Ministry of Agriculture of the Russian Federation
Federal State Budgetary Educational Institution
higher education
"St. Petersburg State University of Veterinary Medicine"

APPROVED BY
Vice-Rector
for educational work
and youth policy
Professor
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Department of Inorganic Chemistry and Biophysics

WORKING PROGRAMM

by discipline

"COMPUTER SCIENCE AND DIGITAL TECHNOLOGIES"

Level of higher education
SPECIALTY
Specialty 05/36/01 Veterinary
Full-time education

Education starts in 2024

Reviewed and accepted
at a department meeting
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Protocol No. 15-05-23/24

Head department
inorganic chemistry and biophysics
Candidate of Chemical Sciences, Associate Professor
A.N. Baryshev

Saint Petersburg
2024

1. GOALS AND OBJECTIVES OF DISCIPLINE

Due to the increasing role of computer science in modern conditions, the introduction of computers into all sectors of the national economy, including the medical sector, is constantly increasing. A modern specialist of any profile must confidently communicate with computer technology, since the accumulation and processing of experimental statistical data is universally carried out using computers.

The purpose of studying the discipline is to study the general theoretical foundations of mathematical biostatistics, as well as the theoretical foundations of computer science as a science, study the composition and functioning of modern computers, obtain computer skills for their effective use in professional activities, as well as for continuous, independent improvement of the level of qualifications based on modern educational and other information technologies.

To achieve this goal, it is necessary to solve the following tasks:

a) The general educational task is to in-depth familiarize students with the basics of mathematical biostatistics and information technology, with the basics of statistical methods for presenting, grouping and processing materials (results) of biological research.

b) The applied task covers issues related to the use of modern application software packages at the level of a qualified user.

c) The special task is to acquire practical skills in statistical research methods in biology, calculation of the most important statistical indicators and patterns characterizing sets of biological objects for their effective use in professional activities.

2. LIST OF PLANNED MASTERING RESULTS BY DISCIPLINE (MODULE), CORRELATED WITH THE PLANNED RESULTS OF MASTERING THE EDUCATIONAL PROGRAM

As a result of mastering the discipline, the student prepares for the following types of activities, in accordance with the educational standard of Federal State Educational Standard of Higher Education 36.05.01 "Veterinary Medicine".

Area of professional activity:

13 Agriculture

Types of professional activity tasks:

- Medical;
- Expert control;
- Scientific and educational.

Student competencies formed as a result of mastering the discipline

Studying the discipline should form the following competencies:

A) Universal Competencies (UC):

UC-1 Able to critically analyze problem situations based on a systematic approach and develop an action strategy:

UC-1ID-1 Know the methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis;

UC-1ID-2 Be able to obtain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific issues related to the professional field; search for information and solutions based on actions, experiment, experience, information and communication technologies;

UC-1ID-3 Be able to study the problem of professional activity using analysis, synthesis and other methods of intellectual activity, including the use of information and communication

technologies; identifying problems and using adequate methods to solve them; demonstrating value judgments in solving problematic professional situations.

UC-4 Able to use modern communication technologies, including in foreign language(s), for academic and professional interaction:

UC-4ID-1 Know computer and information and communication technologies, information and digital infrastructure in the organization; communication in professional ethics; factors for improving communication in an organization, communication technologies in professional interaction; characteristics of communication flows; the importance of communication in professional interaction; methods for studying the communicative potential of an individual; modern means of information and communication technologies;

UC-4ID-2 Be able to create written texts in Russian and foreign languages in scientific and official business styles of speech on professional issues; explore the flow of information through management communications; determine internal communications in the organization, including using digital technologies;

UC-4ID-3 Know the principles of forming a communication system; analyze the system of communication links in the organization by implementing oral and written communications, including in a foreign language; presenting plans and results of one's own and team activities using communication technologies; technology for building effective communication in an organization; transfer of professional information in information and telecommunication networks using modern means of information and communication technologies.

B) **General professional competencies (GPC):**

GPC-5 Able to draw up special documentation, analyze the results of professional activities and submit reporting documents using specialized databases:

GPC-5_{ID-1}Be able to use new information technologies to solve assigned problems in your professional activities, work with specialized information databases;

GPC-5_{ID-2}Possess skills in working with an operating system, with text and spreadsheet processors, with database management systems, with information retrieval systems on the Internet;

GPC-5_{ID-3}Know new information technologies to solve problems in your professional activities, work with specialized information databases.

GPC-7 Able to understand the operating principles of modern information technologies and use them to solve professional problems:

GPC-7_{ID-1}Know modern technical means and information technologies;

GPC-7_{ID-2}Be able to use modern technical tools and information technologies, including elements of machine learning and artificial intelligence, to solve analytical and research problems;

GPC-7_{ID-3} Possess the skills to use modern technical means and information technologies to solve analytical and research problems.

3. THE PLACE OF DISCIPLINE IN THE STRUCTURE OF THE MPEP

Discipline B.1.O.12 "Informatics and digital technologies" is a mandatory discipline of the federal state educational standard of higher education in specialty 36.05.01 "Veterinary Medicine" (specialty level).

Mastered: 1 semester (full-time study)

When teaching the discipline "Computer science and digital technologies", knowledge and skills are used, received by students while mastering a school course in mathematics and computer science in accordance with the state standard of general education.

Discipline " Computer science and digital technologies" is the discipline on which subsequent disciplines are built, such as:

1. Biological physics.
2. Economy.
3. Methods of scientific research.

4. THE SCOPE OF DISCIPLINE AND TYPES OF ACADEMIC WORK

4.1. Scope of the discipline " Computer science and digital technologies" for full-time study

Type of educational work	Total hours	Semester
		1
Classroom lessons (total)	**54**	**54**
Including:		
Lectures, including interactive forms	18	18
Practical exercises (PP), including interactive forms, including:	36	36
practical training (PT)	6	6
Independent work (total)	**54**	**54**
Type of intermediate certification (test/exam)	**Test**	**Test**
Total labor intensityhours/credits	**108/3**	**108/3**

5. CONTENT OF DISCIPLINE"INFORMATICS AND DIGITAL TECHNOLOGIES"

5.1. Contents of the discipline "Informatics and Digital Technologies" for full-time study

№	Name	Formed competencies	Semester	Types of educational work, including independent work of students and labor intensity (in hours)			
				L	PP	PT	IW
1.	Basic concepts of probability theory	**UC-1**Able to critically analyze problem situations based on a systematic approach and develop an action strategy: UC-1ID-1 Know the methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis; UC-1ID-2 Be able to obtain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific issues related to the professional field; search for information and solutions based on actions, experiment, experience, information and communication technologies; UC-1ID-3 Be able to study the problem of professional activity using analysis, synthesis and other methods of intellectual activity, including the use of information and communication technologies; identifying problems and using adequate methods to solve them; demonstrating value judgments in solving problematic professional situations.	1	2	2	2	4
2.	Random variables	**UC-1**Able to critically analyze problem situations based on a systematic approach and develop an action strategy: UC-1ID-1 Know the methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis; UC-1ID-2 Be able to obtain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific issues related to the professional field; search for information and solutions based on actions, experiment, experience, information and communication technologies; UC-1ID-3 Be able to study the problem of professional activity using analysis, synthesis and other methods of intellectual activity, including the use of information and communication technologies; identifying problems and using adequate methods to solve them; demonstrating value judgments in solving problematic professional situations.	1	2	2	2	4
3.	Math statistics. Descriptive methods of data analysis	**UC-1**Able to critically analyze problem situations based on a systematic approach and develop an action strategy: UC-1ID-1 Know the methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis; UC-1ID-2 Be able to obtain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific issues related to the professional field; search for information and solutions based on actions, experiment, experience, information and communication technologies;	1	2	2	-	6

		UC-1ID-3 Be able to study the problem of professional activity using analysis, synthesis and other methods of intellectual activity, including the use of information and communication technologies; identifying problems and using adequate methods to solve them; demonstrating value judgments in solving problematic professional situations.					
4.	Statistical evaluation	**UC-1**Able to critically analyze problem situations based on a systematic approach and develop an action strategy: UC-1ID-1 Know the methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis; UC-1ID-2 Be able to obtain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific issues related to the professional field; search for information and solutions based on actions, experiment, experience, information and communication technologies; UC-1ID-3 Be able to study the problem of professional activity using analysis, synthesis and other methods of intellectual activity, including the use of information and communication technologies; identifying problems and using adequate methods to solve them; demonstrating value judgments in solving problematic professional situations.	1	2	-	2	4
5.	Statistical hypothesis testing	**UC-1**Able to critically analyze problem situations based on a systematic approach and develop an action strategy: UC-1ID-1 Know the methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis; UC-1ID-2 Be able to obtain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific issues related to the professional field; search for information and solutions based on actions, experiment, experience, information and communication technologies; UC-1ID-3 Be able to study the problem of professional activity using analysis, synthesis and other methods of intellectual activity, including the use of information and communication technologies; identifying problems and using adequate methods to solve them; demonstrating value judgments in solving problematic professional situations.	1	2	2	-	4
6.	Basic concepts and methods of computer science and coding theory	**GPC-5**Able to draw up special documentation, analyze the results of professional activities and submit reporting documents using specialized databases: GPC-5_{ID-1}Be able to use new information technologies to solve assigned problems in your professional activities, work with specialized information databases; GPC-5_{ID-2}Possess skills in working with an operating system, with text and spreadsheet processors, with database management systems, with information retrieval systems on the Internet; GPC-5_{ID-3}Know new information technologies to solve problems in your professional activities, work with specialized information databases.	1	2	2	-	4
7.	Technical means for implementing information processes	GPC-**5**Able to draw up special documentation, analyze the results of professional activities and submit reporting documents using specialized databases: GPC-5_{ID-1}Be able to use new information technologies to solve assigned problems in your professional activities, work with specialized information databases; GPC-5_{ID-2}Possess skills in working with an operating system, with text and spreadsheet processors, with database management systems, with information retrieval systems on the Internet;	1	2	-	-	4

