

Educational institution
"Belarusian State Economic University"

УТВЕРЖДАЮ

Ректор учреждения образования
"Белорусский государственный
экономический университет"

А.В. Егоров

2024 г.

Регистрационный № УД 6250-241 уч.

I affirm

Rector of the educational Institution
"Belarusian State Economic University"

A.V. Egorov

28.06 2024 g.

Registration № UD 6250-241 account

Fundamentals of Information Technology

The curriculum of higher education institutions discipline
for specialties:

- 7-06-0311-01 Economics
- 7-06-0311-02 World Economy
- 7-06-0411-02 Finance, taxation and credit
- 7-06-0411-01 Accounting, analysis and audit
- 7-06-0413-02 Commodity research and examination of goods
- 7-06-0413-01 Commerce
- 7-06-0541-01 Statistics and analysis
- 7-06-0412-02 Business Administration
- 7-06-0412-04 Marketing
- 7-06-0412-03 Logistics
- 7-06-0223-01 Philosophy
- 7-06-0312-01 Political Science
- 7-06-0421-01 Jurisprudence

Compiled on the basis of the minimum program for a differentiated test in the general educational discipline "Fundamentals of Information Technology", approved by the Decree of the Ministry of Defense of the Republic of Belarus 03.08.22 No. 223.

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RECOMMENDED FOR APPROVAL:

Department of Information Technology of the educational institution "Belarusian State Economic University" (protocol No. 13 of 30.05 2024 g.)

Methodological commission for the specialty "Economic Informatics" of the educational institution "Belarusian State Economic University"
(protocol No. 5 of 03.06 2024.);

Scientific and methodological council of the educational institution "Belarusian State Economic University" (protocol No. 9 of 27.06 2024 g.)

Explanatory note

Academic discipline "Fundamentals of Information Technology" is intended for mastering by undergraduates studying in the specialties - 7-06-0311-01 Economics; 7-06-0311-02 World Economy; 7-06-0411-02 Finance, taxation and credit; 7-06-0411-01 Accounting, analysis and audit; 7-06-0413-02 Commodity research and examination of goods; 7-06-0413-01 Commerce; 7-06-0541-01 Statistics and analysis; 7-06-0412-02 Business Administration; 7-06-0412-04 Marketing; 7-06-0412-03 Logistics; 7-06-0223-01 Philosophy; 7-06-0312-01 Political Science; 7-06-0421-01 Jurisprudence.

The objectives of the study of the academic discipline:

- training undergraduates to use modern information technologies and instrumental methods based on them as a tool for solving scientific and innovative problems of a problem area;
- the formation of analytical abilities, allowing to make an informed choice of the studied methods, means when solving problems from the problem area of the undergraduate;
- preparation for the development and formation of ideas about the formalization of decision-making procedures in the problem area.

The tasks of studying the academic discipline are as follows:

- obtaining theoretical knowledge about modern information technologies and software for solving problems of a problem area;
- gaining practical skills in using a table processor, working with a database, modeling business processes, solving optimization problems, designing Web pages at an advanced level.

The development of the discipline "Fundamentals of Information Technology" should ensure the formation of the following universal competence¹: UK-8. Have the skills to use modern information technology to solve research and innovation problems.

As a result of studying the academic discipline, the undergraduate must:

know:

- current state of information technologies and their use in their subject area,
- composition, capabilities and prospects for the development of software and hardware for information technology,
- VBA programming basics,
- modeling methods and decision-making optimization
- the basics of the functioning of computer networks, including Internet networks, and their use in professional and scientific activities,

- fixed assets and technologies for ensuring information security; be able to:
 - reasonably choose software and hardware to solve scientific and innovative problems of the subject area,
 - visualize scientific data using business graphics,
 - solve optimization and statistical problems,
 - work with databases using the table processor and database management system,
 - use Web-technologies to solve for solving scientific and innovative problems of the subject area,
 - ensure the security of information resources used,
 - apply methods of modeling business processes to formalize the tasks of the subject area,

own:

- tools for solving problems of analysis, modeling and optimization,
- skills to work with decision support systems,
- skills in working with software for creating Web pages, databases, spreadsheets.

The total number of hours is 72 of which 50 are classroom hours.

