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

PLANT GROWING

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

The purpose of mastering the discipline is to develop theoretical knowledge on the characteristics of the biology of field crops and practical skills in the development and application of resource-saving technologies for their cultivation in various agro-landscape and environmental conditions.

2. REQUIREMENTS TO THE RESULTS OF MASTERING THE DISCIPLINE

Mastering the discipline "Plant Growing" 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-1.3 Develops a strategy for achieving a set goal as a sequence of steps, anticipating the result each of them and assessing their impact on the external environment of the planned activity and on the relationships between the participants in this activity;
UK-2	Able to manage a project at all stages of its life cycle	UK-2.3 Suggests possible ways (algorithms) of implementing the project results into practice (or implements it) implementation);
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-1.1 Demonstrates knowledge of the basic methods of analyzing the achievements of science and production in agronomy; OPK-1.3 Applies available technologies, including information and communication technologies, to solve problems of professional activity in agronomy;
OPK-2	Able to convey professional knowledge taking into account pedagogical methods	OPK-2.1 Knows modern educational technologies of professional education (professional training); OPK-2.2 Transfers professional knowledge in the field agronomy, explains current problems and trends in its development, modern technologies for the production of products plant growing;
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;

PC-2	Able to develop and implement environmentally friendly techniques and technologies for the production of high-quality plant products taking into account properties of agricultural landscapes and economic efficiency	PC-2.1 Determines the planned yield agricultural crops, taking into account available natural and production resources using generally accepted calculation methods; PC-2.2 Organizes quality control and safety of plant products;
PC-3	Able to determine directions improvement and increase in the efficiency of cultivation technologies plant products based on scientific achievements and best practices domestic and foreign manufacturers	PC-3.1 Identifies promising areas for increasing the efficiency of crop production;
PC-4	Capable of creating models of cultivation technologies agricultural crops, plant protection systems, varieties	PC-4.1 Creates models of cultivation technologies agricultural crops, plant protection systems, varieties;

3. PLACE OF DISCIPLINE IN THE STRUCTURE OF EDUCATIONAL EDUCATION

Discipline "Plant growing" refers to To mandatory parts 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 "Plant Growing".

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-2	Able to manage a project at all stages its life cycle		
UK-1	Capable of carrying out a critical analysis of problematic situations based on a systemic approach approach, develop a strategy of action		
OPK-1	Capable of solving problems of development of the professional field activities and (or) organizations based on analysis of scientific and industrial achievements		
OPK-2	Able to convey professional knowledge taking into account pedagogical methods		

PC-1	Able to organize experiments (field trials) assessing the effectiveness of innovations technologies (elements technologies), varieties and hybrids under production conditions		
PC-2	Able to develop and implement environmentally friendly production techniques and technologies high quality products crop production taking into account the properties of agricultural landscapes and economic efficiency		
PC-3	Able to determine directions improvement and enhancement efficiency technologies for growing products plant growing based on scientific achievements, best practices of domestic and foreign manufacturers		
PC-4	Capable of creating models of cultivation technologies agriculturalcrops, plant protection systems, varieties		

* - 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 "Crop Production" discipline is 18 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	**2**	**3**	**4**
Contact work, academic hours	*319*		*102*	*72*	*85*	*60*
Lectures (LC)	116		34	24	34	24
Laboratory work (LW)	0		0	0	0	0
Practical/seminar classes (SZ)	203		68	48	51	36
Independent work of students, academic hours	*233*		*42*	*60*	*59*	*72*
Control (exam/test with assessment), academic hours	*96*		*36*	*12*	*36*	*12*
General complexity of the discipline	**ac.h.**	***648***	*180*	*144*	*180*	*144*
	credit. ed.	***18***	*5*	*4*	*5*	*4*

