*	Solving problems (assessment using a checklist) *Monitoring*

	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				*Brainstorming, responsibility distribution matrix, Gantt chart, "road map"*	*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 2	1	Informational	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 2 LO 4 LO 5	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 4 / Testing the hypothesis of equality of two means using Student's t-test for paired samples // *Stage 3. Project implementation. Working with information source. 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 2 LO 4 LO 5	1/6	Individual task 4 *PjBL Excursion to the library-information center. Literature review, individual and group consultations. Computer practical work with Google Forms, MS Excel*	Solving problems (assessment using a checklist) *Monitoring project progress on a Trello*
5	**Lecture** Parametric methods	One-way analysis of variance.	LO 2	1	Informational	Feedback (quick

	of comparative statistics					questioning)
	Practical class One-way analysis of variance.	One-way analysis of variance. Conditions of application. Implementation of analysis of variance (ANOVA) in the STATISTICA program.	LO 2 LO 4 LO 5	3	Computer-based work / Solving situational tasks.	Oral questioning. Practical work. (assessment using a checklist).
	SIWT/SIW Acceptance of SIW2. Consultation on the implementation of an individual task 5 / Analysis of variance	Scheme for applying the Kruskal–Wallis test	LO 2 LO 4 LO 5	2/5	Individual task 5	Logical flowchart (assessment using a checklist)
	Midterm control-1	Assessment of students' knowledge and skills based on the material covered in lectures, practical classes, and SIWT for topics 1–5.			Computer testing, MCQs	100-point scale assessment
6	**Lecture** Nonparametric methods of comparative statistics	Advantages and disadvantages of nonparametric tests. Mann-Whitney test. Wilcoxon test. Kruskal-Wallis test.	LO 2	1	Informational	Feedback (quick questioning)
	Practical class Nonparametric methods of comparative statistics	Mann-Whitney test. Wilcoxon test. Implementation of nonparametric tests in the STATISTICA program.	LO 2 LO 4 LO 5	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 / Nonparametric methods of comparative statistics/ *Stage 4. Project implementation. Statistical analysis of the obtained data*	Scheme for applying the nonparametric methods of comparative statistics	LO 2 LO 4 LO 5	1/6	Individual task 6 *PjBL Computer practical work with MS Excel, Statistica 12*	Logical flowchart (assessment using a checklist) *Monitoring project progress on a Trello*
7.	**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.	LO 2	1	Informational	Feedback (quick questioning)

		McNemar's chi-square test.				
	Practical class Analysis of qualitative variables.	2x2 contingency tables. Pearson's 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 2 LO 4 LO 5	3	Computer-based work / Solving situational tasks.	Oral questioning. Practical work. (assessment using a checklist).
	SIWT/SIW Acceptance of SIW 3. Consultation on the implementation of an individual task 7/ Analysis of qualitative variables/ *Stage 5. Project implementation. Preparation of a written report and presentation*	Contingency tables of size r x s. Pearson chi-square test (r x s).	LO 2 LO 4 LO 5	1/6	Individual task 7 *PjBL Computer practical work with Google Docs, Canva*	Solving problems (assessment using a checklist) *Monitoring project progress on a Trello*
8.	**Lecture** Correlation analysis.	Correlation analysis as a method for quantitatively assessing risk factors for disease complications. Scatterplot. Pearson's paired correlation coefficient. Reliability of correlation coefficient estimates.	LO 2	1	Informational	Feedback (quick questioning)
	Practical class Correlation analysis.	Pearson's pairwise correlation coefficient. Evaluating the reliability of the correlation coefficient. Implementation of correlation analysis in STATISTICA.	LO 2 LO 4 LO 5	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 8/ Correlation analysis/ *Stage 6. Preparing for the project defense, consultation with the teacher*	An example of the use of correlation analysis in medicine	LO 2 LO 4 LO 5	1/5	Individual task 8 *PjBL Computer practical work with Google Docs, Canva*	Solving problems (assessment using a checklist) *Monitoring project progress on a Trello*
9	**Practical class** Correlation analysis.	Spearman's rank correlation coefficient. Implementation of Spearman's rank correlation in STATISTICA.	LO 2 LO 4 LO 5	4	Computer-based work / Solving situational	Oral questioning. Practical work.