Distribution of class time by types of classes:

- for the full-time form of obtaining the second stage of higher education: lectures - 26 hours of which 12 hours for guided independent work, laboratory classes - 24 hours of which 4 hours for guided independent work.
- - for the correspondence form of obtaining the II stage of education: lectures - 6 hours, laboratory classes - 6 hours.

Forms of control - abstract, differentiated offset.

The knowledge and skills acquired in the course "Fundamentals of Information Technology" can be used in the performance of scientific work and master's theses.

CONTENT OF EDUCATIONAL MATERIAL

Topic 1. Modern information technology

The concept, classification and types of information technology software.

The concept and types of information.

IT technical support.

Classification of computers. Computer architecture. The main components of computers: processor memory.

Computer performance Trends in the development of technical support for information technology.

History and prospects for the development of IT technologies.

Topic 2. Basic information processing software

Classification of software (software).

System software: operating systems (OS), service programs.

Application software. Application packages.

Tool software. Programming technologies. Compiled, interpreted and embedded languages. Procedural, object-oriented and logic programming.

Prospects for the development of software.

Topic 3. Data storage and processing tools

Databases (DB).

Database. Models of data organization in the database. Relational DB.

Database management systems.

Systems for processing multiuser databases. File/server, client/server architectures. distributed databases.

Topic 4. Network technologies and the Internet

The concept of computer networks. Classification of computer networks.

Interaction of computers in a network. The concept of a computer network protocol. OSI model.

Internet. Addressing computers on the Internet.

Basic Internet services. Fundamentals of web technologies. Search engines and bibliographic catalogs and services in the organization of scientific research.

Cloud technologies. Internet of things.

Topic 5. Data protection

Information security assessment: IS standards and classes, IS requirements.

Basic requirements, methods and means of information protection.

Cryptographic method of protection. Electronic digital signature. Computer steganography.

The concept of information security. Information security policy.

Threats to information security.

Topic 6. Mathematical modeling

The concept of a model, a mathematical model.
The main types of models in the economy. Analytical, evolutionary, simulation, structural modeling.
The main stages of mathematical modeling.
Methods for modeling business processes.
Systems and packages for mathematical calculations.

Topic 7. Optimization methods and decision support systems

Optimization as the main stage of the computational experiment.
Artificial intelligence, neural networks, evolutionary computing, fuzzy set theory.
Expert systems.
Decision support systems.
Overview and characteristics of standard data analysis software packages.

Topic 8. Information technology in the economy

The concept of an information system (IS). IP classification. Corporate information systems. Requirements for corporate information systems.
Basic IP standards.
Problem-oriented and integrated APIs. Criteria for selecting software for solving applied problems.
Design of information systems. Means of automation of information systems design. CASE tools.
Assessment of the quality of the information system.
Reengineering of information systems.
Network economy. Electronic business. e-business models.
"Cloud" services in the economy.
Prospects for the use of information technology in the economy.

Educational-methodical map of the discipline "Fundamentals of Information Technology"
for the full-time form of obtaining the second stage of higher education

Section number, font in	Section title, topic	Number of class hours				Other *	
		Lectures	Lab. occupations	Number of hours USR			
				Lectures	Lab. occu- pations		
1	Modern information technology	2		1		[2,4]	
2	Basic information processing software	2	6	1	2	[2]	
3	Data storage and processing tools	2	4	1	1	[1,2]	
4	Networking and the Internet	2	2	0	1	[5,6]	
5	Data protection	2	0	1	0	[3]	
6	Mathematical modeling	2	4	1	0	[7,10]	
7	Optimization methods and decision support systems	2	4	1	0	[11-13]	
8	Information technology in the economy	0	0	6	0	[8,9,12, 14-18]	
	Total hours	14	20	12	4		Differentiated classification

Educational-methodical map of the discipline "Fundamentals of Information Technology"
for the correspondence form of obtaining the second stage of higher education

Section number, ton in	Section title, topic	Number of class hours				Other *
		Lectures	Lab. occupations	Number of hours USR		
				Lectures	Lab. occupations	
1	Modern information technology	0,5				[2,4]
2	Basic information processing software	0,5				[2]
3	Data storage and processing tools	1	2			[1,2]
4	Networking and the Internet	0,5	2			[5,6]
5	Data protection	0,5	2			[3]
6	Mathematical modeling	1	0			[7,10]
7	Optimization methods and decision support systems	1	1			[11-13]
8	Information technology in the economy	1	1			[8,9,12,14-18]
	Total hours	6	6			

INFORMATION AND METHODOLOGICAL PART

Guidelines for the organization of independent work of undergraduates in the discipline

"Fundamentals of Information Technology"

An important stage in mastering the knowledge of a discipline is the independent work of undergraduates. It is recommended that a time budget for independent work on average 2-2.5 hours for a 2-hour classroom lesson.

