

Документ подписан простой электронной подписью
Информация о владельце:
ФИО: Ястребов Олег Александрович
Должность: Ректор
Дата подписания: 26.05.2026 15:53:07
Уникальный программный ключ:
ca953a0120d891083f939673078ef1a989dae18a

**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 TECHNOLOGIES

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

1. COURSE GOAL(s)

The discipline "Information Technologies" is part of the Master's program "Integrated Plant Protection" under the field of study 35.04.04 "Agronomy" and is studied in the 1st semester of the 1st year. The discipline is delivered 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: formation of basic ideas about obtaining and processing information for human analysis and making decisions based on it to perform management tasks related to production activities in the field of agriculture.

2. REQUIREMENTS FOR LEARNING OUTCOMES

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

Table 2.1. List of competences that students acquire through the course study

Competence code	Competence descriptor	Competence formation indicators (within this course)
GC-1	Able to carry out critical analysis of problem situations based on a systematic approach, develop an action strategy	GC-1.1 Performs search for necessary information, its critical analysis and generalizes the results of the analysis to solve the assigned task; GC-1.2 Uses a systematic approach to solve assigned tasks;
GC-7	Able to search for necessary sources of information and data, perceive, analyze, memorize and transmit information using digital means, as well as using algorithms when working with data obtained from various sources in order to effectively use the received information to solve problems, evaluate information, its reliability, build logical conclusions based on incoming information and data	GC-7.1 Evaluates information, its reliability, builds logical conclusions based on incoming information and data; GC-7.2 Has practical experience in searching, perceiving, storing, analyzing, transmitting information and data using digital means, algorithms and application programs in order to solve assigned tasks;
GPC-1	Able to solve problems of development of the field of professional activity and/or organization based on the analysis of scientific and production achievements	GPC-1.3 Applies available technologies, including information and communication technologies, to solve professional tasks in agronomy;
GPC-3	Able to use modern methods of solving problems when developing new technologies in professional activities	GPC-3.2 Uses information resources, achievements of science and practice when developing new technologies in agronomy;

Competence code	Competence descriptor	Competence formation indicators (within this course)
GPC-7	Able to master 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 assigned tasks of professional and research activities in the field of agronomy	GPC-7.1 Masters the tools for working with large arrays of structured and unstructured information; GPC-7.2 Uses modern digital methods of processing, analysis, interpretation and visualization of data in order to solve assigned tasks;
PC-1	Able to collect, process, analyze and systematize scientific and technical information, domestic and foreign experience in the field of agronomy	PC-1.2 Conducts information search on improving technologies for growing and protecting crops, including using the Internet;
PC-6	Able to provide consultations on innovative technologies in agronomy	PC-6.1 Able to work with information systems and databases on issues of agricultural production management;

3.COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The discipline "Information Technologies" belongs to the mandatory part of Block 1 "Disciplines (modules)" of the higher education program.

Within the framework of the higher education program, students also master other disciplines and/or practices that contribute to achieving the planned learning outcomes of the discipline "Information Technologies".

Table 3.1. The list of the higher education programme components/disciplines that contribute to the achievement of the expected learning outcomes as the course study results

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
GC-1	Able to carry out critical analysis of problem situations based on a systematic approach, develop an action strategy		Mathematical Modeling and Design; Scientific research work; Scientific and Research Practice;
GC-7	Able to search for necessary sources of information and data, perceive, analyze, memorize and transmit information using digital means, as well as		Organization of Integrated Plant Protection Systems; Instrumental methods of research; Plant immunity; Biotechnology in Plant Protection; Scientific research work; Scientific and Research

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
	using algorithms when working with data obtained from various sources in order to effectively use the received information to solve problems, evaluate information, its reliability, build logical conclusions based on incoming information and data		Practice; Undergraduate practice/Pre-diploma practice;
GPC-1	Able to solve problems of development of the field of professional activity and/or organization based on the analysis of scientific and production achievements		Scientific research work; Scientific and Research Practice; Biotechnology in Plant Protection; Biological Method of Plant Protection; Instrumental methods of research; Mathematical Modeling and Design; Plant Quarantine; Virology; Organization of Integrated Plant Protection Systems; Plant immunity;
GPC-3	Able to use modern methods of solving problems when developing new technologies in professional activities		Organization of Integrated Plant Protection Systems; Instrumental methods of research; Scientific research work; Scientific and Research Practice;
GPC-7	Able to master 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 assigned tasks of professional and research activities in the field of agronomy		Instrumental methods of research; Scientific and Research Practice; Scientific research work;
PC-1	Able to collect, process, analyze and systematize scientific and technical information, domestic and foreign experience in the field of agronomy		Plant Quarantine; Biotechnology in Plant Protection; Organization of Integrated Plant Protection Systems; Plant immunity; Scientific research work; Scientific and Research

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
			Practice; Undergraduate practice/Pre-diploma practice;
PC-6	Able to provide consultations on innovative technologies in agronomy		Scientific and Research Practice; Biological Method of Plant Protection; Organization of Integrated Plant Protection Systems;

* To be filled in according to the competence matrix of the higher education programme.

** – Elective disciplines/practices

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total labor intensity of the discipline "Information Technologies" is 3 credit units.