					tasks.	(assessment using a checklist).
	SIWT/SIW Consultation on the implementation of an individual task 9/ Summarizing the material using logical flowchart. / *Stage 7. Project presentation*	Odds ratio and relative risk.	LO 2 LO 4 LO 5	1/5	Individual task 9 *"Round table", public presentation*	Logical flowchart (assessment using a checklist) *Assessment according to checklist*
10	**Practical class** Regression analysis	Estimating linear regression parameters using the least squares method. Testing the hypothesis about the significance of regression coefficients. Testing the hypothesis about the significance of the regression equation. Coefficient of determination. Implementation of regression analysis in STATISTICA.	LO 2 LO 4 LO 5	4	Computer-based work / Solving situational tasks.	Oral questioning. Practical work. (assessment using a checklist).
	SIWT/SIW Acceptance of SIW 4. Consultation on the implementation of an individual task 10/ Regression analysis	An example of the use of regression analysis in medicine	LO 2 LO 4 LO 5	2/5	Individual task 10	Solving problems (assessment using a checklist)
	Midterm control-2	Assessment of students' knowledge and skills based on the material covered in lectures, practical classes, and SIWT for topics 5–7.			Computer testing, MCQs	100-point scale assessment
Preparation and conduct of intermediate certification (AAD)				12		

9.	**Teaching methods and controls forms**	
9.1	Lectures	**Biostatistics** Informational / Quick survey
9.2	Practical classes	**Project activity** Practical work on a computer **Biostatistics** Computer-based work / Solving situational tasks / Oral questioning. Practical work. (assessment using a checklist).
9.3	SIWT/SIW	**Project activity** Teamwork **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)*

9.4	Midterm control	**Project activity** Project protection, hearing **Biostatistics** Computer testing, MCQs (100-point scale assessment)

10. Evaluation Criteria

10.1. Criteria for evaluating module learning outcomes

LO	Name of learning outcomes	Unsatisfactory	Satisfactory	Good	Excellent
LO 1	Develops and implements medical and scientific-practical projects, taking into account current problems and needs of the healthcare system, in accordance with the stages of project activity.	1) The relevance of the project is not indicated or it is not related to the medical field ; 2) The stages of the project activity are not taken into account; 3) The project structure is disorganized, the goals and results are not consistent; 4) The result is incomplete or not presented at all.	1) The relevance of the project is described in general terms, a specific medical problem is not identified; 2) Project stages are partially used; 3) Logical connections in the project structure are weak; 4) Project results are presented incompletely or without specific evidence.	1) The project is focused on a specific medical problem; 2) The project stages are systematically outlined; 3) The structure meets the requirements , and the goal and result are mutually consistent; 4) The conclusions are presented in a well-founded and understandable manner.	1) The project reveals a relevant issue in the field of healthcare at a professional level; 2) All project stages were fully, accurately and consistently implemented; 3) The work was carried out in full accordance with scientific and methodological requirements ; 4) The results are visual, structured and innovative.
LO 2	Applies basic and advanced biostatistical methods to analyze medical, clinical, and epidemiological data within professional practice.	1)Unable to select or apply basic biostatistical methods; 2)Makes significant errors in calculations and data interpretation; 3)Lacks proficiency in statistical tools; 4)Cannot explain the obtained results.	1)Partially applies basic biostatistical methods; 2) Makes inaccuracies in calculations; 3) Uses a limited range of methods; 4) Demonstrates basic data interpretation skills without in-depth analysis.	1)Correctly applies basic and some advanced biostatistical methods; 2)Performs calculations confidently; 3)Interprets results with contextual understanding; 4)Uses appropriate software tools.	1)Confidently and reasonably applies both basic and advanced biostatistical methods; 2)Conducts precise analysis of medical and epidemiological data; 3)Accurately interprets results; 4)Demonstrates a high level of proficiency in statistical software and can justify the choice of method.
LO 3	Works effectively in a team within project activities,	1) Does not participate in team work or is passive; 2) Roles are not clearly defined in	1) Partial participation in teamwork; 2) Roles are partially divided,		1) Demonstrates active teamwork coordination or leadership; 2) Distributes roles

