Al-Farabi Kazakh National University

Faculty Medicine and Health Care

Education program on specialty:

"M 10105 Public Health"

**PROGRAM OF THE FINAL EXAM IN THE
DISCIPLINE OF COURSE "BIOSTATISTICS" for
students of 6B10105 specialty of Public Health**

6 credits

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PROGRAM
OF THE FINAL EXAM ON COURSE "BIOSTATISTICS" 6 credits

Study topics for the exam: The final exam will be in writing form as a Case Study. The thematic content covers all types of work: topics from lectures and seminars, as well as assignments for master's students' independent work.

The outcome of learning:

1. To demonstrate knowledge and understanding of the principles of Epidemiology as a science in Public Health.
2. To distinguish concepts of causality in epidemiology.
3. Demonstrate skills to estimate Population Health.
4. To demonstrate knowledge and skills in understanding the hierarchy and design of epidemiologic studies.
5. To show the ability to plan and provide an investigation of Infectious Diseases

List of examination items for preparation for the exam

Class 1. Introduction to Biostatistics. Descriptive and analytic epidemiology.
Class 2. Summarizing Data. Organizing of Data. Types of Variables. Frequency Distributions. Properties of Frequency Distributions. Methods for Summarizing Data. Measures of Central Location.
Class 3. The subject of medical statistics. Types of population. Sampling population. Basic requirements for sampling. Software for data analysis and processing. Application of Ms. Excel in medical statistics. Creating of formula. Statistical function.
Class 4. Variation series. Construction of a variational series. Sturges formula. Performing basic operations on data in SPSS. Data selection. Data transformation. Calculating new variables Calculation of standard deviation.
Class 5. The concept of variability in statistical analysis. Nature of distribution option. Normal distribution. Characterization of population units. Descriptive statistics. Software for data analysis and processing. Application of Ms.Excel in medical statistics. Analysis package. Statistical criteria for testing distributions in SPSS.
MODULE 2. Statistical methods of data processing.
Class 6. Parametric criteria for assessing the validity of differences of repeated measurements. Algorithm of application of paired Student's t-criterion. Parametric tests in SPSS. Comparisons of dependent groups.
Class7. Parametric criteria for assessing the reliability of differences between two independent samples. Algorithm of application of Student's t-criterion. Parametric tests in SPSS. Comparisons of independent groups.
Class 8. Analyzing qualitative traits. Contingency tables: criterion $\chi2$. Fisher's exact test. Statistical criteria for conjugation tables in the SPSS.
Class 9. Nonparametric methods for assessing the reliability of two dependent and independent samples. The criterion of signs. Algorithm application Wilcoxon's T-criterion. Rosenbaum's Q-criterion. Algorithm of application of Mann-Whitney U-Test. Non-parametric tests in SPSS.
Class 10. Analysis of dynamic series. The main indicators of the dynamic series.
Class 11. Methods of equalization of dynamic series. Determination of seasonality indices.
Class 12. Definition of dependence and relationship between phenomena. Pearson's correlation coefficient. Spearman's rank correlation coefficient.Linear regression analysis.
Class 13. Logistic regression.

Class 14. Construction of a survival curve using the Kaplan-Meier method.
Class 15. Correlation

EXAM RULES

1. Bachelor students are authorized in the Moodle LMS and get access to the task "Final exam in the discipline" at the time set by the teacher.

2. Learn the topics of the instructor's case study.

3. Perform the task within 3 hours

4. Load the completed work on the case study into the LMS Moodle for this:

4.1 Students should be authorized in LMS Moodle,

4.2 open the element "Final exam in the discipline,"

4.3 select the item "Add an answer to the task,"

4.4 upload their works in the file upload field,

4.5 click "Save."

The form of the final control (exam):
WRITTEN- CASE STUDY

Form of conducting final control (exam) *.	Used platform	For whom recommend	Availability of proctoring, video recording, verification for plagiarism	Possibility generating tickets of questions	How is done verification of works
WRITTEN: – case study	LMS MOODLE	bachelors	Video recording at individual work - not required. Mandatory check for plagiarism in the works of doctoral students. Provided automatic check work for availability plagiarism with using two services: Antiplagiarism (required) and Strike Plagiarism (if necessary).	**no**	1. Teacher discipline gets ready files / responses in DLS Moodle. 2. Evaluates the work, checks on the presence of plagiarism. 3. Puts points in DLS MOODLE. 4. Transfer points to

Grading

Final assessment of the two stages of the exam: report assessment	Numerical assessment	Scores (%)	Traditional assessment	Requirements
A A-	4,0 3,67	95-100 90-94	Excellent	Full understanding of course topics. Use of cognitive, systemic, and functional competencies. Critical thinking, analysis, and application of knowledge and skills.

