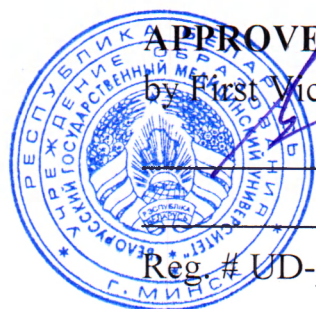**MINISTRY OF HEALTH OF THE REPUBLIC OF BELARUS**
EDUCATIONAL INSTITUTION
BELARUSIAN STATE MEDICAL UNIVERSITY

Контрольный
экземпляр

APPROVED
by First Vice-Rector, Professor
_____ I.N.Moroz
«____» 27.06. 2023
Reg. # UD-091-034/2324edu.

INFORMATICS IN PHARMACY

**Curriculum of educational institution
in the educational discipline for the specialty:**

7-07-0912-01 «Pharmacy»

2023

Curriculum is based on the educational program for the specialty 7-07-0912-01 «Pharmacy», approved 27.06.2023, registration # УД-L.091-034/2324/уч.; on the educational plan for the specialty 7-07-0912-01 «Pharmacy», approved 17.05.2023, registration # 7-07-0912-01/2324/mf.

COMPILERS:

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RECOMMENDED FOR APPROVAL:

by the Department of Medical and Biological Physics of the educational institution «Belarusian State Medical University»
(protocol # 10 of 18.05.2023);

by the Scientific and Methodological Council of the educational institution «Belarusian State Medical University»
(protocol # 6 of 27.06.2023)

EXPLANATORY NOTE

«Informatics in Pharmacy» is an academic discipline of the «Information Technologies in Pharmacy» Module, which contains systematized scientific knowledge about the information processes and methods for creating, storing, reproducing, processing and transferring the medical data by means of computer technology.

The aim of the discipline «Informatics in Pharmacy» is the formation of universal competencies for the use of modern information technologies to solve practical problems of pharmaceutical workers in a healthcare management.

The objectives of the academic discipline «Informatics in Pharmacy» are to form students' scientific knowledge about

the main software products of information technology;

methods and means of information security facility;

the basic concepts of statistical analysis of the experimental data and interpretation of the results obtained;

methods and means of automation technology of a number of pharmaceutical workers professional functions of a healthcare management in order to improve the efficiency of solving accounting problems, the pharmacies activities planning and forecasting, as well as the access to work-related resources of the Internet world network.

The knowledge, skills and abilities received when studying academic discipline «Informatics in Pharmacy» are necessary for the successful mastering of the following academic disciplines: «Biomedical Physics» and «Biomedical Statistics».

Studying the educational discipline «Informatics in Pharmacy» should ensure the formation of students' universal competence: solve professional, scientific and innovative tasks based on the use of information and communication technologies.

As a result of studying the discipline «Informatics in Pharmacy» the student should

know:

the role of modern information technologies in medicine, research and healthcare;

the areas and prospects for the use of information technologies in pharmacy;

the composition, capabilities and operation principles of the modern office suite Microsoft Office application programs;

the basics of statistical methods of medical data processing;

the design basics and database management systems creation;

the fundamental functionality of medical information systems;

be able to:

work in a modern Windows operating system;

work in the application environment of the integrated MS Office suite, exchange information between applications of this software suite;

create the charts and pivot tables to analyze biomedical data in MS Excel;

determine the statistical characteristics of the sample as well as the presence of relationships, using the built-in statistical functions of MS Excel and specialized data analysis tools;

create and demonstrate multimedia presentations to present a research in MS PowerPoint application;

use the query system to select data from databases;

work in a specialist automated workstation program;

use educational and scientific information resources of local networks and the Internet;

master:

practices to process the large design-driven documents, creation of the document headers text of different levels and an electronic table of contents in the MS Word text editor;

skills of complex calculations automation, data presentation in the form of tables, charts and graphs by means of MS Excel spreadsheets;

ways to solve research problems: data analysis, fulfilment of statistical calculations based on sample data and assessment of both the obtained results of statistical processing and analysis of medical and biological data;

procedures to use multimedia MS PowerPoint presentations to promote sanitary-and-hygienic knowledge and a healthy lifestyle;

methods of bulk database file organization and the use of the query system to select data from databases;

practices to work in local and global networks, using Internet information resources;

methods of software protection;

methods of processing medical and biological data by means of specialized programs.

