**Federal State Autonomous Educational Institution of Higher Education
"Peoples' Friendship University of Russia named after Patrice Lumumba"
RUDN University**

Agrarian and 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:**

GENERAL AGRONOMY

higher education programme profile/specialisation
title

2024

1. THE GOAL OF MASTERING THE DISCIPLINE

The discipline "Information Technology" is included in the master's program "General Agronomy" in the direction 35.04.04 "Agronomy" and is studied in the 1st semester of the 1st year. The discipline is implemented by the Agrobiotechnology Department. The discipline consists of 4 sections and 11 topics and is aimed at studying information processing in agriculture.

The purpose of mastering the discipline is to form basic ideas about receiving 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.

2. REQUIREMENTS TO THE RESULTS OF MASTERING THE DISCIPLINE

Mastering the discipline "Information Technology" is aimed at developing the following competencies (parts of competencies) in students:

Table 2.1. List of competencies developed in students while mastering the discipline (results of mastering the discipline)

Cipher	Competence	Indicators of Competence Achievement (within the framework of this discipline)
UK-1	Able to carry out critical analysis of problematic situations based on a systems approach, develop a strategy actions	UK-1.1 Performs a search for the necessary information, its critical analysis and generalizes the results of the analysis to solve the assigned task; UK-1.2 Uses a systematic approach to solving assigned tasks;
UK-7	Able to search for the necessary sources of information and data, to perceive, analyze, remember and transmit information using digital means, as well as with the help of algorithms when working with data obtained from various sources in order to effectively use the information obtained to solve problems, to evaluate the information, its reliability, build logical conclusions based on incoming data information and data	UK-7.1 Conducts an assessment of information, its reliability, builds logical conclusions based on incoming information and data; UK-7.2 Has practical experience in searching, perception, storage, analysis, transmission of information and data using digital means, algorithms and application programs the purpose of solving the assigned tasks;
OPK-1	Capable of solving problems of development of the professional field activities and (or) organizations based on the analysis of scientific achievements and production	OPK-1.3 Applies available technologies, including information and communication technologies, to solve problems of professional activity in agronomy;
OPK-3	Able to use modern methods of solving problems in the development of new technologies in professional activities	OPK-3.2 Uses information resources, scientific achievements and practice in the development of new technologies in agronomy;
OPK-7	Capable of owning	OPK-7.1 Has a working toolkit for working with large

Cipher	Competence	Indicators of Competence Achievement (within the framework of this discipline)
	tools for working with large arrays structured and unstructured information, use modern digital methods of processing, analysis, interpretation and visualization of data for decision making purposes the set tasks of professional and scientific research activities in the field of agronomy	arrays of structured and unstructured information; OPK-7.2 Uses modern digital methods processing, analysis, interpretation and visualization of data in order to solve the assigned tasks;
PC-1	Capable of organizing experiments (field trials) to assess efficiency of innovative technologies (elements technologies), varieties and hybrids under production conditions	PC-1.1 Draws up a research program to study the effectiveness of innovative technologies (elements of technology), varieties and hybrids, develops methods for conducting experiments, masters new methods research;

3. PLACE OF DISCIPLINE IN THE STRUCTURE OF EDUCATIONAL EDUCATION

The discipline "Information Technology" is a compulsory part of Block 1 "Disciplines (modules)" of the educational program of higher education.

As part of the higher education program, students also master other disciplines and/or practices that contribute to the achievement of the planned results of mastering the discipline "Information Technology".

Table 3.1. List of components of the educational program of higher education that contribute to the achievement of the planned results of mastering the discipline

Cipher	Name of competence	Preceding courses/modules, practices*	Subsequent disciplines/modules, practices*
UK-7	Able to search for the necessary sources of information and data, to perceive, analyze, remember and transmit information using digital means, as well as using algorithms when working with data obtained from various sources for the purpose of effective use of the information obtained to solve problems, conduct an assessment of the information, its reliability, build logical conclusions on based on incoming information and data		Plant Protection; Pests and Diseases; Soil Fertility Management; Research work; Undergraduate practice / Pre-graduation practice;

Cipher	Name of competence	Preceding courses/modules, practices*	Subsequent disciplines/modules, practices*
UK-1	Capable of carrying out a critical analysis of problematic situations based on a systemic approach approach, develop a strategy of action		Pests and Diseases; Soil Fertility Management; Postharvest Management; Crop Production; Technological Training; Undergraduate practice; Research work;
OPK-1	Capable of solving problems of development of the professional field activities and (or) organizations based on analysis of scientific and industrial achievements		Crop Production; Postharvest Management; Soil Fertility Management; Pests and Diseases; Technological Training; Undergraduate practice; Research work;
OPK-3	Able to use modern methods of solving problems when development of new technologies in professional activities		Technological Training; Undergraduate practice / Pre-graduate practice; Soil Fertility Management;
OPK-7	Able to master tools for working with large arrays structured and unstructured information, use modern digital processing methods, analysis, interpretation and visualization of data in order to solve the set tasks of professional and researchactivities in the field agronomy		Plant Protection; Pests and Diseases; Research work; Technological Training; Undergraduate practice / Pre-graduate practice;
PC-1	Able to organize experiments (field trials) assessing the effectiveness of innovations technologies (elements of technology), varieties and hybrids under production conditions		Research work; Technological Training; Undergraduate practice / Pre-graduate practice; Crop Production; Pests and Diseases; Breeding and Seed Production; Plant Protection; Soil Fertility Management;

* - filled in in accordance with the competency matrix and the SUP OP VO
** - elective disciplines/practices

4. SCOPE OF THE DISCIPLINE AND TYPES OF STUDY WORK

The total workload of the discipline "Information Technology" is "3" credit units.