		GPC-5_{ID-3}Know new information technologies to solve problems in your professional activities, work with specialized information databases.					
8.	PC software	**GPC-5**Able to draw up special documentation, analyze the results of professional activities and submit reporting documents using specialized databases: GPC-5_{ID-1}Be able to use new information technologies to solve assigned problems in your professional activities, work with specialized information databases; GPC-5_{ID-2}Possess skills in working with an operating system, with text and spreadsheet processors, with database management systems, with information retrieval systems on the Internet; GPC-5_{ID-3}Know new information technologies to solve problems in your professional activities, work with specialized information databases.	1	2	-	-	2
9.	Operating systems (OS)	**GPC-5**Able to draw up special documentation, analyze the results of professional activities and submit reporting documents using specialized databases: GPC-5_{ID-1}Be able to use new information technologies to solve assigned problems in your professional activities, work with specialized information databases; GPC-5_{ID-2}Possess skills in working with an operating system, with text and spreadsheet processors, with database management systems, with information retrieval systems on the Internet; GPC-5_{ID-3}Know new information technologies to solve problems in your professional activities, work with specialized information databases.	1	2	-	-	2
10.	Standard Windows applications	**UC-4** Able to use modern communication technologies, including in foreign language(s), for academic and professional interaction: UC-4ID-1 Know computer and information and communication technologies, information and digital infrastructure in the organization; communication in professional ethics; factors for improving communication in an organization, communication technologies in professional interaction; characteristics of communication flows; the importance of communication in professional interaction; methods for studying the communicative potential of an individual; modern means of information and communication technologies; UC-4ID-2 Be able to create written texts in Russian and foreign languages in scientific and official business styles of speech on professional issues; explore the flow of information through management communications; determine internal communications in the organization, including using digital technologies; UC-4ID-3 Know the principles of forming a communication system; analyze the system of communication links in the organization by implementing oral and written communications, including in a foreign language; presenting plans and results of one's own and team activities using communication technologies; technology for building effective communication in an organization; transfer of professional information in information and telecommunication networks using modern means of information and communication technologies. **GPC-7**Able to understand the operating principles of modern information technologies and use them to solve professional problems: GPC-7_{ID-1}Know modern technical means and information technologies; GPC-7_{ID-2}Be able to use modern technical tools and information technologies, including elements of machine learning and artificial intelligence, to solve analytical and research problems;	1	-	2	-	2

		GPC-7_{ID-3} Possess the skills to use modern technical means and information technologies to solve analytical and research problems.					
11.	Word processor Microsoft Word	**UC-4** Able to use modern communication technologies, including in foreign language(s), for academic and professional interaction: UC-4ID-1 Know computer and information and communication technologies, information and digital infrastructure in the organization; communication in professional ethics; factors for improving communication in an organization, communication technologies in professional interaction; characteristics of communication flows; the importance of communication in professional interaction; methods for studying the communicative potential of an individual; modern means of information and communication technologies; UC-4ID-2 Be able to create written texts in Russian and foreign languages in scientific and official business styles of speech on professional issues; explore the flow of information through management communications; determine internal communications in the organization, including using digital technologies; UC-4ID-3 Know the principles of forming a communication system; analyze the system of communication links in the organization by implementing oral and written communications, including in a foreign language; presenting plans and results of one's own and team activities using communication technologies; technology for building effective communication in an organization; transfer of professional information in information and telecommunication networks using modern means of information and communication technologies. **GPC-7**Able to understand the operating principles of modern information technologies and use them to solve professional problems: GPC-7_{ID-1}Know modern technical means and information technologies; GPC-7_{ID-2}Be able to use modern technical tools and information technologies, including elements of machine learning and artificial intelligence, to solve analytical and research problems; GPC-7_{ID-3} Possess the skills to use modern technical means and information technologies to solve analytical and research problems.	1	-	4	-	4
12.	Microsoft Excel 2007 Spreadsheets	**UC-4** Able to use modern communication technologies, including in foreign language(s), for academic and professional interaction: UC-4ID-1 Know computer and information and communication technologies, information and digital infrastructure in the organization; communication in professional ethics; factors for improving communication in an organization, communication technologies in professional interaction; characteristics of communication flows; the importance of communication in professional interaction; methods for studying the communicative potential of an individual; modern means of information and communication technologies; UC-4ID-2 Be able to create written texts in Russian and foreign languages in scientific and official business styles of speech on professional issues; explore the flow of information	1	-	6	-	6

		through management communications; determine internal communications in the organization, including using digital technologies; UC-4ID-3 Know the principles of forming a communication system; analyze the system of communication links in the organization by implementing oral and written communications, including in a foreign language; presenting plans and results of one's own and team activities using communication technologies; technology for building effective communication in an organization; transfer of professional information in information and telecommunication networks using modern means of information and communication technologies. **GPC-7**Able to understand the operating principles of modern information technologies and use them to solve professional problems: GPC-7_{ID-1}Know modern technical means and information technologies; GPC-7_{ID-2}Be able to use modern technical tools and information technologies, including elements of machine learning and artificial intelligence, to solve analytical and research problems; GPC-7_{ID-3} Possess the skills to use modern technical means and information technologies to solve analytical and research problems.					
13.	Database management system (DBMS) Microsoft Access	**UC-4** Able to use modern communication technologies, including in foreign language(s), for academic and professional interaction: UC-4ID-1 Know computer and information and communication technologies, information and digital infrastructure in the organization; communication in professional ethics; factors for improving communication in an organization, communication technologies in professional interaction; characteristics of communication flows; the importance of communication in professional interaction; methods for studying the communicative potential of an individual; modern means of information and communication technologies; UC-4ID-2 Be able to create written texts in Russian and foreign languages in scientific and official business styles of speech on professional issues; explore the flow of information through management communications; determine internal communications in the organization, including using digital technologies; UC-4ID-3 Know the principles of forming a communication system; analyze the system of communication links in the organization by implementing oral and written communications, including in a foreign language; presenting plans and results of one's own and team activities using communication technologies; technology for building effective communication in an organization; transfer of professional information in information and telecommunication networks using modern means of information and communication technologies. **GPC-7**Able to understand the operating principles of modern information technologies and use them to solve professional problems: GPC-7_{ID-1}Know modern technical means and information technologies;	1	-	4	-	4

		GPC-7_{ID-2}Be able to use modern technical tools and information technologies, including elements of machine learning and artificial intelligence, to solve analytical and research problems; GPC-7_{ID-3} Possess the skills to use modern technical means and information technologies to solve analytical and research problems.					
14.	Microsoft Power Point Presentation Tools	**UC-4** Able to use modern communication technologies, including in foreign language(s), for academic and professional interaction: UC-4ID-1 Know computer and information and communication technologies, information and digital infrastructure in the organization; communication in professional ethics; factors for improving communication in an organization, communication technologies in professional interaction; characteristics of communication flows; the importance of communication in professional interaction; methods for studying the communicative potential of an individual; modern means of information and communication technologies; UC-4ID-2 Be able to create written texts in Russian and foreign languages in scientific and official business styles of speech on professional issues; explore the flow of information through management communications; determine internal communications in the organization, including using digital technologies; UC-4ID-3 Know the principles of forming a communication system; analyze the system of communication links in the organization by implementing oral and written communications, including in a foreign language; presenting plans and results of one's own and team activities using communication technologies; technology for building effective communication in an organization; transfer of professional information in information and telecommunication networks using modern means of information and communication technologies. **GPC-7**Able to understand the operating principles of modern information technologies and use them to solve professional problems: GPC-7_{ID-1}Know modern technical means and information technologies; GPC-7_{ID-2}Be able to use modern technical tools and information technologies, including elements of machine learning and artificial intelligence, to solve analytical and research problems; GPC-7_{ID-3} Possess the skills to use modern technical means and information technologies to solve analytical and research problems.	1	-	4	-	4
		TOTAL FOR 1 SEMESTER	**18**	**30**	**6**	**54**	

6. LIST OF EDUCATIONAL AND METHODOLOGICAL SUPPORT FOR INDEPENDENT WORK OF STUDENTS

6.1.Guidelines for independent work

1. Educational and methodological manual on the organization of independent work of students in the areas of training implemented in St. Petersburg State Academy of Mechanics and Mathematics [Electronic resource] / A.A. Sukhinin [and others]; SPbGAVM - SPb.: Publishing house SPbGAVM, 2018. - 67 p. - Access mode:https://ebs.spbgavm.ru/MarcWeb2/Default.asp(date of access: 04/27/2024)
2. Practical guide to laboratory work in computer science. Text editor Writer Open Office. Part 1 / SPbGAVM; comp.: M.K. Igolinskaya, E.A. Belov. - St. Petersburg: Publishing house of SPbGAVM, 2008. - 54 p.
3. EXCEL spreadsheets: a practical guide to laboratory work in computer science for first-year students of all faculties, for students of the correspondence faculty, for graduate students of veterinary specialties. Part 2 / comp.: M. K. Igolinskaya, E. M. Smirnova, N. A. Lebedinskaya; SPbGAVM. - St. Petersburg: Publishing House SPbGAVM, 2016. - 76 p. - URL: Igolinskaya, Smirnova, Lebedinskaya.EXL_16 - (date of access: 04/27/2024).
4. Igolinskaya M.K. Basics of working with the Access 2007 database management system. Methodological manual for laboratory work in computer science / Igolinskaya M.K. – SPb: SPbGAVM, 2013. – 60 p.

6.2.Literature for independent work

1. Short course on probability theory and mathematical statistics: educational and methodological manual for higher mathematics / comp. M. K. Igolinskaya, N. A. Lebedinskaya, T. Sh. Kuznetsova; SPbGAVM. - St. Petersburg: Publishing house SPbGAVM, 2016. - 61 p.
2. V. E. Probability theory and mathematical statistics: textbook for universities / V. E. Gmurman. — 12th ed. - Moscow: Yurayt Publishing House, 2021. - 479 p. - (Higher education). — ISBN 978-5-534-00211-9. — Text: electronic // Educational platform Urayt [site]. — URL: https://urait.ru/bcode/468331 (date of access: 04/27/2024).

7. LIST OF BASIC AND ADDITIONAL LITERATURE REQUIRED FOR MASTERING THE DISCIPLINE

a) basic literature:

1. Short course on probability theory and mathematical statistics: textbook. -method. higher education allowance mat. for independent work of students and graduate students of SPbGAVM / comp. M. K. Igolinskaya, E. M. Smirnova; SPbGAVM. – St. Petersburg: Publishing house SPbGAVM, 2017. – 65 p. – Text: electronic. – URL:https://clck.ru/VYoUh(date of access: 04/27/2024). – Access mode: for authorization. users of the SPbSUVM EB.
2. Short course on probability theory and mathematical statistics: educational method. higher education allowance mat. for independent work of students and postgraduate students of St. Petersburg State Academy of Mechanics and Mathematics / comp.: M. K. Igolinskaya, N. A. Lebedinskaya. T. Sh. Kuznetsova; SPbGAVM. – St. Petersburg: Publishing house SPbGAVM, 2016. – 61 p. – Text: electronic. – URL:https://clck.ru/VYocu(date of access: 04/27/2024). – Access mode: for authorization. users of the SPbSUVM EB.
3. Mathematical statistics in Excel: practical. hands to the lab. work on stat. with use electron. table Excel for 1st year students of all faculties, for part-time students. Faculty, for graduate students of veterinary science. specialist. / comp. M. G. Igolinskaya, E. M. Smirnova; SPbGAVM. – St. Petersburg: SPbGAVM, 2017. – 24 p. – Text: electronic. – URL:https://clck.ru/VYotu(date of access: 04/27/2024). – Access mode: for authorization. users of the SPbSUVM EB.
4. Rudakova, L. V. Information technologies in the analytical control of biologically active substances: monograph / L. V. Rudakova, O. B. Rudakov. — 2nd ed., rev. - St. Petersburg: Lan, 2021. - 364 p. — ISBN 978-5-81140-1870-1. — Text: electronic // Lan: electronic library system.