Total number of hours for the study of the discipline is 95 academic hours. Classroom hours according to the types of studies: lectures - 4 hours (supervised student independent work – 1 hour), practical classes - 48 hours, student independent work (self-study) - 43 hours.

Intermediate assessment is carried out according to the syllabus of the specialty in the form of a credit (1 semester).

Form of higher education – full-time.

ALLOCATION OF ACADEMIC TIME
ACCORDING TO SEMESTERS OF STUDY

Code, name of the Specialty	Semester	Number of academic hours						Form of intermediate assessment
		Total	in-class	including				
				lectures (including supervised independent work)	supervised student independent work	laboratory studies	out-of-class self-studies	
7-07-0912-01 «Pharmacy»	1	95	52	4	1	48	43	Credit

THEMATIC PLAN

Name of section (topics)	Number of class hours	
	lecture	practical
1. Practices to process the text documents by means of MS Word text editor	-	**6**
1.1. Creation, editing and formatting of office medical text documents. Inline graphics	-	3
1.2. The use of the styles. Creation of a list of contents. Creation of document templates	-	3
2. Excel spreadsheet techniques	-	**6**
2.1. Creation, editing and formatting of spreadsheets. Processing of scientific research materials. The use of the templates to design professional documents	-	3
2.2. Graphical representation of medical data sets	-	3
3. Statistical processing of medical research data by means of an Excel spreadsheet	**2**	**9**
3.1. Descriptive statistics methods		3
3.2. Graphical representation of statistical sample distribution	2	3
3.3. Study of the correlation analysis methods. Criteria for testing statistical hypotheses		3
4. Basic techniques for working with medical databases	-	**6**
4.1. Construction principles of the databases. Creation of medical databases and their processing	-	3
4.2. Work with a medical database. Search information with use of the query system and data filtering	-	3
5. Preparing a presentation of a scientific report by means of PowerPoint program	-	**6**
5.1. Create and save a presentation. Managing objects		3
5.2. Import content from other Office documents into a presentation file		3
6. Specialized medical software used in pharmacy. Medical information resources of local networks and the Internet. Information security issues	**2**	**15**
6.1. Local and global networks. Medical resources Internet. Online information search tools. Methods to protect information resources. Specialized software. Operating principles of the «Belarusian Pharmacy» software	2	3
6.2. Working as a manager of the «Belarusian Pharmacy» software	-	3
6.3. Working in cashier mode of the «Belarusian Pharmacy» software	-	3
6.4. Report preparation by means of the «Belarusian Pharmacy» software	-	3

Name of section (topics)	Number of class hours	
	lecture	practical
6.5. Analysis, planning and forecasting of pharmacy activities	-	3
Total hours	**4**	**48**

CONTENTS OF EDUCATIONAL MATERIAL

1. Practices to process the text documents by means of MS Word text editor

1.1. Creation, editing and formatting of office medical text documents. Inline graphics

The procedure for preparing an abstract, scientific article, official medical documents. Document formatting.

Inserting and editing graphic objects (drawings, diagrams, SmartArt, WordArt). Manipulations with graphic objects. Working with tables and formulas.

1.2. The use of the styles. Creation of a list of contents. Creation of document templates

Methods and automation technology of documents preparation (styles, templates, themes). Creation of a multi-level heading structure. Creation of a table of contents for a large document. Inserting footnotes, reference lists, subject index, list of illustrations.

2. Excel spreadsheet techniques

2.1. Creation, editing and formatting of spreadsheets. Processing of scientific research materials. The use of the templates to design professional documents

Formulas in spreadsheets and their editing. Absolute and relative references. Formatting books and sheets. Processing data sets using built-in functions. Conditional formatting. The use of the autocompletion features. Creating and editing a document template. Create a new document based on a template.