	distributes professional roles, and applies planning, organization, and evaluation skills in medical projects.	the project; 3) Planning and evaluation processes are not taken into account; 4) Communication and responsibility skills are not evident.	but not clearly defined; 3) There are shortcomings in organization and evaluation; 4) Responsibility and communication are limited.	1) Effectively interacts with the team; 2) Clearly allocates roles and fulfills tasks; 3) Properly organizes planning and evaluation work; 4) Maintains a culture of communication.	fairly and effectively; 3) Planning, organizing, and evaluating are carried out in a complete, logical, and professional manner; 4) Establishes trusting, accountable relationships within the team.
LO 4	Interprets biomedical data and draws well-grounded conclusions, using the results of quantitative analysis to support clinical and organizational decision-making.	1)Unable to interpret biomedical data; 2)Does not understand the meaning of the obtained quantitative indicators; 3)Fails to draw conclusions or makes conclusions that contradict the data; 4)No connection to the clinical or organizational context.	1)Interprets data with limited accuracy; 2)Draws superficial or partially supported conclusions; 3)Weakly links analysis results to clinical or organizational decisions.	1)Correctly interprets biomedical data; 2)Draws logically sound and well-founded conclusions; 3)Uses quantitative analysis results in decision-making, demonstrating an understanding of the clinical and organizational context.	1)Thoroughly analyzes and interprets biomedical data; 2)Formulates clear, evidence-based, and clinically justified conclusions; 3)Demonstrates integration of quantitative analysis into decision-making based on a scientific approach and evidence-based medicine.
LO 5	Uses modern digital tools (e.g., Excel, Statistica, etc.) for statistical processing of medical data and for presenting results in the form of tables, graphs, and scientific reports.	1)Does not possess skills in using digital tools for data processing; 2)Unable to create tables and graphs; 3)Makes significant errors in report formatting; 4)The result is uninformative or incomplete.	1)Demonstrates basic skills in using digital tools; 2)Able to perform simple data processing and create basic graphs and tables; 3) Report formatting is incomplete or contains inaccuracies.	1)Confidently uses Excel, Statistica, and similar programs for statistical processing of medical data; 2)Correctly formats tables, graphs, and reports; 3)Analysis results are clear and visually presented.	1)Proficient in using various digital tools and software; 2)Performs complex statistical processing; 3)Creates professionally formatted tables and graphs; 4)The report is logically structured, visually clear, and meets scientific standards.

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. - Correctly selects statistical procedures and conducts analysis. - Finds it difficult to interpret the result. - Correctly saves the spreadsheet and workbook.	30-34	Good
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.	15-29	Satisfactory

	- Finds it difficult to interpret the result. - Correctly saves the spreadsheet and workbook.		
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.		**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	Unsatisfac-tory
Individual task 2.		**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
Individual task 3.		**Max 20**	
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;	18-20	Excellent

	- 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.		
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 χ2- goodness-of-fit test contains minor mistakes; - 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.	15-17	Good
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;	10-14	Satisfactory
4.	- The hypothesis about the normal distribution of the sample was not tested using the Pearson and Kolmogorov-Smirnov goodness-of-fit tests.	0-9	Unsatisfactory
SIW 2			
Individual task 4.		**Max 60**	
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.	46-60	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.	40-45	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;	10-39	Satisfactory

	- The hypothesis was tested according to the Student's t-test algorithm for dependent samples; - The result of the decision is interpreted incorrectly.		
4	- The hypothesis of the equality of the two averages was incorrectly tested using the Student's t-test for dependent samples.	0-9	Unsatisfactory
Individual task 5. Logic flowchart		**Max 40**	
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.	36-40	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.	30-35	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.	1-29	Satisfactory
4	- The flowchart has not been completed.	0	Unsatisfactory
SIW 3			
Individual task 6. Logic flowchart		**Max 40**	
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.	36-40	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.	30-35	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.	1-29	Satisfactory