B+ B B- C+	3,33 3,0 2,67 2,33	85-89 80-84 75-79 70-74	Good	Understanding of course topics with few inaccuracies. Using cognitive, systemic, and functional competencies, as well as standard critical thinking, analysis, and application of knowledge and skills.
C C-	2,0 1,67	65-69 60-64	Satisfied	Incomplete understanding of course topics. Students do not use cognitive, systemic, and functional competencies to the full extent. Standard critical thinking, poor analysis, and incomplete application of knowledge and skills.
D+ D- FX	1,33 1,0 0,5	55-59 50-54 25-49	Unsatisfied	There is a lack of understanding of course topics. The student does not use cognitive, systemic, and functional competencies. There is no critical thinking, and there is poor analysis and application of knowledge and skills.

Required and Recommended Reading :

The main and additional literature:

1. High-Yield Biostatistics, Epidemiology, & Public Health. FOURT H E D I T I O N. TM. Anthony N. Glaser.-2014.-107 pp.
2. Kaplan USMLE. Behavioral Science and Social Sciences. STEP 1 Lecture Notes,2017.- 229 pp.
3. Primer of Biostatistics. Seventh Edition. Stanton A. Glantz, 2012.-297 pp.
4. Biostatistics for Dummies//https://books.google.kz/books?id=tagRAAAAQBAJ&printsec =frontcover&redir_esc=y#v=onepage&q&f=false
5. Kaplan USMLE //
6. SPSS tutorial Kent University//https://libguides.library.kent.edu/SPSS
7. Manual on Excel//
8. SPSS for Beginners//
   https://www.youtube.com/watch?v=_zFBUfZEBWQ&ab_channel=ResearchByDesign
9. Aviva Petrie, Caroline Sabin. Visual medical statistics. Textbook for universities. Moscow, GEOTAR-Media, 2015. 168 c.
10. Nasledov A. N31 IBM S P S S Statistics 20 and AMOS: professional statistical data analysis. - SPb.: Peter, 2013. 416c.
11. Elizabeth De Poy, Laura N. Gitlin; per. from Engl. ed. by V.V. Vlasov. Vlasov. Methods of scientific research in medicine and public health - M.: GEOTAR-Media, 2017. - 432 c.
12. Grzhibovsky A.M., Ivanov S.V., Gorbatova M.A. Descriptive statistics using the packages of Statistica and SPSS statistical programs: distribution verification // Science and Health. 2016. № 1. C. 7- 23.
13. Grzhibovsky A.M., Ivanov S.V., Gorbatova M.A. Comparison of quantitative data of two independent samples using Statistica and SPSS software: parametric and nonparametric criteria // Science and Health. 2016. № 2. C. 5-28.
14. Grzhibovsky A.M., Ivanov S.V., Gorbatova M.A. Comparison of quantitative data of two paired samples using Statistica and SPSS software: parametric and nonparametric criteria // Science and Health. 2016. № 3. C. 5-25.
15. Grzhibovsky A.M., Ivanov S.V., Gorbatova M.A. Comparison of quantitative data of three and more independent samples using Statistica and SPSS software: parametric and nonparametric criteria// Science and Health Care. 2016. № 4. C. 5-37.
16. Grzhibovsky A.M., Ivanov S.V., Gorbatova M.A. Comparison of quantitative data of three and

more paired samples using Statistica and SPSS software: parametric and nonparametric criteria // Science and Health. 2016. № 5. C. 5-29.

Research infrastructure
1. Computer lab 6A
2. Professional research databases www.gapminder
3. com www.cdc.gov

Internet sources
   http://elibrary.kaznu.
   kz/ru https://www.stat.gov.kz/
   Software Excel and SPSS

Type of Exam: Written Case study

Datasets for students are in the IBM SPSS data
Steps for a case study

   I.   Work in IBM SPSS
      1.1   Open dataset in IBM SPSS
      1.2   Check variables and data
      1.3   Code of data
      1.4   Write a list of variables and estimate type of them
      1.5   Provide normality of distribution of quantitative variables and write the mean or median of it
      1.6   Provide a measure of nominal and ordinal variables by frequency and percentages. Write the results in Table.
      1.7   Provide descriptive statistics with quantitative variables (T-tests) and Chi-square test, Fisher test, correlation
      1.8   Provide non-parametric tests: Mann-Witney and Cruskull-Wallis
      1.9   Provide inferential statistics: linear and logistic regression.
   II.   Create tables and write conclusions according to the objectives of the case.