2.2. Graphical representation of medical data sets

Types of charts. Charting, formatting and editing charts.

3. Statistical processing of medical research data by means of an Excel spreadsheet

3.1. Descriptive statistics methods

Creation of a variation series of research data. Study of descriptive statistics methods. Calculation of the main numerical characteristics of the distribution. The use of the Analysis Package for statistical processing of medical data. Estimation of parameters of the general population from its sample.

3.2. Graphical representation of statistical sample distribution

Frequency polygon plotting and distribution histograms plotting, illustrating the distribution of the indicator under study. Formatting charts.

3.3. Study of the correlation analysis methods. Criteria for testing statistical hypotheses

Estimation of the relations between characteristics using correlation analysis methods (qualitatively and quantitatively). Calculation of the correlation coefficient.

Plotting and editing of scatter diagrams. Hypothesis testing, related to normal distribution parameters.

4. Basic techniques for working with medical databases

4.1. Construction principles of the databases. Creation of medical databases and their processing

Records and database fields. Design basis and system implementation of database service. Database creation. Working with a data-entry form. Entering data using the data-entry form. Sorting.

4.2. Work with a medical database. Search information with use of the query system and data filtering

Sampling that satisfies the criterion. The filters use to find the demanded information. Summary for medical database analysis.

5. Preparing a presentation of a scientific report by means of PowerPoint program

5.1. Create and save a presentation. Managing objects

Create and save a presentation. Entering slide content. Insert pictures, graphs, SmartArt, WordArt, charts, and tables.

5.2. Import content from other Office documents into a presentation file

Concept of OLE technology. Embedded objects and linked objects. Scientific report presentation setting.

6. Specialized medical software used in pharmacy. Medical information resources of local networks and the Internet. Information security issues

6.1. Local and global networks. Medical resources Internet. Online information search tools. Methods to protect information resources. Specialized software. Operating principles of the «Belarusian Pharmacy» software

Local and global networks. Medical resources Internet. Search tools of information on the Internet. Network security. Methods and tools of protection from unauthorized access to data. Account system. Rules of computer passwords creation.

Study of the electronic directory structure. Study of the documents and document logs. Information search in the help system and documents. Report preparation on patient file.

6.2. Working as a manager of the «Belarusian Pharmacy» software

Work with the directories and documents. Data selection according to a distinct set of criteria. Sorting selection response.

6.3. Working in cashier mode of the «Belarusian Pharmacy» software

Workplace of a cashier-recipe. Preparation of the check document. Product entry. Cut-rate pharmacy. Product reservation. Formation of the product order.

6.4. Report preparation by means of the «Belarusian Pharmacy» software

Procedure of work with reports. Raw accounting information collection with subsequent on-line automatic processing, information grouping and report preparation. Capability of the report specification.

6.5. Analysis, planning and forecasting of pharmacy activities

Selections preparation for report making on the base of data corresponding to the certain conditions. The results analysis of commercial activities of a pharmacy enterprise.

ACADEMIC DISCIPLINE CURRICULAR CHART

Section, topic #	Title of section, topic	Lectures	supervised student independent work	practical	student independent work	Forms of knowledge control
1.	**Practices to process the text documents by means of MS Word text editor**	-	-	**6**	**4**	
1.1.	Creation, editing and formatting of office medical text documents. Inline graphics	-	-	3	2	Interview
1.2.	The use of the styles. Creation of a list of contents. Creation of document templates	-	-	3	2	Electronic workshop
2.	**Excel spreadsheet techniques**	-	-	**6**	**4**	
2.1.	Creation, editing and formatting of spreadsheets. Processing of scientific research materials. The use of the templates to design professional documents	-	-	3	2	Interview
2.2.	Graphical representation of medical data sets	-	-	3	2	Electronic test
3.	**Statistical processing of medical research data by means of an Excel spreadsheet**	**2**	**0,5**	**9**	**12**	
	Statistical processing of medical research data by means of an Excel spreadsheet	2	0,5	-	-	
3.1.	Descriptive statistics methods	-	-	3	3	Interview
3.2.	Graphical representation of statistical sample distribution	-	-	3	3	Electronic workshop
3.3.	Study of the correlation analysis methods. Criteria for testing statistical hypotheses	-	-	3	6	Electronic test