— URL:https://e.lanbook.com/book/168787(date of access: 04/27/2024). — Access mode: for authorization. users.
5. Stepanov, V. G. Application of nonparametric statistics methods in research of agricultural biology and veterinary medicine: textbook / V. G. Stepanov. — St. Petersburg: Lan, 2019. — 56 p. — ISBN 978-5-8114-3269-1. — Text: electronic // Lan: electronic library system. — URL:https://e.lanbook.com/book/111905(date of access: 04/27/2024). — Access mode: for authorization. users.
6. Text editor MS WORD 2007: educational method. information manual for 1st year students of all faculties, for part-time students. departments and for asp. vet. specialist. / comp. M. K. Igolinskaya, N. A. Lebedinskaya, E. M. Smirnova; SPbGAVM. – St. Petersburg: Publishing house SPbGAVM, 2016. – 67 p. – Text: electronic. – URL:https://clck.ru/VYpkk(date of access: 04/27/2024). – Access mode: for authorization. users of the SPbSUVM EB.

b) additional literature:

1. Derr, V. Ya. Probability theory and mathematical statistics: textbook for universities / V. Ya. Derr. — St. Petersburg: Lan, 2021. — 596 p. — ISBN 978-5-8114-6515-6. — Text: electronic // Lan: electronic library system. — URL:https://e.lanbook.com/book/159475(date of access: 04/27/2024). — Access mode: for authorization. users.
2. Mathematical statistics in biology: educational and methodological manual for students studying in the field of study 03/35/08 - "Aquatic biological resources and aquaculture" / compiled by: E. M. Smirnova; Ministry of Agriculture of the Russian Federation, SPbGAVM. – St. Petersburg: Publishing house SPbGAVM, 2017. – 65 p. – Text: electronic. – URL:https://clck.ru/VYyDU(date of access: 04/27/2024). – Access mode: for authorization. users of the SPbSUVM EB.
3. Ganicheva, A. V. Probability theory: textbook / A. V. Ganicheva. - St. Petersburg: Lan, 2021. - 144 p. — ISBN 978-5-8114-2380-4. — Text: electronic // Lan: electronic library system. — URL:https://e.lanbook.com/book/167356(date of access: 04/27/2024). — Access mode: for authorization. users.
4. Khrushcheva, I.V. Probability theory: textbook / I.V. Khrushcheva. - St. Petersburg: Lan, 2021. - 304 p. — ISBN 978-5-8114-0915-0. — Text: electronic // Lan: electronic library system. — URL:https://e.lanbook.com/book/167789(date of access: 04/27/2024). — Access mode: for authorization. users.

8. LIST OF RESOURCES OF THE INTERNET INFORMATION AND TELECOMMUNICATION NETWORK NECESSARY FOR MASTERING THE DISCIPLINE

To prepare for practical classes and perform independent work, students can use the following Internet resources:

Electronic library systems:

1. EBS "SPBGUVM"
2. EBS "Publishing house "Lan"
3. EBS "Student Consultant"
4. Legal reference system "ConsultantPlus"
5. University information system "RUSSIA"
6. Full text database POLPRED.COM
7. Scientific electronic library ELIBRARY.RU
8. Russian Scientific Network
9. Electronic library system IQlib
10. Web of Science International Science Citation Index Database

11. Full-text interdisciplinary database for agricultural and environmental sciencesProQuest AGRICULTURAL AND ENVIRONMENTAL SCIENCE DATABASE
12. Electronic books from the publishing house "Prospekt Nauki"http://prospektnauki.ru/ebooks/
13. Collection "Agriculture. Veterinary" publishing house "Kvadro"http://www.iprbookshop.ru/586.html

9. METHODOLOGICAL INSTRUCTIONS FOR STUDENTS ON MASTERING THE DISCIPLINE

Methodological recommendations for students are a set of recommendations and explanations that allow the student to optimally organize the process of studying this discipline. The content of methodological recommendations, as a rule, may include:

Tips for planning and organizing the time needed to study the discipline. Description of the sequence of student actions, or "scenario for studying the discipline."

The morning time is the most fruitful for educational work (from 8-14 o'clock), then the afternoon (from 16-19 o'clock) and the evening time (from 20-24 o'clock). The most difficult material is recommended to be studied at the beginning of each time interval after rest. After 1.5 hours of work, a break (10-15 minutes) is required; after 4 hours of work, the break should be 1 hour. Part of the scientific organization of labor is mastering the technique of mental work. Normally, a student should devote about 10 hours a day to studying (6 hours at the university, 4 hours at home).

Recommendations for working on lecture material

When preparing for a lecture, the student is recommended to:

1) review the recordings of the previous lecture and recall previously studied material in memory;

2) it is useful to review the upcoming material of the future lecture;

3) if independent study of individual fragments of the topic of the last lecture is assigned, then it must be completed without delay;

4) prepare yourself psychologically for the lecture.

This work includes two main stages: taking notes of lectures and subsequent work on lecture material.

Note-taking means drawing up notes, i.e. a brief written statement of the content of something (oral presentation - speech, lecture, report, etc. or a written source - document, article, book, etc.).

The method of work when taking notes on oral presentations differs significantly from the method of work when taking notes from written sources.

By taking notes from written sources, the student has the opportunity to repeatedly read the desired passage of text, reflect on it, highlight the main thoughts of the author, briefly formulate them, and then write them down. If necessary, he can also note his attitude to this point of view. While listening to a lecture, the student must put off most of the above-mentioned work for another time, trying to use every minute to record the lecture, and not to comprehend it - there is no time left for this. Therefore, when taking notes from a lecture, it is recommended to separate fields on each page for subsequent entries in addition to the notes.

After recording a lecture or taking notes, you should not leave work on the lecture material until you begin preparing for the test. It is necessary to do as early as possible the work that accompanies note-taking of written sources and which was not possible to do while recording the lecture - read your notes, deciphering individual abbreviations, analyze the text, establish logical connections between its elements, in some cases show them graphically, highlight main thoughts, note issues that require additional processing, in particular, teacher consultation.

When working on the text of a lecture, the student needs to pay special attention to the problematic questions posed by the teacher when giving the lecture, as well as to his assignments and recommendations.

For each lecture, practical lesson and laboratory work, the number, topic, list of issues covered, volume in hours and links to recommended literature are provided. For classes conducted in interactive forms, their organizational form must be indicated: computer simulation, business or role-playing game, analysis of a specific situation, etc.

Recommendations for preparing for practical classes

Practical (seminar) classes constitute an important part of students' professional training. The main goal of conducting practical (seminar) classes is to develop analytical, creative thinking in students by acquiring practical skills. Practical classes are also conducted with the aim of deepening and consolidating the knowledge gained at lectures and in the process of independent work on regulatory documents, educational and scientific literature. When preparing for a practical lesson for students, it is necessary to study or repeat theoretical material on a given topic.

When preparing for a practical lesson, the student is recommended to adhere to the following algorithm;

1) get acquainted with the plan of the upcoming lesson;

2) study the literature sources that were recommended and familiarize yourself with the introductory comments to the relevant sections.

Methodological instructions for practical (seminar) classes in the discipline, along with the work program and schedule of the educational process, refer to methodological documents that determine the level of organization and quality of the educational process.

The content of practical (seminar) classes is recorded in the working curriculum of the disciplines in the sections "List of topics for practical (seminar) classes."

The most important component of any form of practical training is assignments. The basis of the assignment is an example, which is analyzed from the perspective of the theory developed in the lecture. As a rule, the main attention is paid to the formation of specific skills and abilities, which determines the content of students' activities - problem solving, laboratory work, clarification of the categories and concepts of science, which are a prerequisite for correct thinking and speech.

Practical (seminar) classes perform the following tasks:

- stimulate regular study of recommended literature, as well as attentive attention to the lecture course;
- consolidate the knowledge gained in the process of lecture training and independent work on literature;
- expand the scope of professionally significant knowledge, skills and abilities;
- allow you to check the correctness of previously acquired knowledge;
- instill skills of independent thinking and oral presentation;
- promote free use of terminology;
- provide the teacher with the opportunity to systematically monitor the level of students' independent work.

Methodological instructions for practical (seminar) classes in the discipline should be focused on modern business conditions, current regulatory documents, advanced technologies, on the latest achievements of science, technology and practice, on modern ideas about certain phenomena and the reality being studied.

Laboratory work constitutes an important part of students' professional training. They are aimed at experimental confirmation of theoretical principles and the formation of educational and professional practical skills.

Students' performance of laboratory work is aimed at:

- generalization, systematization, deepening, consolidation of acquired theoretical knowledge on specific topics of disciplines;
- formation of necessary professional skills and abilities;

The disciplines for which laboratory work is planned and their volumes are determined by the working curriculum.

Guidelines for conducting laboratory work are developed for the duration of the working curriculum and include:

- title, which indicates the type of work (laboratory), its serial number, volume in hours and name;
- Objective;
- subject and content of the work;
- equipment, technical means, tools;
- order (sequence) of work execution;
- safety and labor protection rules for this work (if necessary);
- general rules for the design of work;
- Control questions;
- tasks;
- list of references (if necessary).

The content of laboratory work is recorded in the working curriculum of the disciplines in the section "List of topics for laboratory work".

When planning laboratory work, it should be taken into account that, along with the leading goal - confirmation of theoretical principles - in the course of completing tasks, students develop practical skills and skills in handling laboratory equipment, equipment, etc., which can form part of professional practical training, as well as research skills (observe, compare, analyze, establish dependencies, draw conclusions and generalizations, independently conduct research, document the results).

The composition of tasks for laboratory work should be planned in such a way that they can be completed efficiently by the majority of students in the allotted time.

Laboratory work as a type of educational activity should be carried out in specially equipped educational laboratories. The necessary structural elements of laboratory work, in addition to the independent activity of students, are instructions given by the teacher, as well as the organization of a discussion of the results of the laboratory work.

The completion of laboratory work is preceded by testing students' knowledge - their theoretical readiness to complete the task.

Recommendations for working with literature.

Working with literature is an important stage of a student's independent work in mastering a subject, contributing not only to consolidation of knowledge, but also to broadening his horizons, mental abilities, memory, ability to think, present and confirm his hypotheses and ideas. In addition, research skills necessary for future professional activities are developed.

When starting to study literature on a topic, it is necessary to make notes, extracts, and notes. It is imperative to take notes on the works of theorists, which allow one to comprehend the theoretical basis of the study. For the rest, you can limit yourself to extracts from studied sources. All extracts and quotations must have an exact "return address" (author, title of work, year of publication, page, etc.). It is advisable to write an abbreviated name of the question to which the extract or quotation relates. In addition, it is necessary to learn how to immediately compile a card index of specialized literature and publications of sources, both proposed by the teacher and identified independently, as well as refer to bibliographic reference books, chronicles of journal articles, book chronicles, and abstract journals. In this case, publications of sources (articles, book titles, etc.) should be written on separate cards, which must be filled out in accordance with the rules of bibliographic description (surname, initials of the author, title of work. Place of publication, publisher, year of publication, number of pages, and for journals articles – journal name, year of publication, page numbers). On each card, it is advisable to record the thought of the author of the book or a fact from this book on only one specific issue. If the work, even in the same paragraph or phrase, contains further judgments or facts on another issue, then they should be written out on a separate card. The presentation should be concise, accurate, without subjective

assessments. On the back of the card you can make your own notes about this book or article, its contents, structure, what sources it was written on, etc.

