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

educational division (faculty/institute/academy) as higher education programme developer

COURSE SYLLABUS

CROP PRODUCTION

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 AGRICULTURE

higher education programme profile/specialisation title

1. COURSE GOAL(s)

The course "Crop Production" is part of the Master's programme "General Agriculture" in the field of study 35.04.04 "Agronomy" and is studied in the 1st, 2nd, 3rd, and 4th semesters of the 1st and 2nd years. The discipline is implemented by the Agrobiotechnology Department. The discipline consists of 8 sections and 25 topics and is aimed at studying the peculiarities of the biology of field crops and their cultivation.

The course aims to:

1. Address the development of students' awareness in the biological characteristics of field crops and understanding of resource-saving cultivation technologies;
2. Familiarize students with the theoretical background, terminology, and concepts of crop physiology, yield programming, morphological characteristics of major crop groups, and seed science fundamentals;
3. Deepen students' knowledge in the biology and cultivation technologies of cereals, legumes, oilseeds, sugar crops, starch crops, fiber crops, and seed production principles;
4. Enhance students' skills in developing and applying resource-saving cultivation technologies for various agro-landscape and ecological conditions through practical seminars and case studies.

The goal of mastering the discipline is the formation of students' theoretical knowledge about the peculiarities of the biology of field crops and practical skills in developing and applying resource-saving technologies for their cultivation in various agro-landscape and ecological conditions. This subject provides an advanced study of crop production strategies and technologies for their implementation in agricultural production.

2. REQUIREMENTS FOR LEARNING OUTCOMES

Mastering the course "Crop Production" is aimed at the development of the following competences (or parts thereof) 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	Ability to carry out critical analysis of problematic situations based on a systemic approach and to develop an action strategy	GC-1.3 Develops a strategy for achieving the set goal as a sequence of steps, anticipating the result of each of them and evaluating their impact on the external environment of the planned activity and on the relationships of the participants in this activity;
GC-2	Ability to manage a project at all stages of its life cycle	GC-2.3 Proposes possible ways (algorithms) for implementing the results of the project into practice (or implements its implementation);

Competence code	Competence descriptor	Competence formation indicators (within this course)
GPC-1	Ability to solve tasks related to the development of the professional field and/or organization based on analysis of achievements in science and production	GPC-1.1 Demonstrates knowledge of main methods for analyzing achievements in science and production in agronomy;
		GPC-1.3 Applies available technologies, including information and communication technologies, to solve tasks of professional activity in agronomy;
GPC-2	Ability to convey professional knowledge taking into account pedagogical methods	GPC-2.1 Knows modern educational technologies of professional education (professional training);
		GPC-2.2 Conveys professional knowledge in the field of agronomy, explains current problems and trends in its development, modern technologies for producing crop production;
PC-1	Ability to organize experiments (field trials) to assess the effectiveness of innovative technologies (technology elements), varieties, and hybrids under production conditions	PC-1.1 Develops a research program to study the effectiveness of innovative technologies (technology elements), varieties, and hybrids; develops methodologies for conducting experiments; masters new research methods;
PC-2	Ability to develop and implement environmentally safe practices and technologies for producing high-quality crop production, taking into account the properties of agro-landscapes and economic efficiency	PC-2.1 Determines the planned yield of agricultural crops, taking into account available natural and production resources using generally accepted calculation methods;
		PC-2.2 Organizes quality control and safety assurance of crop production;
PC-3	Ability to identify directions for improving and increasing the efficiency of crop production technologies based on scientific achievements and best practices of domestic and foreign producers	PC-3.1 Identifies promising directions for improving the efficiency of crop production;
PC-4	Ability to create models of cultivation technologies for agricultural crops, plant protection systems, and	PC-4.1 Creates models of cultivation technologies for agricultural crops, plant protection systems, and varieties;

Competence code	Competence descriptor	Competence formation indicators (within this course)
	varieties	

3.COURSE IN HIGHER EDUCATION PROGRAMME STRUCTURE

The course refers to the core component of Block 1 "Disciplines (Modules)" of the higher educational programme curriculum.