№	Title						Form of control
4.	**Basic techniques for working with medical databases**	-	-	-	6	6	
4.1.	Construction principles of the databases. Creation of medical databases and their processing	-	-	-	3	3	Accounts of laboratory work with oral defense
4.2.	Work with a medical database. Search information with use of the query system and data filtering	-	-	-	3	3	Electronic test
5.	**Preparing a presentation of a scientific report by means of PowerPoint program**	-	-	-	6	4	
5.1.	Create and save a presentation. Managing objects	-	-	-	3	2	Electronic workshop
5.2.	Import content from other Office documents into a presentation file	-	-	-	3	2	Electronic workshop
6.	**Specialized medical software used in pharmacy. Medical information resources of local networks and the Internet. Information security issues**	2	2	0,5	15	13	
	Specialized medical software used in pharmacy. Medical information resources of local networks and the Internet. Information security issues	2	2	0,5	-	-	
6.1.	Local and global networks. Medical resources Internet. Online information search tools. Methods to protect information resources. Specialized software. Operating principles of the «Belarusian Pharmacy» software	-	-	-	3	5	Interview. Accounts of laboratory work with oral defense
6.2.	Working as a manager of the «Belarusian Pharmacy» software	-	-	-	3	2	Electronic workshop
6.3.	Working in cashier mode of the «Belarusian Pharmacy» software	-	-	-	3	2	Electronic workshop
6.4.	Report preparation by means of the «Belarusian Pharmacy» software	-	-	-	3	2	Electronic workshop
6.5.	Analysis, planning and forecasting of pharmacy activities	-	-	-	3	2	Electronic workshop. Credit
	Total hours	4	4	1	48	43	

INFORMATION AND INSTRUCTIONAL UNIT

LITERATURE

Basic (relevant):

1. Medical informatics : textbook / V. A. Taller, et al. – Vitebsk : VSMU, 2019. – 225 p.

2. Informatics in pharmacy : teaching-learning manual / V. A. Taller, et al. – Vitebsk : VSMU, 2018. – 120 p.

Additional:

3. Informatics, medical informatics, statistics : textbook./ V. Omelchenko, A. A. Demidova. – Moscow : Geotar-Media, 2021. – 608 p.

4. Shelamova, M. A. Software «Belarusian Pharmacy»: teaching-learning manual / M. A. Shelamova. – Minsk : BSMU, 2019. – 71 p.

5. Shelamova, M. A. Statistical analysis basis of medical and biological data with the use of MS Excel: teaching-learning manual / M. A. Shelamova, N. I. Insarova, V. G. Leshchenko. – Minsk : BSMU, 2017. – 92 p.

6. Shelamova, M. A. Practices to organize and process medical databases by means of MS Excel: teaching-learning manual / M. A. Shelamova, V. A. Shchukovskaya. – Minsk : BSMU, 2015. – 66 p.

METHODOLOGICAL RECOMMENDATIONS FOR THE ORGANIZATION AND PERFORMANCE OF STUDENT INDEPENDENT WORK IN THE ACADEMIC DISCIPLINE

The time allotted for the independent work can be used by students to:

preparation for laboratory classes;

preparation for the credit in the academic discipline;

carrying out research and creative tasks;

performing practical tasks;

perform test tasks;

work on topics (questions) submitted for independent study;

perform practical tasks;

note-taking of educational literature;

surveying scientific literature on a certain topic;

compilation of a topical collection of literary source and Internet sources.