Table 4.1. Types of academic activities during the periods of higher education programme mastering (**full-time training**)*

Type of academic activities	Total academic hours	Semesters/training modules
		1
<i>Contact academic hours</i>	34	34
including:		
Lectures (LC)	0	0
Lab work (LW)	0	0
Seminars (workshops/tutorials) (S)	34	34
<i>Self-studies</i>	46	46
<i>Evaluation and assessment (exam/passing/failing grade)</i>	28	28
Course workload	academic hours	108
	credits	3

* To be filled in regarding the higher education programme correspondence training mode.

5. COURSE CONTENTS

Table 5.1. Course contents and academic activities types

Course module title	Course module contents (topics)	Academic activities types
Module 1: The role of information technology in the development of modern society. The concept of an information system (IS).	Topic 1.1. A brief historical background. Information and management.	S
	Topic 1.2. The concept of information systems. The composition and general structure of information systems.	S
	Topic 1.3. Classification of information systems. Factual and documentary information systems.	S
Module 2: Storage structures and access methods	Topic 2.1. Data processing systems (data centers). File systems for data processing and trends in their development.	S
	Topic 2.2. Search methods in the index.	S

Course module title	Course module contents (topics)	Academic activities types
	Organization of direct access. Hashing algorithms.	
	Topic 2.3. A binary tree. Balanced trees. B-tree.	S
Module 3: The evolution of information systems and databases	Topic 3.1. Early approaches to database organization. Systems based on inverted lists, hierarchical and network databases.	S
	Topic 3.2. Hierarchical systems. Hierarchical data structures. Network systems.	S
Module 4: The concept of databases (DB).	Topic 4.1. Basic concepts of databases. Database properties. Requirements for the organization of the database.	S
	Topic 4.2. Database management System (DBMS). Levels of data representation.	S
	Topic 4.3. Design expertise.	S

* - to be filled in only for **full**-time training: *LC* - lectures; *LW* - lab work; *S* - seminars.

6. CLASSROOM EQUIPMENT AND TECHNOLOGY SUPPORT REQUIREMENTS

Table 6.1. Classroom equipment and technology support requirements

Type of academic activities	Classroom equipment	Specialised educational / laboratory equipment, software, and materials for course study (if necessary)
Seminar	A classroom for conducting seminars, group and individual consultations, current and mid-term assessment; equipped with a set of specialized furniture and technical means for multimedia presentations.	Set of specialized furniture; technical means: Interactive complex – Triumph Board interactive whiteboard with Optoma projector
Self-studies	A classroom for independent work of students (can be used for seminars and consultations), equipped with a set of specialised furniture and computers with access to the electronic information and educational environment.	

* The premises for students' self-studies are subject to **MANDATORY** mention

7. RESOURCES RECOMMENDED FOR COURSE STUDY

Main readings:

1. Agronomy. DOI: 10.5772/intechopen.78102. Webshop link: <https://www.intechopen.com/books>. ISBN: 9781838812232, 9781838812225, 9781838812249. Publisher: IntechOpen. Publisher website: <https://www.intechopen.com/>. Publication date and place: 2020. Imprint: IntechOpen. Classification: Agronomy & crop production. Pages: 108.
2. Belchenko, S.A. *Innovative technologies in crop production: a textbook for universities* / S.A. Belchenko. — St. Petersburg: Lan, 2025. — 108 p. — ISBN 978-5-507-51685-8. — Text: electronic // Lan: electronic library system. — URL: <https://e.lanbook.com/book/455582>

Additional readings:

1. *Organization of consulting activities in agriculture: a textbook for universities* / V.I. Nechaev, I.S. Sandu, G.M. Demishkevich [et al.]; edited by V.I. Nechaev. — 2nd ed., ster. — St. Petersburg: Lan, 2025. — 320 p. — ISBN 978-5-507-50748-1. — Text: electronic // Lan: electronic library system. — URL: <https://e.lanbook.com/book/461144>
2. Griguletsky, V.G. *Digital technologies in agriculture. Digital models of growth and productivity of agricultural plants: a textbook for universities* / V.G. Griguletsky. — St. Petersburg: Lan Publ., 2024. — 316 p. — ISBN 978-5-507-49433-0. — Text: electronic // Lan: electronic library system. — URL: <https://e.lanbook.com/book/417659>

Internet sources

1. Electronic libraries (EL) of RUDN University and other institutions, to which university students have access on the basis of concluded agreements:

- RUDN Electronic Library System (RUDN ELS) <http://lib.rudn.ru/MegaPro/Web>
- EL "University Library Online" <http://www.biblioclub.ru>
- EL "Yurayt" <http://www.biblio-online.ru>
- EL "Student Consultant" www.studentlibrary.ru
- EL "Lan" <http://e.lanbook.com/>
- EL "Znaniy": <https://znaniy.ru/>

2. Databases and search engines:

- Sage: <https://journals.sagepub.com/>
- Springer Nature Link: <https://link.springer.com/>
- Wiley Journal Database: <https://onlinelibrary.wiley.com/>
- Scientometric database Lens.org: <https://www.lens.org>

Training toolkit for self- studies to master the course *:

- Lecture course on the discipline "Information Technologies".

* The training toolkit for self- studies to master the course is placed on the course page in the university telecommunication training and information system under the set procedure.

DEVELOPERS:

Professor of the Agrobiotechnology Department

Zargar M.

position, department

name and surname

HEAD OF EDUCATIONAL DEPARTMENT:

Director of the Agrobiotechnology Department

Pakina E. N.

name of department

name and surname

**HEAD
OF HIGHER EDUCATION PROGRAMME:**

Director of the Agrobiotechnology Department

Pakina E. N.

position, department

name and surname