4	- The flowchart has not been completed.	0	Unsatisfactory
Individual task 7.		**Max 60**	
1	- The null and alternative hypotheses were formulated correctly; - The theoretical (expected) frequencies were calculated correctly using the formula; - The hypothesis was tested using the Pearson χ2 test; - The solution result was interpreted correctly; - The solution was verified in STATISTICA; a screenshot is attached.	46-60	Excellent
2	- The null and alternative hypotheses are formulated correctly; - The theoretical (expected) frequencies are calculated correctly using the formula; - The hypothesis is tested using the Pearson χ2 test; - The solution result is interpreted correctly.	40-45	Good
3	- The null and alternative hypotheses are formulated correctly; - Errors were made in calculating the theoretical (expected) frequencies using the formula; - The hypothesis was tested using the Pearson χ2 test; - The solution result was interpreted correctly.	10-39	Satisfactory
4	- Pearson's χ2-test analysis (rxs size table) was not performed.	0-9	Unsatisfactory
1	- 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 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.	46-60	Excellent
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;	40-45	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.	10-39	Satisfactory
4	- The task was not completed.	0-9	Unsatisfactory
SIW 4			
Individual task 8.		**Max 40**	
1	- The Pearson correlation coefficient was calculated correctly; - A calculation table was created; - The solution result was explained correctly; - The solution was verified in STATISTICA; a screenshot is attached.	36-40	Excellent
2	- The Pearson correlation coefficient was calculated correctly; - A calculation table was created; - The solution result was explained correctly.	30-35	Good
3	- The Pearson correlation coefficient was calculated incorrectly; - Errors were made in creating the calculation table; - The solution result was explained correctly.	1-29	Satisfactory
4	- The Pearson correlation coefficient was calculated incorrectly; - Errors were made when creating the calculation table;	0	Unsatisfactory

	- The solution result was explained incorrectly.		
Individual task 9. 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.	15-17	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.	10-14	Satisfactory
4	- The flowchart has not been completed.	0-9	Unsatisfactory
Individual task 10.		**Max 40**	
1	- The regression coefficient was calculated correctly; - A calculation table was created; - The solution result was explained correctly; - The solution was verified in STATISTICA; a screenshot is attached.	36-40	Excellent
2	- The regression coefficient was calculated correctly; - A calculation table was created; - The solution result was explained correctly.	30-35	Good
3	- The regression coefficient was calculated incorrectly; - Errors were made when creating the calculation table; - The solution result was explained correctly.	1-29	Satisfactory
4	- The regression coefficient was calculated incorrectly; - Errors were made when creating the calculation table; - The solution result was explained incorrectly.	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	The goal is formulated clearly and concisely. The objectives of the study are fully consistent with the goal.	15-20

	defining tasks to achieve it	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 complete. Scientific terms are not used. The text is presented randomly.	0-4
2	Objectivity and reliability of the obtained results,	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

	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 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

Project activity

Checklist for practical lessons

Evaluation criteria	Level			
	Very good	Good	Satisfaction	Dissatisfied
	90 – 100	70-89	50-69	<50

Oral request	35-40	25-34	20-24	< 20
Know the key terms and definitions for the topic under consideration.	10-10	8-10	7	< 6
Knowledge of the basic principles of medical care	10-10	8-10	7	< 6
Be able to determine the relationship between the topic under consideration and the future profession, and be able to provide specific practical examples .	10-10	8-10	6	< 6
References to additional literary sources when answering, additional notes, analysis of medical publications	5-10	1-4	0-3	0 - 2
To generate reports or perform tasks.	27-30	23-26	20-22	< 20
Analyze the given data.	9-10	8-9	7 - 8	< 7
Ability to work with regulatory documents.	9-10	8-9	7 - 7	< 6
Being able to draw conclusions.	9-10	7-8	6 - 7	< 6
Test follow-up	28 – 30	22-27	10 – 21	< 10