METHODOLOGICAL RECOMMENDATIONS FOR THE ORGANIZATION AND PERFORMANCE OF SUPERVISED STUDENT INDEPENDENT WORK IN THE ACADEMIC DISCIPLINE

Main forms of supervised student independent work:

preparation and presentation of abstracts;

presentation of reports;

studying topics and problems that have not been discussed at the lectures;

preparation and participation in active forms of education.

Control of supervised student independent work is carried out in the form of:
discussion of abstracts;
defense of educational assignments;
assessment of an oral reply to a question, presentation, report or problem solving.

LIST OF AVAILABLE DIAGNOSTIC TOOLS

The following forms are used for competences assessment:

Oral form:
interviews;
credit.

Oral-written form:
accounts of laboratory work with oral defense;

Technical form:
electronic tests;
electronic workshops (practicals).

LIST OF AVAILABLE TEACHING METHODS

Traditional method (lecture, laboratory practicals);
Active (interactive) methods:
Problem-Based Learning (PBL).

LIST OF PRACTICAL SKILLS

1. Work in a modern Windows operating system.
2. Work in the application environment of the integrated MS Office suite, exchange information between applications of this software suite.
3. Create the charts and pivot tables to analyze biomedical data in MS Excel.
4. Determine the statistical characteristics of the sample as well as the presence of relationships, using the built-in statistical functions of MS Excel and specialized data analysis tools.
5. Create and demonstrate multimedia presentations to present a research in MS PowerPoint application.
6. Use the query system to select data from databases.
7. Work in a specialist automated workstation program.
8. Use educational and scientific information resources of local networks and the Internet.

LIST OF EQUIPMENT USED

Personal computer.

LIST OF LECTURES

1. Statistical processing of medical research data by means of an Excel spreadsheet.

2. Specialized medical software used in pharmacy. Medical information resources of local networks and the Internet. Information security issues.

LIST OF PRACTICAL STUDIES

1. Creation, editing and formatting of office medical text documents. Inline graphics.

2. The use of the styles. Creation of a list of contents. Creation of document templates.

3. Creation, editing and formatting of spreadsheets. Processing of scientific research materials. The use of the templates to design professional documents.

4. Graphical representation of medical data sets.

5. Descriptive statistics methods.

6. Graphical representation of statistical sample distribution.

7. Study of the correlation analysis methods. Criteria for testing statistical hypotheses.

8. Construction principles of the databases. Creation of medical databases and their processing.

9. Work with a medical database. Search information with use of the query system and data filtering.

10. Create and save a presentation. Managing objects.

11. Import content from other Office documents into a presentation file.

12. Local and global networks. Medical resources Internet. Online information search tools. Methods to protect information resources. Specialized software. Operating principles of the «Belarusian Pharmacy» software.

13. Working as a manager of the «Belarusian Pharmacy» software.

14. Working in cashier mode of the «Belarusian Pharmacy» software.

15. Report preparation by means of the «Belarusian Pharmacy» software.

16. Analysis, planning and forecasting of pharmacy activities.

PROTOCOL OF THE CURRICULUM APPROVAL
BY OTHER DEPARTMENTS

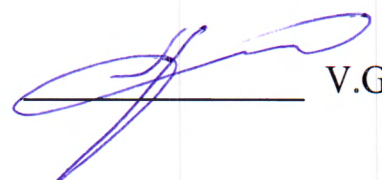| Title of the discipline requiring approval	Department	Amendments to the curriculum in the academic discipline	Decision of the department, which designed the curriculum (date, protocol #)
Biomedical statistics	Public Health and Health Care	no additions or changes	protocol #10 of 18.05.2023

COMPILERS/AUTHORS:

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Associate Professor of the Medical and Biological Physics Department of the educational institution «Belarusian State Medical University», Ph.D., Associate Professor

_____ L.V.Rabushka

Curriculum content, composition and the accompanying documents comply with the established requirements.

Dean of the Medical Faculty for International Students of the educational institution «Belarusian State Medical University»
26. 06. 2023

_____ O.S.Ishutin

Methodologist of the educational institution «Belarusian State Medical University»
26. 06. 2023

_____ S.V.Zaturanova