Explanations about working with test materials for the course, recommendations for completing homework.

Testing allows you to determine whether the actual behavior of the program corresponds to the expected behavior by performing a specially selected set of tests. A test is the fulfillment of certain conditions and actions necessary to verify the operation of the function being tested or its part. Each question in the discipline must be answered correctly by choosing one option.

Recommendations for completing coursework (if it is included in the curriculum), defining their thematic focus, goals and objectives of implementation, requirements for content, volume, design and organization of management of their preparation on the part of departments and teachers.

According to the guidelines presented in the list of guidelines.

10. EDUCATIONAL WORK

As part of the implementation of the discipline, educational work is carried out to form a modern scientific worldview and a system of basic values, the formation and development of spiritual, moral, civil and patriotic values, a system of aesthetic and ethical knowledge and values, attitudes of tolerant consciousness in society, the formation in students of the need to work as the first vital necessity, the highest value and the main way to achieve success in life, to understand the social significance of your future profession.

11. LIST OF INFORMATION TECHNOLOGIES USED IN THE EDUCATIONAL PROCESS

11.1. The educational process in the discipline provides for the use of information technologies:

lecturing and conducting practical classes using multimedia;

conducting practical classes using multimedia;

interactive technologies (conducting dialogues, collective discussion of various approaches to solving a particular educational and professional problem);

interaction with students via email;

joint work in the Electronic Information and Educational Environment of St. Petersburg State University of Mathematics and Mathematics: https://spbguvm.ru/academy/eios/

11.2. Software

List of licensed and freely distributed software, including domestically produced ones

No.	Name of technical and computer training aids recommended by sections and topics of the program	License
1	MS Power Point	67580828
2	Libre Office	free software
3	OS Alt Education 8	AAO.0022.00
4	ABIS "MARK-SQL"	02102014155
5	MS Windows 10	67580828
6	System Consultant Plus	503/KL
7	Android OS	free software

12. MATERIAL AND TECHNICAL BASE REQUIRED FOR THE IMPLEMENTATION OF THE EDUCATIONAL PROCESS IN THE DISCIPLINE

Name of the discipline (module), practice in accordance with the curriculum	**Name of special premises and premises for independent work**	**Equipping special rooms and rooms for independent work**
Computer Science and Digital Technologies	137 (196084, St. Petersburg, Chernigovskaya str., building 5) Classroom for conducting seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification	*Specialized furniture:*desks, chairs, stools, blackboard. *Visual aids and educational materials:*posters by sections.
	138 (196084, St. Petersburg, Chernigovskaya str., building 5) Classroom for conducting seminar-type classes, group and individual consultations, ongoing monitoring and intermediate certification	*Specialized furniture:*desks, chairs, stools, blackboard. *Visual aids and educational materials:*posters by section *Equipment:*personal computers
	206 Large reading room (196084, St. Petersburg, Chernigovskaya str., building 5) Room for independent work	*Specialized furniture*: tables, chairs *Technical training aids:*computers with an Internet connection and access to the electronic information and educational environment
	214 Small reading room (196084, St. Petersburg, Chernigovskaya str., building 5) Room for independent work	*Specialized furniture:*tables, chairs *Technical training aids:*computers with an Internet connection and access to the electronic information and educational environment
	324 Department of Information Technologies (196084, St. Petersburg, Chernigovskaya str., building 5) Room for storage and preventive maintenance of educational equipment	*Specialized furniture:*tables, chairs, special equipment, materials and spare parts for preventive maintenance of educational equipment
	Box No. 3 Carpentry workshop (196084, St. Petersburg, Chernigovskaya str., building 5) Room for storage and preventive maintenance of educational equipment	*Specialized furniture:*tables, chairs, special equipment, materials for preventive maintenance of specialized furniture

Appendix No. 1 on 37 pages.

The work program was compiled by:

Head of the department, associate professor A.N. Baryshev

Annex 1

Ministry of Agriculture of the Russian Federation
Federal State Budgetary Educational Institution
Of higher education
"St. Petersburg State University of Veterinary Medicine"

Department of Inorganic Chemistry and Biophysics

FUND OF ASSESMENT TOOLS
for the discipline

"COMPUTER SCIENCE AND DIGITAL TECHNOLOGIES"

Level of higher education
SPECIALIST COURSE
Specialty 36.05.01 Veterinary Medicine
Full-time education

Education starts in 2024

Saint Petersburg
2024

1. PASSPORT OF THE ASSESSMENT FUND

Table 1

No.	Molded competencies	Controlled sections (topics) disciplines	Evaluation tool
1.	**UC-1**Able to critically analyze problem situations based on a systematic approach and develop an action strategy: UC-1ID-1 Know the methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis; UC-1ID-2 Be able to obtain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific issues related to the professional field; search for information and solutions based on actions, experiment, experience, information and communication technologies; UC-1ID-3 Be able to study the problem of professional activity using analysis, synthesis and other methods of intellectual activity, including the use of information and communication technologies; identifying problems and using adequate methods to solve them; demonstrating value judgments in solving problematic professional situations.	Section 1. Combinatorics	Tests, test work
2.		Section 2. Probability theory	Tests, test work
3.		Section 3. Random variables	Tests, test work
4.		Section 4. Statistics	Tests, test work
5.	**UC-4** Able to use modern communication technologies, including in foreign language(s), for academic and professional interaction: UC-4ID-1 Know computer and information and communication technologies, information and digital infrastructure in the organization; communication in professional ethics; factors for improving communication in an organization, communication technologies in professional interaction; characteristics of communication flows; the importance of communication in professional interaction; methods for studying the communicative potential of an individual; modern means of information and communication technologies; UC-4ID-2 Be able to create written texts in Russian and foreign languages in scientific and official business styles of speech on professional issues; explore the flow of information through management communications; determine internal communications in the organization, including using digital technologies; UC-4ID-3 Know the principles of forming a communication system; analyze the system of communication links in the organization by implementing oral and written communications, including in a foreign language; presenting plans and results of one's own and team activities using communication technologies; technology for building effective communication in an organization; transmission of professional information in information and telecommunication networks using modern means of information and communication technologies	Section 5: Standard Windows Applications	Tests

6.	**GPC-5**Able to draw up special documentation, analyze the results of professional activities and submit reporting documents using specialized databases: GPC-5_{ID-1}Be able to use new information technologies to solve assigned problems in your professional activities, work with specialized information databases; GPC-5_{ID-2}Possess skills in working with an operating system, with text and spreadsheet processors, with database management systems, with information retrieval systems on the Internet; GPC-5_{ID-3}Know new information technologies to solve problems in your professional activities, work with specialized information databases. **GPC-7**Able to understand the operating principles of modern information technologies and use them to solve professional problems: GPC-7_{ID-1}Know modern technical means and information technologies; GPC-7_{ID-2}Be able to use modern technical tools and information technologies, including elements of machine learning and artificial intelligence, to solve analytical and research problems; GPC-7_{ID-3} Possess the skills to use modern technical means and information technologies to solve analytical and research problems.	Section 6. Technical means for implementing information processes	tests

2. Approximate list of assessment tools

table 2

No.	Name evaluation tool	Brief description of the evaluation tool	Presentation of the assessment tool in the fund
1.	Test	A system of standardized tasks that allows you to automate the procedure measuring the level of knowledge and skills of the student	Test task fund
2.	Test	A tool for testing the ability to apply acquired knowledge to solve problems of a certain type on a topic or section	Set of control tasks for options

3. INDICATORS AND CRITERIA FOR ASSESSING COMPETENCIES AT VARIOUS STAGES OF THEIR FORMATION, DESCRIPTION OF ASSESSMENT SCALES

Table 3

Planned results of mastering the competency	Mastery level				Evaluation tool
	unsatisfactory	satisfactorily	Fine	Great	
UC-1 Able to critically analyze problem situations based on a systematic approach and develop an action strategy					
UC-1ID-1 Know the methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis;	Knowledge level below the minimum requirements, serious errors occurred	Minimum acceptable knowledge level, a lot was allowed minor mistakes	Level of knowledge in in a volume corresponding to the training program, is allowed a few minor mistakes	Level of knowledge in volume corresponding to the program preparation, without errors.	Tests, test work
UC-1ID-2 Be able to obtain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific issues related to the professional field; search for information and solutions based on actions, experiment, experience, information and communication technologies;	When deciding standard tasks did not demonstrate basic skills, there were rough errors	Basic skills have been demonstrated, typical problems with minor errors have been solved, all tasks, but not in in full	All the main ones are demonstrated skills, all basic problems with non-rough ones have been solved errors, all tasks were completed in full, but some with flaws	All the main ones are demonstrated skills, all solved main tasks with separate insignificant shortcomings, all completed assignments in full volume	Tests, control work
UC-1ID-3 Be able to study the problem of professional activity using analysis, synthesis and other methods of intellectual activity, including the use of information and communication technologies; identifying problems and using adequate methods to solve them; demonstrating value judgments in solving problematic professional situations.	When deciding standard tasks do not demonstrate basic skills, there were serious mistakes	Available minimum set skills for solutions standard tasks with some shortcomings	Basic skills demonstrated when deciding standard tasks with some shortcomings	Demonstrated skills in solving non-standard tasks without errors and shortcomings	Tests, control work
UC-4 Able to use modern communication technologies, including in a foreign language(s), for academic and professional interaction (UK-4)					