Within the higher education programme, students also master other disciplines and/or internships that contribute to the achievement of the expected learning outcomes as results of the course study.

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-2	Ability to manage a project at all stages of its life cycle		
GC-1	Ability to carry out critical analysis of problematic situations based on a systemic approach and to develop an action strategy		
GPC-1	Ability to solve tasks related to the development of the professional field and/or organization based on analysis of achievements in science and production		
GPC-2	Ability to convey professional knowledge taking into account pedagogical methods		
PC-1	Ability to organize experiments (field trials) to assess the effectiveness of innovative technologies (technology elements), varieties, and hybrids under production conditions		
PC-2	Ability to develop and		

Competence code	Competence descriptor	Previous courses/modules*	Subsequent courses/modules*
	implement environmentally safe practices and technologies for producing high-quality crop production, taking into account the properties of agro-landscapes and economic efficiency		
PC-3	Ability to identify directions for improving and increasing the efficiency of crop production technologies based on scientific achievements and best practices of domestic and foreign producers		
PC-4	Ability to create models of cultivation technologies for agricultural crops, plant protection systems, and varieties		

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

4. COURSE WORKLOAD AND ACADEMIC ACTIVITIES

The total workload of the course "Crop Production" amounts to **17 credits (612 academic hours)**.

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	2	3	4
<i>Contact academic hours</i>	289	102	72	85	30
including:					
Lectures (LC)	102	34	24	34	10
Lab work (LW)	0	0	0	0	0
Seminars (workshops/tutorials) (S)	187	68	48	51	20
<i>Self-studies</i>	230	42	60	59	69
<i>Evaluation and assessment (exam/passing/failing)</i>	93	36	12	36	9

Type of academic activities		Total academic hours	Semesters/training modules			
			1	2	3	4
<i>grade)</i>						
Course workload	academic hours	612	180	144	180	108
	credits	17	5	4	5	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: Theoretical Foundations of Crop Production	Topic 1.1. Plant biology and conditions of genotype formation. Classification of field crops..	LC, S
	Topic 1.2. Phytometric indicators of crops with specified productivity	LC, S
Module 2: Cereals of Groups I and II	Topic 2.1. General characteristics of cereal crops: morphology, biology, classification.	LC, S
	Topic 2.2. Sown areas and yield dynamics in the world and individual countries. Systematics of wheat. Comparative biological and economic characteristics of common and durum wheat.	LC, S
	Topic 2.3. Spring and winter barley. Main directions in growing and using barley.	LC, S
	Topic 2.4. Maize. The most important food, feed, and industrial crop. Agrotechnical significance of maize.	LC, S
Module 3: Cereal Legume Crops	Topic 3.1. Role of cereal legumes in increasing production of plant protein for food and feed purposes.	LC, S
	Topic 3.2. Soybean. Significance of soybean as a protein and oil crop. Dynamics of sown areas and productivity, prospects for distribution in new, non-traditional areas (temperate zone).	LC, S
	Topic 3.3. Bean. Origin and history of cultivation. Classification.	LC, S

Course module title	Course module contents (topics)	Academic activities types
	Topic 3.4. Pea. Food and feed value. Cultivation zones.	LC, S
Module 4: Oilseed Crops	Topic 4.1. National economic significance of oilseed crops. Classification and botanical characteristics.	LC, S
	Topic 4.2. Sunflower. Origin and history of cultivation, distribution and productivity.	LC, S
	Topic 4.3. Cruciferous oilseeds. Rapeseed, turnip rape (winter and spring forms), gray and white mustard.	LC, S
Module 5: Sugar Crops	Topic 5.1. Most important sugar crops of the world. Distribution and significance in total gross sugar production.	LC, S
	Topic 5.2. Sugar beet. Origin and distribution, botanical characteristics.	LC, S
Module 6: Starch Crops	Topic 6.1. Starch crops – a source of carbohydrate nutrition. Botanical and economic classification.	LC, S
	Topic 6.2. Potato – the most important starch crop of the world. Origin, distribution and productivity.	LC, S
Module 7: Fiber Crops	Topic 7.1. Cotton – the main fiber crop of the world. Origin. Main cultivation areas and productivity.	LC, S