Checklist for the IEP

Evaluation criteria	Price	Evaluation criteria
Presentation of the topic	Very good Price according to: A (95-100%); A- (90-94%)	At least 20 slides were prepared using 5 sources of literature. The slides were of high-quality content. Demonstrated deep knowledge during the defense. Answered questions in detail. The presentation was submitted by the deadline.
	Good Price according to: B+ (85-89%); B (80-84%); B- (75-79%); C+ (70-74%).	Prepared no less than 18 slides using 4 sources of literature. The slides were of high-quality content. Demonstrated deep knowledge during the defense. Answered questions in full, with some errors in the answers. The presentation was submitted by the deadline.
	Satisfactory According to the price: C (65-69%); C- (60-64%); D + (55-59%); D (50-54%).	Prepared at least 15 slides using 3 sources of literature. The slides were of poor quality. Did not demonstrate in-depth knowledge during the defense. Did not answer questions completely, made mistakes in some answers. The presentation was not submitted by the deadline.
	Unsatisfactory According to the price: FX (25-49%) F(0-24%)	Prepared less than 10 slides, using less than 3 references. Slides are of poor quality. Does not know the topic during the defense. Did not answer the questions completely, made mistakes in some answers. Did not submit the presentation by the deadline.
Preparing the report and protection	Very good to the price : A (95-100%); A- (90-94%)	The report was carefully prepared and submitted by the deadline. It should use no more than 7 references and be no less than 15 pages long. Figures and tables are shown in accordance with the topic of the report. During the defense of the report, he did not read it, but narrated it himself. He answered the questions posed perfectly .
	Good to the price : B+ (85-89%); B (80-84%); B- (75-79%); C+ (70-74%).	The report was carefully prepared and submitted by the deadline. It should not be less than 10 pages long and should use more than 5 references. Figures and tables are presented in accordance with the topic of the report. During the defense of the report, the candidate did not read it, but narrated it himself. The answers to the questions given were incomplete.
	Satisfactory According to the	The report was carefully prepared and submitted by the deadline. It should not be less than 8 pages long and should use more than 3 references. Figures and

	price: C (65-69%); C- (60-64%); D + (55-59%) D - (50-54%)	tables are presented in accordance with the topic of the report. The report was read during the defense. The answers to the questions given were incomplete.
	Unsatisfactory According to the price: FX (25-49%) F(0-24%)	The report was not carefully prepared and submitted by the deadline. Figures and tables were not presented in accordance with the topic. The report was read during the defense. The answers to the questions were made in a gross manner.
Preparing test tasks	Very good Price according to: A (95-100%); A- (90-94%)	The test questions should not be less than 20 questions. They are given in their own time . The test questions are meaningful and detailed. The correct answers are indicated.
	Good Price according to: B+ (85-89%); B (80-84%); B- (75-79%); C+ (70-74%).	The test questions should not be less than 18 questions. They are given in their own time . The test questions are meaningful and carefully designed. The questions are not the same. The correct answers are indicated.
	Satisfactory According to the price: C (65-69%); C- (60-64%); D + (55-59%) D - (50-54%)	The test questions should not be less than 15 questions. They are given in their own time . The test questions are not comprehensive and detailed. Not all correct answers are shown.
	Unsatisfactory According to the price: FX (25-49%) F(0-24%)	Test questions are less than 10 questions. Not submitted on time. Test questions are not meaningful and detailed. Correct answers not shown.

Evaluation criteria	**90-100**	**70-89**	**50-69**	**< 50**
Deadline for submission of the EIS (on time, submitted 1-2 days late, submitted 3 days late, submitted more than 4 days late)	25-25	18-24	17-23	< 13-1 6
The type of assignment (number of pages/slides, number of test tasks) meets the requirements of the syllabus.	25-25	18-24	17-23	<13-16
Visuality (font size and type, use of graphics tools, image shapes, color features, etc.).	20-25	17-24	10-16	< 9-10
References	20-25	17	6-7	< 4-5