UC-4ID-1 Know computer and information and communication technologies, information and digital infrastructure in the organization; communication in professional ethics; factors for improving communication in an organization, communication technologies in professional interaction; characteristics of communication flows; the importance of communication in professional interaction; methods for studying the communicative potential of an individual; modern means of information and communication technologies;	Knowledge level below the minimum requirements, serious errors occurred	Minimum acceptable knowledge level, a lot was allowed minor mistakes	Level of knowledge in in a volume corresponding to the training program, is allowed a few minor mistakes	Level of knowledge in volume corresponding to the program preparation, without errors.	tests
UC-4ID-2 Be able to create written texts in Russian and foreign languages in scientific and official business styles of speech on professional issues; explore the flow of information through management communications; determine internal communications in the organization, including using digital technologies.	When deciding standard tasks did not demonstrate basic skills, there were rough errors	Basic skills have been demonstrated, typical problems with minor errors have been solved, all tasks, but not in in full	All the main ones are demonstrated skills, all basic problems with non-rough ones have been solved errors, all tasks were completed in full, but some with flaws	All the main ones are demonstrated skills, all solved main tasks with separate insignificant shortcomings, all completed assignments in full volume	Tests
UC-4ID-3 Know the principles of forming a communication system; analyze the system of communication links in the organization by implementing oral and written communications, including in a foreign language; presenting plans and results of one's own and team activities using communication technologies; technology for building effective communication in an organization; transfer of pro-	When deciding standard tasks do not demonstrate basic skills, there were serious mistakes	Available minimum set skills for solutions standard tasks with some shortcomings	Basic skills demonstrated when deciding standard tasks with some shortcomings	Demonstrated skills in solving non-standard tasks without errors and shortcomings	Tests

fessional information in information and telecommunication networks using modern means of information and communication technologies.					
GPC-5 Able to draw up special documentation, analyze the results of professional activities and submit reporting documents using specialized databases:					
GPC-5_{ID-1}Be able to apply new information technologies to solve assigned problems in your professional activities, work with specialized information databases.	Knowledge level below the minimum requirements, serious errors occurred	Minimum acceptable knowledge level, a lot was allowed minor mistakes	Level of knowledge in in a volume corresponding to the training program, is allowed a few minor mistakes	Level of knowledge in volume corresponding to the program preparation, without errors.	Tests
GPC-5_{ID-2}Possess skills in working with an operating system, with text and spreadsheet processors, with database management systems, with information retrieval systems on the Internet.	When deciding standard tasks did not demonstrate basic skills, there were rough errors	Basic skills have been demonstrated, typical problems with minor errors have been solved, all tasks, but not in in full	All the main ones are demonstrated skills, all basic problems with non-rough ones have been solved errors, all tasks were completed in full, but some with flaws	All the main ones are demonstrated skills, all solved main tasks with separate insignificant shortcomings, all completed assignments in full volume	Tests
GPC-5_{ID-3}Know new information technologies to solve problems in your professional activities, work with specialized information databases.	When deciding standard tasks do not demonstrate basic skills, there were serious mistakes	Available minimum set skills for solutions standard tasks with some shortcomings	Basic skills demonstrated when deciding standard tasks with some shortcomings	Demonstrated skills in solving non-standard tasks without errors and shortcomings	Tests
GPC-7 Able to understand the operating principles of modern information technologies and use them to solve professional problems:					

GPC-7_{ID-1}Know modern technical means and information technologies;	Knowledge level below the minimum requirements, serious errors occurred	Minimum acceptable knowledge level, a lot was allowed minor mistakes	Level of knowledge in in a volume corresponding to the training program, is allowed a few minor mistakes	Level of knowledge in volume corresponding to the program preparation, without errors.	Tests
GPC-7_{ID-2}Be able to use modern technical tools and information technologies, including elements of machine learning and artificial intelligence, to solve analytical and research problems.	When deciding standard tasks did not demonstrate basic skills, there were rough errors	Basic skills have been demonstrated, typical problems with minor errors have been solved, all tasks, but not in in full	All the main ones are demonstrated skills, all basic problems with non-rough ones have been solved errors, all tasks were completed in full, but some with flaws	All the main ones are demonstrated skills, all solved main tasks with separate insignificant shortcomings, all completed assignments in full volume	Tests
GPC-7_{ID-3} Possess the skills to use modern technical means and information technologies to solve analytical and research problems.	When deciding standard tasks do not demonstrate basic skills, there were serious mistakes	Available minimum set skills for solutions standard tasks with some shortcomings	Basic skills demonstrated when deciding standard tasks with some shortcomings	Demonstrated skills in solving non-standard tasks without errors and shortcomings	Tests

4. LIST OF CHECK TASKS AND OTHER MATERIALS REQUIRED FOR THE ASSESSMENT OF KNOWLEDGE, ABILITIES, SKILLS AND ACTIVITY EXPERIENCE

4.1. Typical tasks for ongoing progress monitoring

UC-1 Able to critically analyze problem situations based on a systematic approach and develop an action strategy

UC-1ID-2 Be able to obtain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific issues related to the professional field; search for information and solutions based on actions, experiment, experience, information and communication technologies;

GPC-7 Able to understand the operating principles of modern information technologies and use them to solve professional problems:

GPC-7_{ID-2}Be able to use modern technical tools and information technologies, including elements of machine learning and artificial intelligence, to solve analytical and research problems.

GPC-7_{ID-3} Possess the skills to use modern technical means and information technologies to solve analytical and research problems.

Test

Option 1

1. Give examples:
   a) a complete group of events;
   b) two joint and independent events.
2. Is it possible for the distribution density to be equal to 1 in the interval (–0.5; 0.7)?
3. The technical device consists of three units. Event Ak – the kth node will fail during time T (k = 1, 2,3). Establish a correspondence between the events and their verbal formulation:

1) all nodes will fail within time T;
2) only the third node will fail within time T;
3) exactly two nodes will fail during time T;
4) at least one node will not fail during time T;
5) no node will fail during time T.

a) $\bar{A}1\ \bar{A}2\ A3$;
b) $A1\ \bar{A}2\ \bar{A3}$ □ $A\bar{1}\ A2\ A3$ □ $A1\ A2\ A3$;
c) $\bar{A}1$ □ $A\bar{2}$ □ A3;
d) A1 A2 A3;
e) A1 A2 A3.

4. The post office sells ten types of envelopes and five types of stamps. In how many ways can you buy a stamp envelope for it?

Option 2

1. If the classical probability of some event is 1, then is it true that this event is certain? Why?
2. How many different license plates are there that consist of five characters if the license plate consists of one letter of the English alphabet followed by any four digits?
3. According to economists' forecasts, annual inflation will not exceed a given percentage with probability p=0.8. What is the probability that this economic forecast will come true over the next three years?

4. N a i t i: a) mathematical expectation; b) standard deviation of the random variable X specified by the distribution law
X–5234

P0,40,30,1p4

Option 3

1. Prove that for any two events A and B the inequality holds $P(A+B) \leq P(A)+R(B)$.

2. Six music lovers rush to line up at the Philharmonic box office. In how many ways can such a queue be formed?
3. In a set of 10 floppy disks, exactly two are infected with a virus. What is the probability that both floppy disks taken at random will be free of the virus? Write the answer as a decimal fraction approximately with an accuracy of 0.01.
4. A continuous random variable X is specified by the distribution density f (x) = 1.5 sin3x in the interval (0; π /3) and f (x) = 0 outside this interval. Find the probability that in three experiments X will fall twice into the interval (π /6; π /4).

Option 4

1. Prove that if A and B are independent events, then every pair of events A and B, A and B, A and B is a pair of independent events.
2. On Saturday there should be four lessons in the class. How many Saturday schedules can you create if there are ten academic disciplines in total?
3. An average of five people visit an online store's website within an hour. The probability that an order for a product will be placed for each visitor is 1/3. What is the probability that at least three out of five customers will place an order within an hour? Write the answer as a decimal fraction approximately with an accuracy of 0.01.
4. The random variable X is specified by the distribution density

$$f(x) = ax\,2 + 4.5x - 6 \text{ at } x \in [2, 4]; \; f(x) = 0 \text{ at } x \notin [2, 4].$$

Hay t i:
a) the value of parameter a; b) mathematical expectation.

Option 5

1. The probability p of the occurrence of event A in each experiment is constant. Experiments are carried out before the first occurrence of the event. What is the probability that exactly n experiments will be performed?
2. Each of the three independently operating alarms promptly reports a violation of the specified operating mode of the reactor with a probability, respectively, p1 □ 0.9; p2 □ 0.8; p3 □ 0.75. What is the probability that if the specified operating mode is violated, no signal will be received?
3. A class of 17 people should be divided into two subgroups to study English and French, and the "English" group should have 10 people. How many ways are there to form subgroups if the students themselves do not express any preferences regarding the choice of a foreign language?
4. Based on a sample size of 100, a variation series was obtained

xi357912
ni22n2231812

Find the relative frequency of the options x2.

4.2 Tests

UC-1 Able to critically analyze problem situations based on a systematic approach and develop an action strategy:

UC-1ID-1 Know the methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis;

1. On what groundshas a variational distribution series been constructed?
1. continuous
2. quantitative
3. quantitative and qualitative
4. continuous

2. What is the frequency of options 0 in the sample 3,1,3,1,4,2,2,4,0,3,0,2,2,0,2?

eleven
21/2
3.3
4.2

3. What kind of image does the polygon serve as?
1. interval series
2. histograms
3. discrete series
4. continuous value

4. What is the concept of the average value of a random variable in probability theory?
1. median
2. fashion
3. mathematical expectation
4. cumulates

5. What is the subject study of mathematical statistics?
1. random phenomena
2. aggregates
3. natural phenomena
4. random phenomena based on observational results

6. What is the measure of the spread of a random variable from its mathematical expectation called?
1. variance of a random variable
2. discrete random variable
3. continuous random variable
4. Discontinuous random variable

7. What is the name of the set of all possible objects of a given type, over which observations are carried out in order to obtain specific values of a certain random variable?
1. options
2. sampling
3. cumulate
4. general population

8. What is the name of the indicator of dispersion of the values of a random variable relative to its mathematical expectation?

1. standard deviation
2. median
3. fashion
4. general population

9. What is the probability of a certain event?
eleven
20
3. 0.99
4. 0.5

10. How is the probability that event A will occur m times correctly calculated using Bernoulli's formula if n independent trials are conducted in which the probability of event A occurring is p?

1. yes
2. no
3. not always
4. no, according to Bayes' formula

11. What is 3!?

1.7
2.9
3.6
4.8

12. What formula is used to calculate the probability that event A will occur m times if n independent trials are performed in which the probability of occurrence of event A is equal to p, and p tends to zero, and n is large?
1. Bernoulli
2. Poisson
3. Bayesian
4. Pearson

13. In Bernoulli's test scheme, can the probability of the occurrence of event A change from experiment to experiment?

1. there is no correct answer
2. must remain constant
3. yes, it can
4. changes randomly

14. How is the conditional probability of event B written, provided that event A has occurred with a non-zero probability?

1. $p(B/A) = p(AB) / p(B)$
2. $p(B/A) = p(AB)\ p(A)$

3. p(B/A) = p(B) / p(A)
4. p(B/A) = p(B) + p(A)

15. What is the probability of an impossible event?
eleven
20
3. 0.99
4. 0.5

16. What size should the sample be so that it can be used to judge a random variable?

1. random
2. representative
3.repeat
4. reliable

17. What is the distribution mode called?

1. the value of a random variable at which the probability equals 0.
2. the value of a random variable at which either the probability or the density function reaches its maximum value
3. the value of a random variable at which the probability is 0.5;
4. the value of a random variable at which either the probability or the density function reaches the average value

18. What is the value of 4!?

1.30
2.26
3.24
4.18

UC-1ID-2 Be able to obtain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific issues related to the professional field; search for information and solutions based on actions, experiment, experience, information and communication technologies;

No. 19. What is the name of 0,0,0,1,1,2,2,2,2,2,2,3,3,3,4,4 when sampling 3,1,3,1,4,2,2,4,0 ,3,0,2,2,0,2?

1. ranked series
2. polygon
3. group
4. cumulates

20. How to define a discrete random variable?

1. indicating its distribution law
2. indicating its probabilities
3. assigning each elementary outcome a real number

4. assigning each elementary outcome a rational number

21. How is the representativeness of the sample ensured?

1. grouping
2. random selection
3. table
4. schedule

22. What is the operation of ranking when values are arranged in order?
1. descending
2. increasing
3. Grouping
4. descending

23. What is the probability that a student will pull out a memorized ticket during an exam if he has learned only 25 questions out of 30 questions?