Course module title	Course module contents (topics)	Academic activities types
	Topic 7.2. Flax – a fiber-oil crop. Cultivation areas of long flax and oil flax.	LC, S
	Topic 7.3. Hemp – a crop of universal use.	LC, S
Module 8: Fiber Crops	Topic 8.1. Seed science as an independent science and its connection with crop production.	LC, S
	Topic 8.2. Formation and phases of seed development. Physiological and biochemical processes of seed filling and ripening.	LC, S
	Topic 8.3. Morphological characteristics and physical properties of seeds. Scientific foundations of seed cleaning.	LC, S
	Topic 8.4. Field germination of seeds and ways to increase it. Factors affecting field germination of seeds.	LC, S

Course module title	Course module contents (topics)	Academic activities types
	Topic 8.5. Methods for determining sowing qualities of seeds. Methods for selecting average samples. Purity of seeds. Fractional composition and mass of 1000 seeds. Laboratory germination and germination energy. Seed viability. Sowing suitability.	LC, 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)
Lecture	A lecture hall for lecture-type classes, equipped with a set of specialised furniture; board (screen) and technical means of multimedia presentations.	Set of specialised furniture; technical facilities: Interactive complex – Triumph Board interactive whiteboard with Optoma projector
Seminar	A classroom for conducting seminars, group and individual consultations, current and mid-term assessment; equipped with a set of specialised furniture and technical means of multimedia presentations.	Set of specialised furniture; technical facilities: 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. Crop Production / V. E. Torikov, N. M. Belous, O. V. Melnikova, S. V. Artyukhova; edited by V. E. Torikov. — 2nd ed., ster. — Saint Petersburg: Lan, 2022. — 604 p. — ISBN 978-5-507-44799-2. — Electronic text // Lan: electronic library system. — URL: <https://e.lanbook.com/book/243341>

2. Naumkin, V. N. Technology of Crop Production / V. N. Naumkin, A. S. Stupin. — 4th ed., ster. — Saint Petersburg: Lan, 2023. — 592 p. — ISBN 978-5-507-47819-4. — Electronic text // Lan: electronic library system. — URL: <https://e.lanbook.com/book/327623>

Additional readings:

1. Vyugina, G. V. Fundamentals of Ornamental Crop Production. Practical Workshop: textbook for higher education institutions / G. V. Vyugina, I. A. Karamulina, S. M. Vyugin. — 2nd ed., ster. — Saint Petersburg: Lan, 2022. — 120 p. — ISBN 978-5-8114-9072-1. — Electronic text // Lan: electronic library system. — URL: <https://e.lanbook.com/book/184081>

2. Practical Workshop on Technology of Crop Production: textbook / V. A. Shevchenko, I. P. Firsov, A. M. Solovyov, I. N. Gasparian. — Saint Petersburg: Lan, 2022. — 400 p. — ISBN 978-5-8114-1626-4. — Electronic text // Lan: electronic library system. — URL: <https://e.lanbook.com/book/211640>

Internet sources

1. **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): <https://mega.rudn.ru/MegaPro/Web>
- EL "University Library Online": <http://www.biblioclub.ru>
- EL "Yurait": <http://www.biblio-online.ru>
- EL "Student Consultant": www.studentlibrary.ru
- EL "Znanium": <https://znanium.ru/>

Databases and search engines:

- Techexpert (information and reference system of GOSTs): <http://www.cntd.ru/>
- "Selkhoztehnika" (automated reference system): <http://www.agrobase.ru>
- Sage: <https://journals.sagepub.com/>
- Springer Nature Link: <https://link.springer.com/>
- Wiley Journal Database: <https://onlinelibrary.wiley.com/>
- Bibliometric database Lens.org: <https://www.lens.org>

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

1. The set of lectures on the course "Crop Production".

* 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.

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