Federal State Autonomous Educational Institution of Higher Education
PEOPLES' FRIENDSHIP UNIVERSITY OF RUSSIA
NAMED AFTER PATRICE LUMUMBA
RUDN University

Agrarian-Technological Institute
educational division (faculty/institute/academy) as higher education programme developer

COURSE SYLLABUS

Information technology
course title

Recommended by the Didactic Council for the Education Field of:

35.04.04 Agronomy
field of studies / speciality code and title

The course instruction is implemented within the professional education programme of higher education:

Integrated Plant Protection
higher education programme profile/specialisation title

2023

1. THE PURPOSE OF MASTERING THE DISCIPLINE

The purpose of mastering the discipline "Information Technologies" is to form basic ideas about obtaining and processing information for its analysis by a person and making decisions on its basis to perform management tasks related to production activities in the field of agriculture.

REQUIREMENTS FOR THE RESULTS OF MASTERING THE DISCIPLINE

Mastering the discipline "Information Technologies" is aimed at the formation of the following competencies (parts of competencies) among students:

Table 1 - The list of competencies formed by students during the development of the discipline (the results of mastering the discipline)

Code	Competence	Competency Achievement Indicators
UK-1.	Able to carry out search, critical analysis of problem situations on the basis of a systematic approach, to develop an action strategy	UK-1.1 Performs the search for the necessary information, its critical analysis and summarizes the results of the analysis to solve the task
		UK-1.2 Uses a systematic approach to solve the tasks
UK-7.	Able to search for the necessary sources of information and data, perceive, analyze, memorize and transmit information using digital means, as well as with the help of algorithms when working with data received from various sources in order to effectively use the information received to solve problems, to evaluate information, its reliability, to build logical conclusions on the basis of incoming information and data	UK-7.1 Evaluates information, its reliability, builds logical conclusions on the basis of incoming information and data
		UK-7.2 Has practical experience in searching, perceiving, storing, analyzing, transmitting information and data using digital tools, algorithms and application programs in order to solve the tasks
OPK-1	Able to solve the problems of development of the field of professional activity and (or) organization on the basis of analysis of the achievements of science and production	OPK-1.3 Applies available technologies, including information and communication technologies, to solve the problems of professional activity in agronomy
OPK-3	Able to use modern methods of problem solving in the development of new technologies in professional activities	OPK-3.2 Uses information resources, achievements of science and practice in the development of new technologies in agronomy
OPK-6	Able to manage teams and organize production processes	OPK-6.1 Able to work with information systems and databases on personnel management issues
OPK-7	Able to own the tools for working with large arrays of structured and unstructured information, use modern digital methods of processing, analysis, interpretation and visualization of data in order to solve the tasks of professional and research activities in the field of agronomy	OPK-7.1 Owns the tools for working with large arrays of structured and unstructured information
		OPK-7.2 Uses modern digital methods of data processing, analysis, interpretation and visualization in order to solve the tasks

PK-1	Able to collect, process, analyze and systematize scientific and technical information, domestic and foreign experience in the field of agronomy	PP-1.2 Conducts information retrieval of knowledge-intensive technologies in biotechnology and genetic engineering using various databases and network resources
PK-6	Able to prepare conclusions on the feasibility of introducing into production the studied techniques, varieties and hybrids of agricultural crops based on the analysis of experimental data	PK-6.1 Proficient in the methods of calculating the agronomic, energy and economic efficiency of innovation implementation

2. THE PLACE OF DISCIPLINE IN THE STRUCTURE OF THE EP HE

The discipline "Information Technologies" refers to the mandatory part of the block *B1.O.01.02*.

Within the framework of the EP HE, students also master other disciplines and / or practices that contribute to the achievement of the planned results of mastering the discipline "Information Technology".