Checklist for intermediate certification		
Intermediate control/ solving oral,	Very good Price according to: A (95-100%); A- (90-94%)	90-100% correct answers on the ticket. The student solved the case studies correctly, and the answers were logically justified.
	Good Price according to: B+ (85-89%); B (80-84%); B- (75-79%); C+ (70-74%).	70-89% of correct answers on the ticket. The student solved the case studies correctly, but the answers were poorly logically substantiated.
	Satisfactory	50-69% of correct answers on the ticket. The student solved the case

situational problems	According to the price: C (65-69%); C- (60-64%); D + (55-59%) D - (50-54%)	problems incorrectly, and his answers were not logically substantiated.
	Unsatisfactory According to the price: FX (25-49%) F(0-24%)	Less than 50% of correct answers on the ticket. The student did not solve the situational problems correctly.

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	Medline Ultimate EBSCO	https://surl.li/rcdthz
9	eBook Medical Collection EBSCO	https://surl.li/rcdthz
10	Scopus	https://www.scopus.com/

Electronic textbooks

Biostatistics

1. Биостатистика [Электронный ресурс]: учебник /К.Ж. Кудабаев [и др.].- Электрон. текстовые дан. (85,7Мб).- Шымкент: ЮКГФА, 2015. – 187с. эл. опт. диск (CD-ROM)
2. Койчубеков Б.К., Сорокина М.А., Букеева А.С., Такуадина А.И. БИОСТАТИСТИКА в примерах и задачах: Учебно-метод. пособие/– Алматы ТОО «Эверо», 2020 https://elib.kz/ru/search/read_book/870/
3. Койчубеков Б.К. Биостатистика: Учебное пособие – Издательство «Эверо», Алматы, 2020, 154 с. https://elib.kz/ru/search/read_book/867/
4. В.Р.Чудиновских, Ж.Н.Абдикадыр. Применение компьютерных программ для проверки статистических гипотез в медико-биологических исследованиях: учебное пособие. – Караганда: ИП «Издательство АҚНҰР».-2016, 100 с. https://aknurpress.kz/reader/web/1344

5. В.Р.Чудиновских, Ж.Н.Абдикадыр, А.Ш.Каипова, А.У.Алтаева. Применение программ EXCEL и SPSS Statistics для статистического анализа медико-биологических данных: учебное пособие.– Караганда: ИП «Издательство АҚНҰР».– 2016, 128с. https://aknurpress.kz/reader/web/1342

Project Activity

Electronic resource

1. Seythanova BT Basics of project service: [Electronic resource]: educational and methodological manual) / BT Seythanova [et all.]. - Shymkent, 2025 el . wholesale disk (CD -ROM)
2. Seitkhanova B. T. Fundamentals of project activity: [Electronic resource]: educational and methodological tools / B. T. Seitkhanova [and others]. - Shymkent, 2025 e-mail.
3. Kargabayeva S.T., Abeldanova A.B. Project Management: a textbook.- "Medet Group" LLP . Almaty , 2020. – 238 p. https://aknurpress.kz/reader/web/2669
4. Trubilin A. I. Project Management: a textbook. - Almaty, Moscow: EDP Hub, IP Media, 2025. - 186 cI https://www.iprbookshop.ru/147680.html
5. Project management in healthcare. Ch. 2. Functional subsystems and evaluation of project effectiveness: uch.posobie/ A.V. Akhokhova, A.B. Khadzugov (and others).- Nalchik: KBSU. H.M. Berbekova, 2024.- 168 c. //IPR SMART: https://www.iprbookshop.ru/146630.html
6. Project activity as a way of personal development of students and their professional training: methodical instructions / E.A. Bulatova.- Nizhny Novgorod: NNGASU, EBS ASV, 2015.- 32 c. //IPR SMART: https://www.iprbookshop.ru/54955

Software

1.MS Excel
2.STATISTICA

Literature

Biostatistics

Main

1. Чудиновских В.Р. Абдикадыр Ж.Н. Применение программ EXCEL и SPSS statistics для статистического анализа медико-биологических данных. Учебное пособие.- ИП "АҚНҰР", 2021.
2. Койчубеков Б. К. Биостатистика. уч. пособие / Б.К. Койчубеков. - Алматы: Эверо, 2016. - 152 с.
Койчубеков Б.К. Биостатистика: учебное пособие. - Эверо, 2014.

