Educational institution
"Belarusian State Economic University"

Fundamentals of Information Technology

The curriculum of higher education institutions discipline
for specialties:

1-21 80 12 Philosophy
1-23 80 07 Political Science
1-24 80 01 Jurisprudence
1-25 80 01 Economics
1-25 80 02 World Economy
1-25 80 03 Finance, taxation and credit
1-26 80 06 Logistics
1-25 80 05 Accounting, analysis and audit
1-25 80 07 Commodity research and examination of goods
1-25 80 09 Commerce
1-25 80 10 Statistics and analysis
1-26 80 03 Business Administration
1-26 80 05 Marketing

2019

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RECOMMENDED FOR APPROVAL:

Department of Information Technology of the educational institution "Belarusian State Economic University" (protocol No. 5 of 2.8.11, 2019 g.)

Scientific and methodological council of the educational institution "Belarusian State Economic University" (protocol No. _____ of _____ 2019 g.)

Explanatory note

The discipline "Fundamentals of Information Technology" is intended for mastering by undergraduates studying in the specialties - 1-21 80 12 Philosophy; 1-23 80 07 Political Science; 1-24 80 01 Jurisprudence; 1-25 80 01 Economics; 1-25 80 02 World economy; 1-25 80 03 Finance, taxation and credit; 1-25 80 05 Accounting, analysis and audit; 1-25 80 07 Commodity research and examination of goods; 1-25 80 09 Commerce; 1-25 80 10 Statistics and analysis; 1-26 80 03 Business Administration; 1-26 80 05 Marketing; 1-26 80 06 Logistics.

The objectives of the study of the 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 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 competence[1]:

UK-8. Have the skills to use modern information technology to solve research and innovation problems.

As a result of studying the 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 108 of which 72 hours are classroom hours. Classroom time distribution by occupation:

–for the full-time form of obtaining the II level of higher education: lectures - 36 hours of which 24 hours for controlled independent work, laboratory classes - 36 hours of them 22 hours for controlled independent work.

–for the correspondence form of obtaining the II level of education: lectures - 8 hours, laboratory classes - 10 hours.

Recommended forms of control - abstract, differentiated classification. The knowledge and skills acquired in the course "Fundamentals of Information Technology" can be used in carrying out scientific work and master's theses.

CONTENT OF EDUCATIONAL MATERIAL

Topic 1. Modern information technology

The concept of information technology and information system.

Classification of information systems.

Standards of corporate information systems (CRP, MPS, MRP, MRPII, ERP, ERP II, CRM).

State policy in the field of information technology.

Informatization of scientific research.

Problems of informatization of society.

Topic 2. Technical support of information technology

Classification of technical means of information technology (IT): classification of computers.

Computing system (VS): types of architectures and composition of the aircraft.

Personal computer (PC): standard kit, internal and external devices.

Processor: main components and features.

PC memory: types and features of internal and external memory.

Electronic office equipment. Basic configuration devices: monitor, keyboard, mouse.

Peripheral devices: printer, scanner, modem, etc.

Trends in the development of technical support for information technology.

Topic 3. The main software tools of information technology

The concept and classification of software (software).

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

Application software. Application packages: word processors, spreadsheets (tabular processors), graphic processors, dynamic presentation systems, computer math systems, statistical data analysis systems.

Application software. Problem-oriented RFP.

Tool software. Programming systems, integrated programming environments, CASE-tools.

Middleware software.

Trends in the development of information technology software.

Topic 4. Networking and the Internet

The concept of computer networks and network technologies. Classification of computer networks. Computer network development trends.

The interaction of computers on the network. Computer network protocol concept. OSI model. Implementation of the OSI model in the TCP / IP protocol.

Ethernet technology and its development (Fast Ethernet, Gigabit Ethernet): the principle of operation, basic characteristics.

Wireless network technologies: WPAN (BlueTooth, ZigBee, etc.), WLAN, MLAN (WiFi, WiMax), WWAN (GSM cellular networks).

Global computer network Internet: basic definitions, factors affecting its development, structural components.

IP - addressing in the global Internet: address classes, concept of address mask, routing, DNS.

The main services (e-mail, web, IP-telephony, IP-television, etc.) of the global Internet and their development.

Topic 5. Database Management Systems

The concept of a database (DB). Applications, components, users, DBA. Data structures.