Table 2 – List of components of the EP HE that contribute to the achievement of the planned results of the discipline

Code	**Competence**	**Previous disciplines/modules, practices**	**Subsequent disciplines/modules, practices**
UK-1.	Able to carry out search, critical analysis of problem situations on the basis of a systematic approach, to develop an action strategy		
UK-7.	Able to search for the necessary sources of information and data, perceive, analyze, memorize and transmit information using digital means, as well as with the help of algorithms when working with data received from various sources in order to effectively use the information received to solve problems, to evaluate information, its reliability, to build logical conclusions on the basis of incoming information and data		
OPK-1	Able to solve the problems of development of the field of professional activity and (or) organization on the basis of analysis of the achievements of science and production		
OPK-3	Able to use modern methods of problem solving in the development		

	of new technologies in professional activities		
OPK-6	Able to manage teams and organize production processes		
OPK-7	Able to own the tools for working with large arrays of structured and unstructured information, use modern digital methods of processing, analysis, interpretation and visualization of data in order to solve the tasks of professional and research activities in the field of agronomy		
PK-1	Able to collect, process, analyze and systematize scientific and technical information, domestic and foreign experience in the field of agronomy		
PK-6	Able to prepare conclusions on the feasibility of introducing into production the studied techniques, varieties and hybrids of agricultural crops based on the analysis of experimental data		

3. THE SCOPE OF DISCIPLINE AND TYPES OF EDUCATIONAL WORK

The total labor intensity of the discipline "Information Technology" is 3 credits.

Table 3 – Types of educational work by periods of mastery of EP HE for full-time education

Type of educational work		**Total, aca. hrs.**	**Semester**
			1
Contact work		34	34
including:			
Lectures (LC)		–	–
Laboratory works (LR)		–	–
Practical/Seminar Classes (FPs)		34	34
Independent work of students		46	46
Control (exam/test with grade)		28	28
Overall labor intensity of the discipline	aca. hrs.	108	108
	Zach. Units.	3	3

4. CONTENTS

Table 6 – Content of the discipline (module) by types of educational work

Name of the discipline section	**Contents**	**Type of educational work**
Section 1. The role of information technology in the development of modern society. The concept of an information system (IS).	Topic 1.1. Brief historical background. Information and management. The main processes of information conversion. Stages of development of information technologies. Computer information technologies and their types.	NW

	Topic 1.2. The concept of information systems. Composition and general structure of information systems. The main purpose of information systems. Needs of information systems. Synthesis and decomposition of IS. IC models. Ip life cycle.	NW
	Topic 1.3. Classification of information systems. Factual and documentary information systems. Geographic information systems. Information technologies. Types of information technologies.	NW
Section 2. Storage Structures and Access Methods	Topic 2.1. Data processing systems (ODS). File data processing systems and trends in their development. Data structures for FSOD and access methods. A simple sequential file model. The index organization of the file.	NW
	Topic 2.2. Index search methods. Organization of direct access. Hashing algorithms. Overflow handling. List organization.	NW
	Topic 2.3. Binary tree. Balanced trees. B-tree. Multi-key access methods. Multi-list file. Inverted file. A two-linked tree.	NW
Section 3. Evolution of development of information systems and databases	Topic 3.1. Early approaches to the organization of the database. Systems based on inverted lists, hierarchical and network DBMSs. Examples. Strengths and disadvantages of early systems. The main features of systems based on inverted lists. Topic 3.2. Hierarchical systems. Hierarchical data structures. Network systems. Network data structures. Data manipulation. Constraints.	NW
Section 4. Database concept.	Topic 4.1. Database concepts. Database properties. Requirements for the organization of the database. Data bank. Information store components. Information store administrator.	NW
	Topic 4.2. Database management system (DBMS). Data presentation layers. Database life cycle. Database design process. The principle of top-down design with successive iterations. Subject	NW

	4.3. Project expertise. Requirements analysis.	NW

5. MATERIAL AND TECHNICAL SUPPORT OF DISCIPLINE

Table 7 – Discipline Logistics

Audience type	Equipping the classroom	Specialized educational/laboratory equipment, software and materials for mastering the discipline
Seminary	An auditorium for seminar-type classes, group and individual consultations, current control and intermediate certification, equipped with a set of specialized furniture and	
	technical means of multimedia presentations.	
Computer Lab	Computer class for classes, group and individual consultations, current control and intermediate certification, equipped with personal computers (in the amount of _____pieces), a whiteboard (screen) and technical means of multimedia presentations.	
For independent work of students	An auditorium for independent work of students (can be used for seminars and consultations), equipped with a set of specialized furniture and computers with access to EIOS.	