Supplementary

1. Койчубеков Б.К. Биостатистика. Монография.- Алматы: ТОО Эверо, 2024.- 152с.
Бухарбаев М. А. Медицинская статистика: учебное пособие / М. А. Бухарбаев, В. Н. Казагачев. - 2-е изд. - Алматы: Эпиграф, 2022. - 268 с.

Project Activity

Main literature:

1.Кудайбергенова Г.У. Разработка проектно-сметной документации и бизнес-плана: лекционный комплекс.- АО ЮКМА, 2025. - 107 с.
2. Ғылыми жазылым теориясы мен практикасы. Күрделі қарапайым тілмен : оқу құралы = Теория и практика научного письма. Просто о сложном : учебное пособие = Theory and practice of scientifig writing. Intelligibly about the complicated : study guide / М. К. Кульжанов [и др.]. - Алматы : КМУ "ВШОЗ", МОН РК, 2022. - 365 с.

Additional literature:

1.Методические рекомендации по организации проектной деятельности обучающихся. АО «ЮКМА», 2022. http://surl.li/vazqkn
2.Основы доказательной медицины: методические указания / Т. М. Мажитов [и др.].- Астана: [б. и.], 2010. - 41 с.
3.Дербісалина Г.Ә. Дәлелді медицина негіздері: әдістемелік нұсқау / Г.Ә. Дербісалина.- 3-ші бас.- Қарағанды: ЖК "Ақнұр", 2020. - 138 б.
4.Сейтханова Б. Т. Жобалық қызмет негіздері : оқу-әдістемелік құралы.– Шымкент. – 2025 ж. – 86 бет.
5.Seythanova B. T. Basics of project servise: educational and methodical manual.- Shymkent, 2025
6.Койков, В. В. Надлежащая практика научных исследований: Избранные вопросы методологии биомедицинских исследований и исследований в медицинском образовании : исследование / В. В. Койков, Г.

А. Дербисалина. - Караганда : АҚНҰР, 2014. - 140 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 4 and 7th days of theoretical training. The results of the midterm control 1,2 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.
The 2nd intermediate control of students' knowledge in the "Project Activity" section is held on the 15th day of theoretical training, the results of the second intermediate control, taking into account penalty points, are posted in the electronic journal (the delivery of lectures in the form of penalty points is deducted from the assessment of the intermediate control). The penalty point for delivering 1 lecture is 2.0 points. A student who does not come to the intermediate control without a valid reason is not allowed to take the exam in the subject. The results of the intermediate 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%.

$$90 \times 0.4 = 36 \text{ points.}$$

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.

$$\text{The final grade (100 points)} = MCM_{average} \times 0.2 + CCM_{average} \times 0.4 + FC \times 0.4$$

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
«25» 06 2025 y.	№ 7	Derbicheva R.I.	
Date of approval at the department	**Protocol No.**	**Head of the Department Med.biophysics and IT**	**Signature**
«23» 05 2025 y.	№ 12a	Ivanova M.B.	
Date of approval at the department	**Protocol No.**	**"Microbiology , Allergology and Immunology "Head of the Department**	**Signature**
«26» 06 2025 y.	№ 11a	Seitkhanova B.T.	

Date of approval by AC EP	Protocol No.	Chairman of the AC EP	Signature
«23» 06 2025 y.	№ 6	Auezkhan D.	
Date of revision at the department	**Protocol No.**	**Head of the Department Med.biophysics and IT**	**Signature**
«____» ____202__ y.	№ ___	Ivanova M.B.	
Date of revision at the department	**Protocol No.**	**"Microbiology,Allergology and Immunology "Head of the Department**	**Signature**
«____» ____202__ y.	№ ___	Seitkhanova B.T.	
Date of revision on AC EP	**Protocol No.**	**Chairman of the AC EP**	**Signature**
«____» ____202__ y.	№ ___	Auezkhan D.	