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	Theoretical foundations of plant growing	1.1	Plant biology and conditions of genotype formation. Classification of field crops. Fundamentals of physiological-genetic theory of productivity: PAR resources and potential harvest; solar energy accumulation and PAR efficiency	LK, SZ
		1.2	Phytometric indicators of crops of a given productivity; determination of possible yields based on moisture supply and heat resources; agrochemical principles programming of crops	LK, SZ
Section 2	Cereal crops of groups I and II	2.1	General characteristics of grain crops: morphology, biology, classification. Structure and chemical composition of grain. Features of organogenesis; phenology. The importance of heterotic and short-stemmed forms and varieties	LK, SZ
		2.2	Cultivation areas and yield dynamics in the world and individual countries. Wheat taxonomy. Comparative biological and economic characteristics of soft and hard wheat. Spring and winter forms. Strong wheat. Winter wheat. Ways to improve winter hardiness. Features of plant growth in the autumn and spring-summer periods of vegetation. Technology of winter wheat cultivation. Zonal and varietal agricultural technology of wheat. Winter wheat in irrigated agriculture	LK, SZ
		2.3	Spring and winter barley. Main directions in growing and using barley. Comparative characteristics biology and methods of spring and winter barley culture. Features of growing malting barley	LK, SZ
		2.4	Corn. The most important food, feed and industrial crop. Agrotechnical importance of corn. Main cultivation areas and dynamics productivity. Biological foundations of culture. Comparative biological and economic characteristics of the most important subspecies of corn. Cultivation technology in different climatic zones at growing for grain and green mass. The role of hybrid forms in increasing the productivity and quality of corn grain. Combined corn crops with grain and leguminous crops.	LK, SZ

Section 3	Cereal legumes	3.1	The role of grain legumes in increasing the production of vegetable protein for food and feed purposes. Agrotechnical significance of grain legumes. Distribution and productivity. Botanical and economic classification. Biological and ecological characteristics of grain legumes. Crops temperate, subtropical and tropical zones, comparative characteristics of cultural practices	LK, SZ
		3.2	Soybean. The importance of soybean as a protein and oil crop. Dynamics of sowing areas and productivity, prospects for expansion in new, non-traditional areas (temperate zone). Botanical and biological Characteristics. Features of zonal agricultural technology of crops	LK, SZ
		3.3	Beans. Origin and history of culture. Classification. Botanical and biological characteristics of the most important species of new and Old World. Features of agricultural technology of individual species	LK, SZ
		3.4	Peas. Food and feed value. Cultivation zones. Botanical and biological characteristics. Cultivation techniques in different soil and climate conditions zones	LK, SZ
Section 4	Oilseeds	4.1	National economic importance of oil crops. Classification and botanical characteristics. Biochemical characteristics of vegetable oils. Cultivation areas, sown areas, yield of main crops oilseeds (average and potential)	LK, SZ
		4.2	Sunflower. Origin and history of culture, distribution and productivity. Russia's priority in oilseed crops sunflower. Botanical characteristics and classification. Biological features. Sunflower promotion to subtropical and tropical zones. Cultivation techniques	LK, SZ
		4.3	Cruciferous oilseeds. Rapeseed, turnip rape (winter and spring forms), blue and white mustard. National economic importance. Distribution. Comparative morphological and biological characteristics. Features of agricultural technology of winter and spring forms.	LK, SZ
Section 5	Sugar crops	5.1	The most important sugar crops of the world. Distribution and importance in the total gross production of sugar. Prospects and economic efficiency	LK, SZ
		5.2	Sugar beet. Origin and distribution, botanical characteristics. Biological features. Comparative characteristics of methods of cultivation of factory and seed beets	LK, SZ
Section 6	Starchy crops	6.1	Starchy crops are a source of carbohydrate nutrition. Botanical and economic classification. Plant response to changing environmental conditions. Theory tuberization. Biochemical characteristics	LK, SZ