Data models: hierarchical, network, relational, post-relational, object-oriented and object-relational, multidimensional. Their advantages and disadvantages.

The concept of DBMS. Features provided to users; architecture; classification, DBMS functions. The user operating modes from the database to the DBMS. Directions of development of a DBMS.

File / server architecture. Desktop DBMS, their advantages and disadvantages, etc.

Client / Server Architecture. Database servers, their functions, characteristics, examples.

Distributed databases, their types. Distribution strategies. The Twelve Rules of C. Data. Distributed DBMS, their advantages and disadvantages, examples.

Purpose, SQL language standards. Team structure. Data types, expressions. Commands for data definition, data manipulation, data extraction, access control, transaction management. Commands embedded in application programs. SQL dialects.

Topic 6. Information Security

The concept of information security (IS). Information Security Objects. The concept of information threat. Classification of threats.

Information Security Policy. Organizational measures of information security.

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

Methods and means of information protection. Cryptographic method of protection. Electronic digital signature. Computer steganography and other software and hardware information protection.

State legislation in the field of information security of information systems.

Topic 7. Mathematical modeling and numerical methods

The concept of a model, a mathematical model.
Types of modeling systems.
The essence of the systems approach and system analysis.
The main stages of mathematical modeling.
Qualitative and quantitative methods for modeling systems.
The main types of models in the economy.
Methods of modeling business processes.

Topic 8. Optimization methods and decision support systems

Optimization problems and their classification.
Optimization as the final stage of a computational experiment.
Classification of methods for optimizing functions.
Methods of unconditional optimization of functions.
Methods of conditional optimization of functions.
Expert system, its characteristic.
Decision support systems, their characteristics.
Software optimization methods and decision support.

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

Section number, topic	Section title, topic	Number of class hours				Other *	Form of control of knowledge
		Lectures	Lab. occupations	Number of hours USR			
				Lectures	Lab.occupations		
1	Modern information technology	1		4		[1,2,4]	Google Poll
2	Technical support of information technology	2		5		[2]	Google Poll
3	The main software tools of information technology	1	4	3	8	[1,2]	Google Poll
							Individual task
4	Networking and the Internet	2	2	2	2	[5,6]	Google Poll
							Individual task
5	Database Management Systems	1	0	3	8	[3]	Google Poll
							Individual task
6	Information Security	1	0	3	0	[7,10]	Google Poll
7	Mathematical modeling and numerical methods	2	4	2	2	[11-13]	Google Poll
							Individual task
8	Optimization methods and decision support systems	2	4	2	2	[8,9,12, 14-18]	Google Poll
							Individual task
	Total hours	**12**	**14**	**24**	**22**		**Differentiated classification**

The content of laboratory classes in English

Section title, topic	Topic	In Russion		in English		correspondence training	Form of control of knowledge
		Auditory lessons, hour	USR, ч	Auditory lessons, hour	USR, hour	Auditory lessons, hour	
3. The main software tools of information technology	Tabular data visualization in Excel	2	2	2	2	2	Individual task
	Work with built-in functions Excel		2	2	2		Individual task
	Working with an Excel spreadsheet as a database		2	2	2		Individual task
	Language programming VBA	2	2				
4. Networking and the Internet	Web page creation	2	2	2	2	2	Individual task
5. Database Management Systems	Working with a database in Access		8	6	4	2	Individual task
7.Mathematical modeling and numerical methods	Business Process Modeling	4	2	4	2	2	Individual task
8.Optimization methods and decision support systems	Optimization of choice of alternatives in DSS Assistant Choice	2	2	2	2	2	Individual task
	The solution of optimization problems by means Excel	2					Individual task

TOTAL	14	22	20	16	10	
Total hours	36		36			

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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, Z.I. Punchik. - Minsk: BGEU, 2015. 215 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.

5. Shangin, V.F. Comprehensive protection of information and corporate systems. - Moscow: Forum: Infra-M, 2016 - 591 p.

6. Olifer, V.G. Computer Networks. Principles, Technologies, Protocols./V.G. Olifer, N.V. Olifer. St. Petersburg: Peter, 2016. - 991 p.

Additional:

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.

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 protocol)
1. *Каул. ина мехр*	*Инф. мехн*	*нет Смет*	*Прот. N 5 От 28.11.2019*

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

№ n/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

_____   _____   _____

AffIRM
Dean of faculty