1. 0.5
2. 0.3
3. 5/6
4. 6/5

24. What is the probability that only one of the events will happen if some event A can happen with probability 0.3, and event B with probability 0.1?

1. 0.5
2. 0.63
3. 0.03
4. 0.34

25. What is the probability that among 300 porcini mushrooms there will be 75 if the probability of finding a porcini mushroom among others is 1/4?

1. 0.053
2. 0.63
3. 0.03
4. 0.34

26. How is it possible for two or more of the hypotheses H1, H2,.....Hn to occur jointly when using the total probability formula or Bayes formula?
1. no, hypotheses must be mutually exclusive
2. of course it's possible, that's the only way it happens
3. possible if event A depends on hypotheses
4. this is determined by calculation

27. What is the probability that of two light bulbs taken at random, both will turn out to be working, if the light bulbs are manufactured independently of each other and on average one light bulb in a thousand turns out to be defective?

1. 0.9
2. 0.998001

3. 0.98
4. 0.9853

28. What is the probability that the coat of arms will appear three times in 5 coins thrown?

1. 17/32
2.5/16
3. 15/32
4.5/10

29. What is the probability that the number of ripe watermelons will be in the range from 564 to 600 if in a batch of 768 watermelons each watermelon is unripe with a probability of 1/4?

1. 0.7562
2. 0.8186
3. 0.7256
4. 0.9353

UK-1ID-3 Be able to study the problem of professional activity using analysis, synthesis and other methods of intellectual activity, including the use of information and communication technologies; identifying problems and using adequate methods to solve them; demonstrating value judgments in solving problematic professional situations.

30. What is the mathematical expectation of M(X) for a given distribution law of a random variable?

X	24	26	28	thirty
R	0.2	0.3	0.4	0.1

1. 25.5
2. 26.4
3.27
4. 26.8

31. What is the mathematical expectation of a given random variable X, If shegiven by the distribution law?

X	-2	2
p	0.2	0.8

1. 0.4
2.0.0
3. 1.0
4. 1.2

32. What is the standard deviation of a given random variable X, if it is given by the distribution law?

X	-2	2
p	0.2	0.8

1. 0.6
2. 0.8
3. 1.6
4. 1.4

33. What is the number of the wrong answer, if there can be general populations?

1. final
2. endless
3. interval
4. numerical

34. What is the standard deviation of a given random variable X, if it is given by the distribution law?

X	24	26	28	thirty
R	0.2	0.3	0.4	0.1

1. 1.833
2. 3.123
3. 0.964
4. 2.52

35. What is the probability that after firing three shots, the shooter will hit twice if he hits the target on average 8 times out of 10?

1. 0.358
2. 0.384
3. 0.45
4. 0.252

36. What is the probability that a point will fall into a square inscribed in a circle if a point is thrown into the circle at random?

1. 0.358
2. 0.637
3. 0.450
4. 0.750

37. What is the probability that a point will randomly fall into a cube inscribed in a ball (round to the nearest thousand)?

1. 0.368
2. 0.637
3. 0.450
4. 0.750

38. What is the probability that a batch of products will be accepted under the following conditions: the workshop produces on average 96% of products of the highest grade and at the base the receiver checks 200 products of this workshop and if among them there are more than 10 products of not the highest grade, then the entire batch of products is it rejected?

1. 0.7623
2. 0.637
3. 0.8450
4. 0.9750

39. 200 independent experiments are carried out with a probability of success in each of 24%. What is the probability of successfully conducting 50 experiments?

What is the probability of successfully conducting 50 experiments, among 200 independent experiments conducted with a probability of success in each of 24%?

1. 0.762
2. 0.637
3. 0.063
4. 0.875

40. Find the probability that in a circle of radius $\frac{3\sqrt{2}}{2}$ see a dot is placed at random and it does not fall into the isosceles right triangle inscribed in it, round the answer to the nearest thousandth?

1. 0.258
2. 0.637
3. 0.033
4. 0.451

UC-4 Able to use modern communication technologies, including in foreign language(s), for academic and professional interaction:

UC-4ID-1 Know computer and information and communication technologies, information and digital infrastructure in the organization; communication in professional ethics; factors for improving communication in an organization, communication technologies in professional interaction; characteristics of communication flows; the importance of communication in professional interaction; methods for studying the communicative potential of an individual; modern means of information and communication technologies;

1. What operating system was on the first computers?
1. MS DOS
2. MD SOS
3.Windows
4. Linux

2.When did the Windows operating system appear?
1.1995

2.1981
3.1992
4.1985

3. What is the name of a file created using a Windows application program?
1. document
2. folder
3. root directory
4. catalog

4. How can root directories (drives) be designated?
1. A:, B:, C:
2. ABBA
3.PUMA
4.REX

5. What is indicated by the file name and extension?
1. purpose and file type
2. purpose and name of the file
3. file type and extension
4. file size and type

6. What does the file name consist of?
1. name and extension
2. last name and first name
3. type and extension
4. name and title

7. What is the purpose of a file structure?

1. to download programs
2. for editing texts
3. to work faster
4. for storing information in external memory

8. What is a folder?
1. a place to store document files
2. executable file
3. text document
4. file as before

9. Whichminimum image element:

1.bit2. dpi3. pixel 4. byte

10. What software products can be used to perform the following typical file operations (creating folders, copying files and folders; moving files and folders; deleting files):
1. conductor

2.WinRar
3.WinZip
4.MS DOS

11. What does the full file name consist of?
1. own name and extension
2. logical drive name, directory path, file name
3. Directory name and file name
4. Directory names and extensions

12.What exactly is information compression during archiving?

1. a special type of information encoding
2. removing unnecessary information
3. backup coding of information
4. information backup

13. When should archiving not be used?

1. to save disk space
2. to destroy viruses
3. to create backup copies of files
4. to create additional copies of files

14. Which statement is true?
1. all files are compressed equally during archiving
2. raster graphics files are best compressed
3. different types of files are compressed differently during archiving
4. Vector graphics files are best compressed

15. What are the characteristics of archivers?

1. degree and speed of archiving
2. method of distribution
3.compression method and speed
4. ease of use

UC-4ID-2 Be able to create written texts in Russian and foreign languages in scientific and official business styles of speech on professional issues; explore the flow of information through management communications; determine internal communications in the organization, including using digital technologies;

16. What extension do Word text documents have?
1.doc
2.xls
3.exe
4.bmp

17.What are they?Templates in MS Word?

1. a tool that allows automated document formatting

2. a set of successful style settings saved along with the finished document
3. a set of unified elements and color schemes
4. a set of style settings that allows automated document formatting

18. What is needed to change margin boundaries in a MS Word document?

1. select the File\Page Setup command, then in dialog mode with the system, set the field boundaries.
2. select the Page Layout\Margins command, then in dialog mode with the system, set the margins of the fields
3. select the Design\Margins command, then in dialog mode with the system, set the boundaries of the fields
4. select the Insert\Fields command, then in dialog mode with the system, set the field boundaries

19. What is Microsoft PowerPoint used for?

1. Creating and editing texts and drawings
2. To create tables
3. To create presentations and movies from slides
4. Creation and editing of hypertexts

20.That isobject of Microsoft PowerPoint processing?
1. documents with the extension .txt
2. documents with the extension .ppt
3. documents with the extension .rtf
3. documents with the extension .exe

21. To work with the clipboard, use the following commands:
1. cut, copy, paste
2. delete, rename
3. create, save
4. create, delete

22. What is the word processor Word?

1. system program for creating documents
2. application program for creating and processing text documents
3. system for preparing documents of varying complexity
4. system for preparing spreadsheet documents

23. How can I change the font type, size and style?

1. "Home" toolbar
2. Formatting toolbars
3. Drawing panels
4. Page Layout panels

24. In which folder are the main programs for working with disks in Windows located?

1. official

2. standard
3.office
4. documents

25. What does TrueType font mean?

1. text typed in this font will look the same both on the monitor and printed
2. text typed in this font can be edited in any text editor
3. the typed font was used by default when the documents were initially created
4. the typed font was used when editing documents

26. What ensures the merging of documents created by Ole technology?

1. in any Microsoft Office application
2. any application that meets the CUA standard
3. in the form of a graphical flow of information
4. in any of the Windows applications

27. How can you process text data?
1. multi-office applications
2. hypertext applications
3. test editors
4. graphic editors

28.WhichMain advantagesIt hastext editor by compared to a typewriter when working with text?

1. possibility of multiple text editing
2. possibility of faster typing
3. the ability to reduce labor intensity when working with text
4. ability to use different fonts when typing

29. What is text editing?

1. the process of making changes to existing text
2. procedure for saving text on disk as a text file
3. the process of transmitting text information over a computer network
4. the procedure for reading previously created text from an external storage device

30. What can you do with a watermark applied to a text document?
1. it makes the document unique
2. it protects the document from viruses;
3. it allows third-party users to copy the text posted in the document.
4. it protects the document from copying

UK-4ID-3 Know the principles of forming a communication system; analyze the system of communication links in the organization by implementing oral and written communications, including in a foreign language; presenting plans and results of one's own and team activities using communication technologies; technology for building effective communication in an organization; transmission of professional information in information and telecommunication networks using modern means of information and communication technologies

31. What are the following personal computer hardware required when working with a word processor?

1. keyboard, display, processor, random access memory
2. external storage device, printer
3. mouse, scanner, hard drive
4. modem, plotter

32. Which character cannot contain its own file name in the Windows operating system?

1. question mark (?)
2. comma (,)
3. dot (.)
4. addition sign (+)

33.According to what Do tabs need to be navigated to enable automatic hyphenation?

1. Page Layout – Hyphenation
2. Insert – Text – Insert hyphens
3. Links – Additional materials – Insert hyphenation
4. Insert – Text – Insert hyphens

34. Which keys must be pressed simultaneously to create a new page?

1. Ctrl and Enter
2. Shift and spacebar;
3. Shift and Enter
4. Shift and Ctrl

35. What keyboard shortcut should you use to quickly paste a copied item?

1. Ctrl + V
2. Ctrl + C
3. Ctrl + X
4. Ctrl and Enter

36.What is the name of the list of instructions that Word tells you, a pre-written order of actions to achieve a certain goal?

1. footer
2. macro
3. instructions
4. list

37. What page orientation does not exist?

1. notepad
2. book
3. landscape
3. landscape and portrait

38. How to save a written document using hotkeys?

1. Alt + Ctrl + F2
2. Ctrl + Shift + F2
3. Alt + Shift + F2
4. Alt + Ctrl + F3

39. To insert a hyperlink, highlight the desired word and click:

1. right mouse button and then selecting the "Hyperlink" tab
2. left mouse button and then selecting the "Hyperlink" tab;
3. Double-click the left mouse button and then select the "Hyperlink" tab.
3. Simultaneously click on the left and right mouse buttons and then select the "Hyperlink" tab.