		6.2	Potatoes are the most important starchy crop in the world. Origin, distribution and productivity. Economic classification and biological features. Causes of potato degeneration and methods for obtaining healthy planting material.Potato agrotechnics in different climatic zones	LK, SZ
Section 7	Fiber crops	7.1	Cotton is the world's main fiber crop. Origin. Main growing areas and productivity. Indicators qualities of cotton fiber. Botanical characteristics of the main types of cotton. Biology of culture. Development phases, flowering and fruit formation features. Features agricultural technology	LK, SZ
		7.2	Flax is a fibrous oil crop. Regions of cultivation of fiber and oil flax. Classification. Botanical and biological characteristics. Agricultural technology of flax and oil flax. Primary processing of flax	LK, SZ
		7.3	Hemp is a versatile crop use. Prospects, morphology, biology and ecology of culture. Features of agricultural technology and primary processing	LK, SZ
Section 8	Seed science	8.1	Seed science as an independent science and its connection with plant growing. Requirements, requirements for seed quality. Organization of seed control service in Russia and abroad. Structure of the International Seed Inspection Association (ISTA), participation of the State Seed Inspection of Russia in the work of ISTA	LK, SZ
		8.2	Formation and development phases of seeds. Physiological and biochemical processes of filling and ripening of seeds. The relationship between nutritional and storage organs of plants. Heterogeneity of seeds. Ecological and agrotechnical conditions for growing high-quality seeds	LK, SZ
		8.3	Morphological features and physical properties of seeds. Scientific basis for seed cleaning. Methods of preparing seed material for sowing	LK, SZ
		8.4	Field germination of seeds and ways to improve it. Factors Affecting Field Germination of Seeds. Agricultural Technology and Field Germination	LK, SZ
		8.5	Methods for determining the sowing qualities of seeds. Methods of selecting an average sample. Purity seeds. Fractional composition and weight of 1000 seeds. Laboratory germination and germination energy. Seed viability. Sowing suitability. Registration of documents on sowing qualities of seeds	LK, 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)
Lecture	An auditorium for conducting lecture-type classes, equipped with a set of specialized furniture; a board (screen) and technical equipment by means of multimedia presentations.	Specialized setfurniture; technical equipment: interactive whiteboard Triumph Board with Optoma projector
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 equipment: interactive whiteboard 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. Plant growing / V. E. Torikov, N. M. Belous, O. V. Melnikova, S. V. Artyukhova; Edited by: Torikov V. E. - 2nd ed., erased. - St. Petersburg: Lan, 2022. - 604 p. — ISBN 978-5-507-44799-2. — Text: electronic // Lan: Electronic library system. — URL: https://e.lanbook.com/book/243341 (date of access: 11.03.2024). — Access mode: for authorized users

2. Naumkin, V. N. Plant growing technology / V. N. Naumkin, A. S. Stupin. - 4th ed., reprinted. - St. Petersburg: Lan, 2023. - 592 p. - ISBN 978-5-507-47819-4. - Text : electronic // Lan : electronic library system. — URL: https://e.lanbook.com/book/327623 (date of access: 11.03.2024). — Access mode: for authorized users

Further reading:

1. Vyugina, G. V. Fundamentals of Ornamental Plant Growing. Workshop: a textbook for universities / G. V. Vyugina, I. A. Karamulina, S. M. Vyugina. - 2nd ed., Stereotype. - St. Petersburg: Lan, 2022. - 120 p. - ISBN 978-5-8114-9072-1. - Text: electronic // Lan: electronic library system. - URL: https://e.lanbook.com/book/184081 (date of access: 11.03.2024). — Access mode: for authorized users

2. Practical training in crop production technology: textbook / V. A. Shevchenko, I. P. Firsov, A. M. Soloviev, I. N. Gasparyan. - St. Petersburg: Lan, 2022. - 400 p. - ISBN 978-5-8114-1626-4. - Text: electronic // Lan: electronic library system. — URL: https://e.lanbook.com/book/211640 (date

accessed: 11.03.2024). — Access mode: for authorized users

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. A course of lectures on the subject "Plant growing".

* - 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* for assessing the level of formation of competencies (part of competencies) based on the results of mastering the discipline "Plant growing" are 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.

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