The main areas of independent work of the student are:

- initially a detailed familiarization with the curriculum;
- familiarization with the list of recommended literature on the discipline as a whole and its sections, its presence in the library and other available sources, the study of the necessary literature on the topic, the selection of additional literature;
- study and expansion of the lecture material of the teacher due to special literature, consultations;
- preparation for laboratory studies according to specially developed plans with the study of basic and additional literature;
- independent performance of individual tasks on these topics;
- preparation of an essay for admission to the differentiated classification.

LITERATURE

The main:

1. Information Systems in the Economy: A Tutorial/M. N. Sadovskaya et al.; Under Society. M.N. Sadovskaya. - Minsk: BGEU, 2018. - 316 p.
2. Technical and software: training manual/M.N. Sadovskaya et al.]; Under Society. M.N. Sadovskaya. - Minsk: BGEU, 2017. - 271 p.
3. Oskerko, V.S. Database and Knowledge Technologies: Tutorial/, V.S. Oskerko, N. N. Govyadinova, Z.I. Punchik. - Minsk: BGEU, 2020. 251 p.
4. Information systems in the economy: textbook for academic baccalaureate: for students of higher educational institutions studying in economic directions and specialties/[V. N. Volkova et al.]; Under Ed. V.N. Volkova and V.N. Yureva; St. Petersburg Polytechnic University. Un-t Peter the Great. - Moscow: Jurayt, 2017. - 401 p.

Additional:

5. Romanets, Yu.V. Information protection in computer systems and networks / Yu.V. Romanets, P.A. Timofeev, V.F. Shangin. - M.: Radio and communication 199. - 381 p.
6. Shangin, V.F. Comprehensive protection of information and corporate systems. - Moscow: Forum: Infra-M, 2016 - 591 p.
7. Olifer, V.G. Computer Networks. Principles, Technologies, Protocols./V.G. Olifer, N.V. Olifer. St. Petersburg: Peter, 2016. - 991 p.
7. Romanets, Yu.V. Information Protection in Computer Systems and Networks/Yu.V. Romanets, P.A. Timothy, V.F. Shangin - M.: Radio and Communication 199. -381 p.
8. Carr, N. The Great Transition. Revolution of Cloud Technologies/N. Carr. - Moscow: Mann, Ivanov and Ferber, 2017. - 273 c.
9. Klementyev, I.P. Introduction to Cloud Computing, 2nd ed./I.P. Klementyev, V.A. Ustinov. - Moscow: Intuit, 2016. - 311 c.
10. Baranova, E.K. Cryptographic Methods of Information Protection -E.K. Baranova, A.V. Babash. - Moscow: KnosRus, 2015. - 196 p.
11. Reislin, V. I. Mathematical Modeling. Tutorial/V.I. Reislin. - Moscow: Jurayt, 2016. - 128 c.
12. Strongin, R. G. Surgery Study. Models of economic behavior/R.G. Strongin. - Moscow: Internet University of Information Technologies, Binom. Knowledge Lab, 2016. - 208 c.
13. Yudin, S. V. Mathematics and economic and mathematical models. Textbook/S.V. Yudin. - M.: Infra-M, RIOR, 2016. - 376 c.
14. Kini R.L., Raifa H. Decision-making under many criteria of preference and change/Under Ed. I.F. Shahnova. - M.: Radio and Communications, 1981.
15. Ventzel E.S. Research of Operations. - M.: Soviet Radio, 1972.
16. Prokopenko N.Y. Decision Support Systems [Electronic Resource]: Training/N. Yu. Prokopenko; Nizhegor. state. architecture. - builds. Un-t. - N. Novgorod:

NNGASU, 2017.