40. What happens if you click on the image of the floppy disk icon in the top line of the taskbar?

1. the document will be deleted
2. the document will be saved
3. the document will be written to a disk or flash drive inserted into the computer
3. the document will be linked to a disk or flash drive inserted into the computer

GPC-5 Able to draw up special documentation, analyze the results of professional activities and submit reporting documents using specialized databases:

GPC-5_{ID-1}Be able to use new information technologies to solve assigned problems in your professional activities, work with specialized information databases;

1. Which main purpose of spreadsheets?
1. edit and format text documents
2. store large amounts of information
3. perform calculations using formulas
4. there is no right answer

2. Which program is not a spreadsheet?
1. Excel
2. Quattropro
3. Superkalk
4.Word

3. What is the name of the document in Excel?

1. worksheet
2. book
3. page
4. sheet

3.What does it consist of? workbook
1. several working pages
2. multiple worksheets
3.multiple cells

4. one worksheet

4. What is the smallest structural unit within a table?

1. line
2 cell
3 column
4. range

5. What types of data cannot a cell contain?

1. text
2. formulas
3. numbers
4. pictures

6.What are the names of cell values that are entered by the user and not obtained as a result of calculations?

1. current
2. derivatives
3. initial
4. calculated

7. What is the correct cell address?

1. F7
2. P6
3. 7V
4. there is no right answer

8. What type of software is a spreadsheet?

1. to system
2. to programming languages
3. to application
4. to the operating room

9. What sign does the formula begin with?

1. "
2. No.
3. =
4. there is no right answer

10. Which cell is called active?

1. any
2. where the cursor is located
3. filled
4. there is no right answer

11. What sign separates the integer part of a number from the fractional part?

1. :
2. ;
3. .
4. there is no right answer

OPK-5ID-2Possess skills in working with an operating system, with text and spreadsheet processors, with database management systems, with information retrieval systems on the Internet;

12. What extension does the Access DBMS file have?

1.xls.
2. doc.
3.accdb
4.dbf.

13. When does MS Access create a file to work with the application?

1. at the beginning of working with the document
2. when closing the document.
3. at a time specified by the user.
4. Only after saving the document.

14. What are the main objects of the MS Access DBMS?

1. tables, forms, queries, reports
2. forms, tables, rows, reports
3. reports, tables, forms
4. forms, tables, queries, selections

15. What is the main object of the MS Access DBMS?

1. form
2. sampling
3. table
4. report

16. What are queries in the Access DBMS intended for?

1. searching and sorting data
2. adding and viewing data
3. search, sort, add and delete, update records
4. to edit data in the table

17. What is not a typical chart in a table?
1. circular
2. mesh
3. histogram
4. schedule

18 . What category does the IF function fall into?
1. mathematical
2. statistical
3. logical
4. calendar

19. What are the main data types in Excel?
1. numbers, formulas
2. text, numbers, formulas
3. numbers, dates, numbers
4. sequence of actions

20. How is a logical command written in Excel?
1. if (condition, action1, action2)
2. (if condition, action1, action2)
3. =if (condition, action1, action2)
4. if condition, action1, action2

21. How to understand the message # sign! when calculating a formula?

1. the formula uses a non-existent name
2. the formula refers to a non-existent cell
3. error when calculating the function
4. error in number

22. What does it mean in Excel when ####### appears when performing calculations?

1. the width of the cell is less than the length of the result obtained
2. error in the calculation formula
3. lack of result
4. there is no right answer

23. What is the purpose of a report in the Access DBMS?

1. Data storage
2. Printing data
3. data entry and editing
4. creating teams to automate work

24. How many characters can there be in a text field?

1. 65635
2.255
3. 1024
4.512

25. What is the purpose of the substitution wizard in the MS Access DBMS?

1. to create a new field in the table
2. to create new tables

3. to add field values from other tables or a fixed list of data
4. for input or output expressions

OPK-5ID-3Know new information technologies to solve problems in your professional activities, work with specialized information databases.

26. What types of data are used in the MS Access DBMS to store large amounts of text?

1. text
2. OLE
3. MEMO
4. hyperlink

27.Which button Are reports created in the MS Access DBMS on the "Creation" tab?

1. blank report
2. report designer
3. report wizard
4. all of the above

28. What type of data must be selected to enter the amount of 4784 rubles, 67 $?

1. numeric
2. financial
3. monetary
4. text

29.Whatcan it be placed in an OLE field in an Access DBMS?

1. image or MS Excel sheet
2. large pieces of text
3. links
4. boolean values

30. What are the financial functions of table processors used for?

1. calculating the product of arguments; determining the factorial of a number
2. determining the key performance indicator; constructing logical expressions
3. calculations of income on a treasury bill and the actual annual interest rate
4. constructing logical and text expressions

31. What software do table processors belong to?

1. applied
2. functional
3. specialized
4. special

32. What types of filters exist in the Excel spreadsheet processor?

1. thematic filter, autofilter
2. auto filter, advanced filter
3. text filter, number filter
4. hypertext filter, non-numeric filter

33.What is the absolute cell address from the Excel spreadsheet?

1. D3
2. D3
3. D3
2. D3$

34.Which cell is active?

1. with a formula that contains an absolute reference
2. into which data is currently being entered
3. with a formula that contains a relative reference
4. with a formula that contains a cross-reference

35. What is the difference between a spreadsheet and a regular one?

1. automatic recalculation of data specified by formulas in case of changes in the original
2. representation of connections between interrelated processed data
3. processing of various types of data
4. processing of various types of data

36. What type of relationship must be established if one record in table A can correspond to several records in table B, and one record in table B can correspond to several records in table A?

1. "One-to-one"
2. One-to-many
3. Many-to-one
4. "Many-to-many"

37. What requirement must key fields meet?

1. must be of the "Counter" type
2. must contain an attachment
3. must not be repeated
4. must be MEMO type

38. Between what objects are connections established?

1. between requests
2. between forms
3. between reports
4. between tables

39. What is the purpose of a key field?
1. data sorting
2. data filtering

3. creating new tables
4. creating relationships between tables

40. What is used to store data in the Access DBMS?

1. form
2. table
3. report
4. request

OPK-7 Able to understand the operating principles of modern information technologies and use them to solve professional problems:

OPK-7$_{ID-1}$Know modern technical means and information technologies;

1. What is computer architecture called?
1. technical description of computer device parts
2. description of devices for input/output information
3. description of software for computer operation
4. list of devices connected to the PC

2. What is the name of the device for entering information from a sheet of paper?
1. plotter;
2. streamer;
3. driver;
4. scanner;

3. Which PC device is intended for displaying information?
1. CPU
2. monitor
3. keyboard
4. record player

4.What does read-only memory store?
1. particularly valuable application programs
2. especially valuable documents
3. constantly used programs
4. programs for booting a computer and testing its nodes

5.What is a driver?
1. long-term storage device
2. a program that controls a specific external device
3. input device
4. output device

6.What components do operating systems include?
1. database management systems
2. programming systems
3. application software
4. system software

7. Which of the following applies to storage media?
1. Scanner
2. Printer

3. Plotter
4. HDD

8. What number system does the computer use?
1. in binary
2. in hexadecimal
3. in decimal
4. all answers are correct

9. What types of personal computer cases are there?
1. horizontal and vertical
2. internal and external
3. manual, roller and tablet
4. matrix, inkjet and laser

10. What types of scanners are there?
1. horizontal and vertical
2. internal and external
3. manual, roller and tablet
4. matrix, inkjet and laser

11. What printers cannot be?
1. tablet;
2. matrix;
3. laser;
4. jet;

12. How can I save information before turning off my computer?

1. in RAM
2. in external memory
3. in the magnetic disk controller
4. in ROM

13. What is a program called?
1. algorithm written in a programming language
2. computer operating system command set
3. a directed graph indicating the order in which computer commands are executed
4. protocol for interaction between computer network components

14. What is called an operating system?

1. a system of programs that ensures the joint operation of all computer devices for processing information
2. a system of mathematical operations for solving individual problems
3. system of scheduled repair and maintenance of computer equipment
4. document scanning program

15. What files are infected by macro viruses?
1. executive;
2. graphic and sound;

3. Word document and Excel spreadsheet files;
4. html documents.

16. What is the anti-virus program based on?
1. waiting for the start of a virus attack
2. to compare program codes with known viruses
3. on deleting infected files
4. on creating viruses

17. What is the name of the device that converts analog signals into digital signals and vice versa?
1. LAN card
2. modem
3. CPU
4. adapter

18. How is information presented on a computer processed?
1. in BASIC
2. in text form
3. in binary codes
4. in decimal number system

19. What is called a code?
1. fixed length binary word
2. sequence of characters
3. arbitrary finite sequence of characters
4. a set of symbols (conventions) to represent information

OPK-7ID-2Be able to use modern technical tools and information technologies, including elements of machine learning and artificial intelligence, to solve analytical and research problems;

20. In what PC device is information processed?
1. external memory
2. display
3. CPU
4. mouse

21. What is the joystick input device used for?
1. for computer games;
2. when carrying out engineering calculations;
3. for transferring graphic information to a computer;
4. for transmitting symbolic information to a computer;

22. What types of monitors are not available?
1. monochrome
2. liquid crystal
3. CRT based
4. infrared

23. What applies to external memory?
1. modem, disk, cassette

2. cassette, optical disc, tape recorder
3. disc, cassette, optical disc
4. Mouse, light pen, hard drive

24. What is application software?
1. reference application for programs
2. text and graphic editors, training and testing programs, games
3. set of gaming programs
4. Word, Excel, Power Point

25. What refers to computer operating systems?
1. DOS, Windows, Unix
2. Word, Excel, Power Point
3. (hospital department staff): head. department, 2 surgeons, 4 medical. Sisters
4. dr. Web, Kaspersky Anti-Virus

26. What are the names of viruses that can live in document files?
1. network
2. macro viruses
3. file
4. bootable

27. Which of the following programs are anti-virus?
1. Doctor WEB, AVG
2. WinZip, WinRar
3. Word, PowerPoint
4. Excel, Internet Explorer

28. What is the name for the combination of computers and local networks located at a remote distance for the common use of the world's information resources?
1. the local network
2. global network
3. corporate network
4. regional network

29.What is a code?
1. a rule describing the mapping of a set of characters from one alphabet to a set of characters from another alphabet
2. arbitrary finite sequence of characters
3. a rule describing the mapping from one set of characters to another set of characters or words
4. fixed length binary word

30. What is 5 kilobytes equal to?
1. 5000 bytes
2. 5000bit
3. 5120 bits
4. 5120 bytes

31. What does a computer mean by zero or one when writing binary code?
1. Yes or no
2. 0 or 1

3. no electrical signal or electrical signal present
4. all answers are correct

GPC-7ID-3 Possess the skills to use modern technical means and information technologies to solve analytical and research problems.