Table 4.1. Types of educational work by periods of mastering the educational program of higher education for full-time education.

Type of academic work	TOTAL, ac.h.		Semester(s) 1
Contact work, academic hours	*34*		*34*
Lectures (LC)	0		0
Laboratory work (LW)	0		0
Practical/seminar classes (SZ)	34		34
Independent work of students, academic hours	*38*		*38*
Control (exam/test with assessment), academic hours	*36*		*36*
General complexity of the discipline	**ac.h.**	*108*	*108*
	credit. ed.	*3*	*3*

5. CONTENT OF THE DISCIPLINE

Table 5.1. Contents of the discipline (module) by types of academic work

Section number	Name of the discipline section		Section (Topic) Contents	Type of academic work*
Section 1	The role of information technology in development modern society. Concept informationalsystems (IS).	1.1	Brief historical background. Information and management. Main processes information transformation. Stages of development information technologies. Computer information technologies and their types.	SZ
		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. IS models. Life cycle of IS.	SZ
		1.3	Classification of information systems. Factual and documentary information systems. Geographic information systems. Information technologies. Types of information technologies	SZ
Section 2	Storage structures and access methods	2.1	Data Processing Systems (DPS). File systems for data processing and their trends development. Data structures for FSOD and access methods. Model of a simple sequential file. Indexed file organization.	SZ
		2.2	Index search methods. Direct access organization. Hashing algorithms. Overflow handling. List organization.	SZ
		2.3	Binary tree. Balanced trees. B-tree. Access methods by several keys. Multilist file. Inverted file. Doubly linked tree.	SZ
Section 3	Evolution of development information systems and databases	3.1	Early approaches to database organization. Systems based on inverted lists, Hierarchical and network DBMS. Examples. Strengths and weaknesses of early systems. Main features of systems based on inverted lists.	SZ
		3.2	Hierarchical systems. Hierarchical data structures. Network systems. Network Data structures. Data manipulation. Integrity constraints.	SZ
Section 4	The concept of databases (DB).	4.1	Basic concepts of databases. Database properties. Requirements for database organization. Data bank. Data bank components. Administrator data bank	SZ
		4.2	Database Management System (DBMS). Data Presentation Levels. Database Life Cycle. Database Design Process. Top-Down Design Principle successive iterations. Topic	SZ
		4.3	Project expertise. Requirements analysis.	SZ

* - filled in only for FULL-TIME education: LK – lectures; LR – laboratory work; PZ – practical/seminar classes.

6. LOGISTIC AND TECHNICAL SUPPORT OF DISCIPLINE

Table 6.1. Material and technical support of the discipline

Audience type	Equipping the auditorium	Specialized educational/laboratoryequipment, software and materials for mastering the discipline (if necessary)
Seminar	An auditorium for conducting seminar-type classes, group and individual consultations, ongoing monitoring and midterm assessment, equipped with a set of specialized furniture and technical means for multimedia presentations.	Specialized setfurniture; technical means: Interactive complex - interactive board Triumph Board with Optoma projector
For independent work	A classroom for independent work of students (can be used for conducting seminars and consultations), equipped with a set of specialized furniture and computers with access to the Electronic Information System.	

* - the audience for independent work of students MUST be indicated!

7. EDUCATIONAL, METHODOLOGICAL AND INFORMATIONAL SUPPORT OF THE DISCIPLINE

Main literature:

1. Information technologies / A. S. Kolomeichenko, N. V. Polshakova, O. V. Chekha. - 3rd ed., reprinted. - St. Petersburg: Lan, 2022. - 212 p. - ISBN 978-5-507-45293-4.

Further reading:

1. Information technologies in the digital economy of agriculture: textbook / O. V. Kirilova. - Tyumen: State Agrarian University of the Northern Trans-Urals, 2022. - 119 p.

Resources of the information and telecommunications network "Internet":

1. RUDN University EBS and third-party EBSs to which university students have access based on concluded agreements
- Electronic library system of RUDN - ELS RUDN http://lib.rudn.ru/MegaPro/Web
- Electronic library system "University library online"http://www.biblioclub.ru
- EBS Yuraithttp://www.biblio-online.ru
- Electronic Library System "Student Consultant"www.studentlibrary.ru
- Electronic library system "Troitsky Bridge"
2. Databases and search engines
- electronic fund of legal and normative-technical documentation http://docs.cntd.ru/
- Yandex search engine https://www.yandex.ru/
- Google search engine https://www.google.ru/
- SCOPUS abstract database http://www.elsevierscience.ru/products/scopus/

Educational and methodological materials for independent work of students mastering the discipline/module*:

1. Lecture course on the subject "Information Technology".

* - all educational and methodological materials for independent work of students are posted in accordance with the current procedure on the discipline page in TUIS!

8. EVALUATION MATERIALS AND SCORE-RATING SYSTEM FOR ASSESSING THE LEVEL OF DEVELOPMENT OF COMPETENCES IN THE DISCIPLINE

Evaluation materials And point-rating system*
assessments levelformation of competencies (part of competencies) based on the results of mastering the discipline
"Information technology" is presented in the Appendix to this Work Program of the discipline.
* - OM and BRS are formed on the basis of the requirements of the relevant local regulatory act of RUDN.

DEVELOPER:

Professor of the Department of
Agrobiotechnology

Zargar M.

Position, BUP	*Signature*	*Surname I.O.*

HEAD OF THE BUP:

Professor of the Department of
Agrobiotechnology

Pakina E. N.

Position of the BUP	*Signature*	*Surname I.O.*

HEAD OF THE OP VO:

Director
agrobiotechnology department

Pakina E. N.

Position, BUP	*Signature*	*Surname I.O.*