17. Data Mining - data mining/BaseGroup Labs. Access mode - http://www.basegroup.ru/library/methodology/data_mining/. - access date 10.11.2019.

18. Gavrilova, T. A. Intellectual Technologies in Management: Tools and Systems: Study, Manual/T. A. Gavrilova, D. I. Muromtsov. - 2nd ed. - SPb.: Higher School of Management of SPbSU, 2017.

19. Nabatova, D. S. Mathematical and instrumental methods of supporting decision-making: textbook and workshop for bachelor 's degree and master 's degree/D. S. Nabatova. - M.: Publishing House Jurayt, 2017. - 292 p. - Series: Baka- Lavr and Master. Academic course.

20. Isakova, A. I. Fundamentals of information technology: textbook / A. I. Isakova. - Tomsk: TUSUR, 2016. - 206 p. : ill. – Access mode: by subscription. – URL: <https://biblioclub.ru/index.php?page=book&id=480808> (date of access: 06. 05.2024). – Bibliography: p. 197-198. – Text : electronic.

21. Fundamentals of information technology / S. V. Nazarov, S. N. Belousova, I. A. Bessonova [and others]. - 2nd ed., corrected. - Moscow: National Open University "INTUIT", 2016. - 531 p. : ill. – Access mode: by subscription. – URL: <https://biblioclub.ru/index.php?page=book&id=578063> (date of access: 10/05/2024). – Bibliography: p. 527 - 530. - Text: electronic.

22. Modern computer technologies: textbook / R. G. Khismatov, R. G. Safin, D. V. Tuntsev, N. F. Timerbaev; Ministry of Education and Science of Russia, Kazan National Research Technological University. - Kazan: Kazan Research Technological University (KNITU), 2014. - 83 p. : schemes. – Access mode: by subscription. – URL: <https://biblioclub.ru/index.php?page=book&id=428016> (date of access: 06. 05.2024). - Bibliography. in book. – ISBN 978-5-7882-1559-4. – Text : electronic.

23. Proskuryakov, A. V. Computer networks: the basics of building computer networks and telecommunications: a tutorial / A. V. Proskuryakov. - Rostov-on-Don; Taganrog: Southern Federal University, 2018. - 202 p. : ill. – Access mode: by subscription. – URL: <https://biblioclub.ru/index.php?page=book&id=561238> (date of access: 06. 05.2024). – Bibliography: p. 195-196. – ISBN 978-5-9275-2792-2. – Text : electronic.

24. Kovgan, N. M. Computer networks: textbook / N. M. Kovgan. - Minsk: RIPO, 2019. - 180 p. : ill., tab. – Access mode: by subscription. – URL: <https://biblioclub.ru/index.php?page=book&id=599948> (date of access: 06. 05.2024). - Bibliography. in book. – ISBN 978-985-503-947-2. – Text : electronic.

25. Urbanovich, P. P. Computer networks: textbook / P. P. Urbanovich, D. M. Romanenko. - Moscow ; Vologda: Infra-Engineering, 2022. - 460 p. - ISBN 978-5-9729-0962-9. - Text : electronic. - URL: <https://znanium.com/catalog/product/1902692> (date of access: 10.05.2024). – Access mode: by subscription.

26. Redkina, N. S. Information technology in questions and answers: a tutorial / N. S. Redkina. - 2nd ed., revised. and additional - Moscow: INFRA-M, 2022. - 161 p. — (Higher education: Bachelor's degree). - ISBN 978-5-16-111070-6. - Text : electronic. -

URL: <https://znanium.com/catalog/product/1908680> (date of access: 10.05.2024). –
Access mode: by subscription.

UVE PROGRAM AGREEMENT PROTOCOL

Name of Training disciplines with which is required approval	Title departments	Suggestions of changes in the curriculum content institutions of higher discipline education	The decision made by the department that developed the curriculum (indicating the date and number of the)

ADDITIONS AND CHANGES TO THE SVO TRAINING PROGRAM
for ____ / ____ academic year

№ п/п	Additions and changes	Foundation
1.		
2.		

The curriculum was revised and approved at the meeting of the Department
_____ (protocol № ____ from _____ 202_

g.)

Head of department