6. EDUCATIONAL, METHODOLOGICAL AND INFORMATION SUPPORT OF THE DISCIPLINE

Main literature:

1. Computer Technologies in Science and Education: A Textbook / L.S. Onokoy, V.M. Titov. - M.: ID FORUM: INFRA-M, 2011. - 224 p. http://znanium.com/bookread.php?book=241862

2. Modern technologies and technical means of informatization: Textbook / O.V. Shishov. - M.: NIC Infra-M, 2012. - 462 p. http://znanium.com/bookread.php?book=263337

3. Computer workshop on the course "Informatics": Textbook / V.T. Bezruchko. - 3rd ed., rev. and add. - M.: ID FORUM: INFRA-M, 2012. - 368 p.: http://znanium. com/bookread. php? book=332293

Further reading:

1. Economic and mathematical methods and models: computer modeling: Textbook / I.V. Orlova, V.A. Polovnikov. - 3rd ed., rev. and add. - M.: Vuzovskii uchebnik: INFRA-M, 2011. - 389 p. http://znanium.com/bookread.php?book=324780
2. Computer technologies of data analysis in econometrics / D.M. Dayitbegov. - 2nd ed., ispr. and add. - M.: Vuzovsky textbook: INFRA-M, 2010. - 578 p.: http://znanium. coiTi/bookread. php? book=251791
3. Distance educational technologies: design and implementation of training courses / Lebedeva M. B., Agaponov S. V., Goryunova M. A., Kostikov A. N., Kostikova N.

A.,
Nikitina L. N., Sokolova I. I., Stepanenko E. B., Fradkin V. E., Shilova O. N. / Pod obshch. red. M. B. Lebedevoy. SPb.: BHV-Peterburg, 2010. ? 336 s. http://znanium. coiTi/bookread. php? book=350822

Resources of the information and telecommunication network "Internet":

1. RUDN University EBS and third-party EBS, to which university students have access on the basis of concluded contracts:

– Electronic library system RUDN University – EBS RUDN University http://lib.rudn.ru/MegaPro/Web
– EBS "University Library Online" http://www.biblioclub.ru
- EBS Jurait http://www.biblio-online.ru
– EBS "Student Consultant" www.studentlibrary.ru
- EBS "Lan" http://e.lanbook.com/
- EBS "Trinity Bridge"

2. Databases and search engines:

– – electronic fund of legal and normative-technical documentation of the http://docs.cntd.ru/
– – Yandex https://www.yandex.ru/ search engine
– – Google search engine https://www.google.ru/
– – abstract database SCOPUS http://www.elsevierscience.ru/products/scopus/
– http://quakes.globalincidentmap.com/,
– http://www.globalincidentmap.com/, http://earthquake.usgs.gov/earthquakes/recenteqsww/Quakes/quakes_all.php,
– http://www.tesis.lebedev.ru/forecast_activity.html
– University Library Online: http://www.biblioclub.ru
– National digital resource "RUKONT": http://rucont. ru
– IQlib: http://www.iqlib.ru
– ScienceDirect: http://www. sciencedirect. com
– EBSCO: http://search.ebscohost.com
– Sage Publications:http://online.sagepub.com
– Springer/Kluwer:http://www.springerlink.com
– Tailor & Francis: http://www.informaworld.com
– Web of Science: http://www.isiknowledge.com
– University Information System RUSSIA: http://www. cir. ru/index. jsp
– U chebny portal RUDN University: http://web-local.rudn.ru/
– Http://www.studmedlib.ru Student Advisor
– National digital resource "RUKONT": http://rucont. ru
– IQlib: http://www. iqlib. ru
– http://www.rsl.ru - Russian State Library http://www.cnshb.ru/ - Central Scientific Agricultural Library http://www.mcx.ru/ - Ministry of Agriculture of the Russian Federation (MINISTRY of Agriculture of the Russian Federation)http://www.gpntb.ru/ - State Public Scientific and Technical Library of Russia http://www.fao.org/ - FAO databases
– The basic concepts of computer information technologies - http://bip-ip. com/osnovnye-ponyatiya-kompyuternyx-informacionnyx-texnologij/
– Computer technologies in science and education -
– http://www.google.nj/url?sa=t&rct=j&q=%D0%BA%D0%BE%D0%BC%D0%BF%D1%8C%D1%8E%D1%8 New information technologies in science and education - http://www.iis.nsk.su/files/articles/sbor_kas_10.pdf

7. ASSESSMENT MATERIALS AND POINT-RATING SYSTEM FOR ASSESSING THE LEVEL OF FORMATION OF COMPETENCIES IN THE DISCIPLINE

Evaluation materials and a point-rating system for assessing the level of formation of competencies (part of competencies) based on the results of mastering the discipline "Information Technologies" are presented in the Appendix to this Work Program of the discipline.

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