32. What makes it impossible to connect a computer to the global network?
1. computer type
2. composition of peripheral devices
3. no disk drive
4. no network card

33. What are the following personal computer hardware required when working with a text editor?
1. keyboard, display, processor, random access memory
2. external storage device, printer
3. mouse, scanner, hard drive
4. modem, plotter

34. What is the minimum number of bits required to encode the coordinates of one chess field if it consists of 8 columns and 8 rows?
1. 4
2. 5
3. 6
4. 7

35. What is the minimum composition of a personal computer?
1. hard drive, disk drive, monitor, keyboard
2. monitor, keyboard, system unit
3. printer, keyboard, monitor, memory
4. system unit, modem, hard drive

36. Which of the listed input devices belongs to the class of manipulators?
1. touchpad;
2. joystick;
3. microphone;
4. keyboard

37. What types of printers are there?
1. desktop, portable
2. matrix, laser, inkjet
3. monochrome, color, black and white
4. CRT based

38. What is needed to store the programs required to start and test the computer when it is turned on?
1. RAM
2. CPU
3. VZU
4. ROM

39. What is a global network?

1. association of computers within one city, region, country
2. combining computers located at a great distance from each other
3. combining local networks within one corporation to solve common problems
4. association of computers located at a short distance from each other

40. By what mandatory criterion was the name "virus" attributed to computer programs?
1. ability to mutate
2. self-reproduction ability
3. divisibility
4. resizability

4.3 Typical tasks for intermediate certification

4.3.1 List of questions for testing

UC-1 Able to critically analyze problem situations based on a systematic approach and develop an action strategy:

UC-1ID-1 Know the methods of critical analysis and evaluation of modern scientific achievements; basic principles of critical analysis;

1. Classification of events. Determination of reliable, unreliable and equally possible events.
2. Definition of random and opposite events. How are these events related to each other?
3. Definition of joint and non-joint events..
4. Definition of dependent and independent events.
5. Classic definition of probability. Properties of the probability of various events.
6. Definition of a complete group of incompatible events. Theorem and corollary on the complete group of events.
7. Probability addition theorems.
8. Probability multiplication theorems.
9. Total probability formula. Definition of hypotheses and properties of hypotheses.
10. Repeated tests. Bernoulli's formula. Poisson's formula.
11. Definition and formula of permutations Pn. Definition and formula of Combinations C_n^m.

UC-1ID-2 Be able to obtain new knowledge based on analysis, synthesis, etc.; collect and summarize data on current scientific issues related to the professional field; search for information and solutions based on actions, experiment, experience, information and communication technologies;

12. Random variables and probability distribution function, discrete random variables. Continuous random variables and probability density function.
13. Characteristics of random variable distributions (expectation, dispersion, median, mode). Examples of distribution of random variables.
14. Binomial distribution, Poisson distribution, normal distribution.
15. Distributions related to normal (c2 distribution, Student distribution and Fisher distribution).
16. Subject of mathematical statistics. Main goals.
17. Basic concepts of mathematical statistics – population, sample, sample representativeness. Concept of statistical evaluation. Properties of assessments: unbiased, consistent, effective.

UC-1ID-3Be able to study the problem of professional activity using analysis, synthesis and other methods of intellectual activity, including the use of information and communication

technologies; identifying problems and using adequate methods to solve them; demonstrating value judgments in solving problematic professional situations.

18. Descriptive and graphical methods of data analysis. Histogram: empirical distribution function.
19. Column and pie charts.
20. Point estimates of the numerical characteristics of the distribution (empirical frequency, sample mean, sample variance). Interval estimation.
21. Confidence interval. Confidence intervals for mathematical expectation and variance of normal distribution.
22. The logic of testing statistical hypotheses. Errors of the first and second kind, level of significance and power of the test.
23. Fischer, Student, Kolmogorov-Smirnov goodness-of-fit tests.

UC-4 Able to use modern communication technologies, including in foreign language(s), for academic and professional interaction:

UC-4ID-1 Know computer and information and communication technologies, information and digital infrastructure in the organization; communication in professional ethics; factors for improving communication in an organization, communication technologies in professional interaction; characteristics of communication flows; the importance of communication in professional interaction; methods for studying the communicative potential of an individual; modern means of information and communication technologies;

24. Standard Windows software application:
25. Windows operating system.
26. File structure of information.
27. Windows OS settings.
28. Windows graphical interface. Task bar.

UC-4ID-2 Be able to create written texts in Russian and foreign languages in scientific and official business styles of speech on professional issues; explore the flow of information through management communications; determine internal communications in the organization, including using digital technologies;

29. Program "Explorer". Ability to search for folders and files.
30. Windows specifications.

UC-4ID-3 Know the principles of forming a communication system; analyze the system of communication links in the organization by implementing oral and written communications, including in a foreign language; presenting plans and results of one's own and team activities using communication technologies; technology for building effective communication in an organization; transfer of professional information in information and telecommunication networks using modern means of information and communication technologies.

31. Computer networks. Internet services

GPC-5 Able to draw up special documentation, analyze the results of professional activities and submit reporting documents using specialized databases:

GPC-5_{ID-1}Be able to use new information technologies to solve assigned problems in your professional activities, work with specialized information databases;

32. PC software – system and special

33. Types of operating systems. Operating system requirements.

GPC-5_{ID-2}Possess skills in working with an operating system, with text and spreadsheet processors, with database management systems, with information retrieval systems on the Internet;

34. Analysis of statistical data in MS Office 2007 in MS Excel
35. Excel spreadsheet processor.

GPC-5ID-3 Know new information technologies to solve assigned tasks in your professional activities, work with specialized information databases.

36. DatabasesAccess.

GPC-7 Able to understand the operating principles of modern information technologies and use them to solve professional problems:

GPC-7_{ID-1}Know modern technical means and information technologies;

37. Computer science: science, technology, industry.
38. Information. Measure and quality of information. Properties of information.
39. Binary number system. Its connection with the decimal number system. Converting numbers from one system to another and vice versa.
40. Octal number system. Its connection with the decimal number system. Converting numbers from one system to another and vice versa.
41. Hexadecimal number system. Its connection with the decimal number system. Converting numbers from one system to another and vice versa.
42. PC architecture. Principles of building a classic personal computer.
43. PC structure. Composition of the system (motherboard) board
44. Microprocessor: main components and their purpose
45. Clock generator. System bus.
46. Composition and characteristics of the main memory of a PC.
47. External memory devices.
48. PC input devices. PC output devices.
49. Operating system DOS. Components and their purpose.
50. PC software – system and special.
51. Information Security. Methods for protecting information in networks.

GPC-7_{ID-2}Be able to use modern technical tools and information technologies, including elements of machine learning and artificial intelligence, to solve analytical and research problems;

52. Classification and characteristics of computer viruses. Modern antivirus tools.

GPC-7ID-3 Possess the skills to use modern technical means and information technologies to solve analytical and research problems.

53. Technologies for processing graphic information. Graphic editor.
54. Text and graphic editors.

5. METHODOLOGICAL MATERIALS DETERMINING PROCEDURES FOR ASSESSING KNOWLEDGE, ABILITIES AND SKILLS AND ACTIVITY EXPERIENCE CHARACTERIZING THE STAGES OF COMPETENCY FORMATION

Criteria for assessing students' knowledge during testing:

The test result is assessed on a percentage rating scale. Each student is offered a set of test tasks consisting of 25 questions:

- **Mark "excellent"**– 25-22 correct answers.
- **Mark "good"**– 21-18 correct answers.
- **Mark "satisfactory"** –17-13 correct answers.
- **Mark "unsatisfactory"**– less than 13 correct answers

Criteria for assessing students' knowledge when checking test papers:

- **Mark "excellent"**- the problem is identified and its relevance is justified; an analysis of various points of view on the problem under consideration was made and one's own position was logically stated; conclusions are formulated, the topic is fully disclosed, the scope is maintained; requirements for external design have been met, basic requirements for the abstract have been met
- Marked "good" - some shortcomings have been made. In particular, there are inaccuracies in the presentation of the material; there is no logical consistency in judgments; the volume of the abstract is not maintained; there are omissions in the design, there are significant deviations from the requirements for abstracting.
- Marked "satisfactory" - the topic is only partially covered; there were factual errors in the content of the abstract; there are no conclusions, the topic of the abstract is not disclosed
- Marked "unsatisfactory" - there is a significant misunderstanding of the problem or the abstract is not presented at all.

Knowledge criteria for the test:

- The "pass" grade must correspond to the parameters of any of the positive grades ("excellent", "good", "satisfactory").
- A "failed" grade must correspond to the parameters of an "unsatisfactory" grade.
- Mark "excellent" – all types of academic work provided for by the curriculum have been completed. The student demonstrates the correspondence of knowledge, skills and abilities to the indicators given in the tables, operates with acquired knowledge, skills and abilities, and applies them in situations of increased complexity. In this case, inaccuracies and difficulties may occur during analytical operations and the transfer of knowledge and skills to new, non-standard situations.
- Mark "good" – all types of educational work provided for by the curriculum have been completed. The student demonstrates the correspondence of knowledge, skills and abilities to the indicators given in the tables, operates with acquired knowledge, skills and abilities, and applies them in standard situations. In this case, minor errors, inaccuracies, and difficulties during analytical operations and the transfer of knowledge and skills to new, non-standard situations may be made.
- Mark "satisfactory" – one or more types of academic work provided for by the curriculum have not been completed. The student demonstrates incomplete compliance of knowledge, abilities, skills with the indicators given in the tables, significant mistakes are made, a partial lack of knowledge, abilities, and skills is manifested in a number of indicators, the student experiences significant difficulties in operating knowledge and skills when transferring them to new situations.

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• The mark "unsatisfactory" means that the types of educational work provided for by the curriculum have not been completed. demonstrates incomplete compliance of knowledge, abilities, and skills with those given in the tables of indicators, significant errors are made, a lack of knowledge, abilities, and skills is manifested in a larger number of indicators; the student experiences significant difficulties in operating knowledge and skills when transferring them to new situations

6. ACCESSIBILITY AND QUALITY OF EDUCATION FOR PERSONS WITH DISABILITIES

If necessary, disabled people and persons with limited health capabilities are given additional time to prepare an answer for the test.

When carrying out the procedure for assessing the learning outcomes of people with disabilities and people with limited health capabilities, their own technical means may be used.

The procedure for assessing the learning outcomes of people with disabilities and people with limited health capabilities in the discipline provides for the provision of information in forms adapted to the limitations of their health and perception of information:

For people with visual impairments:	– in printed form in enlarged font, – in the form of an electronic document.
For people with hearing impairments:	– in printed form, – in the form of an electronic document.
For persons with musculoskeletal disorders	– in printed form, device: – in the form of an electronic document.

When carrying out the procedure for assessing the learning outcomes of disabled people and persons with limited health capabilities in the discipline, it ensures the fulfillment of the following additional requirements depending on the individual characteristics of the students:

a) instructions on the procedure for conducting the assessment procedure are provided in an accessible form (orally, in writing);

b) an accessible form for submitting assignments of assessment tools (in printed form, in printed form in enlarged font, in the form of an electronic document, assignments are read out by the teacher);

c) an accessible form of providing answers to assignments (written on paper, typing answers on a computer, orally).

If necessary, for students with disabilities and people with disabilities, the procedure for assessing learning outcomes in the discipline can be carried out in several stages.

The procedure for assessing the learning outcomes of disabled people and persons with limited health capabilities is permitted using distance learning technologies.