S.Seifullin Kazakh Agrotechnical University

CATALOG OF ELECTIVE DISCIPLINES

For students in the direction of preparation 8D081 Agronomy Brief description of the elective disciplines of the educational program

EPG	EP	Form of education	The name of discipline	Code of subject	Discipline cycle	Component	Number of credits	Level of training	Cafedra	Course	Academic period	Pre- requisitions	Post-requisitions	Brief content of the discipline	Key learning outcomes	Name of the alternative discipline
D131 - «Plant growing»	8D08101 - «Genetics and selection of crops»	Full-time (PhD 3 years) tremestr	Innovative technologies in the breeding of crops	ITSSK 7302	AS	Elective subjects	5.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agriculture and plant growing	1	1	plant physiology, botany, cytology, biochemistry, genetics, plant breeding, microbiology, molecular biology.	PhD student's research work, incl. doctoral thesis	The course is aimed to the study and application of modern technologies used in crop breeding, the use of molecular genetics in breeding research, including MAS - selection, as well as theoretical foundations and methods of their application. The discipline considers the application of various methods of genetic marker analysis in breeding to create new varieties of crops, including gene mapping, genome sequencing, genetic transformation and genome editing.	Knowledge of modern methods of molecular genetics in breeding research. Distinguish marker-mediated selection from other selection methods. Show knowledge about genetic markers of crops, about gene mapping, genome sequencing. Analyze and evaluate the practical use of molecular methods of plant breeding, including genetic transformation, genome editing.	Optimization of the selection process

D131 - «Plant growing»	8D08101 - «Genetics and selection of crops»	Full-time (PhD 3 years) tremestr	Optimization of the selection process	OSP 7303	AS	Elective subjects	5.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agriculture and plant growing	1	1	plant physiology, botany, cytology, biochemistry, genetics, plant breeding, microbiology, molecular biology.	PhD student's research work, incl. doctoral thesis	The discipline is aimed at studying and mastering skills in the field of practical genetics and plant breeding, the main modern methods of phenotypic, biochemical and molecular genetic marker analysis used in crop breeding. The course examines the knowledge of the methodology of theoretical and experimental research in the field of breeding and genetics of agricultural crops, as well as obtaining skills of independent work with special literature, including electronic databases on genetics, as well as patent documentation and leading scientific journals of biological and genetic orientation.	To know the main problems in breeding for each culture separately, the concepts, definitions and terms of the discipline. Know the fundamental methods of crop breeding. Apply modern methods of analysis of breeding material. Analyze the problem situation as a system. Demonstrate the ability to study modern literature. Plan the breeding process. To present research results in the form of reports, publications and scientific discussions.	Innovative technologies in the breeding of crops
D131 - «Plant growing»	8D08101 - «Genetics and selection of crops»	Full-time (PhD 3 years) tremestr	Physiological bases of plant resistance	FOUR 7204	BS	Elective subjects	5.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agriculture and plant growing	1	1	cytology, genetics, plant physiology, ecology, biochemistry, biotechnology	PhD student's research work, incl. doctoral thesis	The purpose of teaching the discipline "Physiological basis of plant resistance" is to give undergraduates a modern understanding of the basic physiological processes of plants, the mechanisms of their regulation and patterns of interaction of plants with environmental conditions. In this course, PhD Students consider the main issues of theoretical and practical application of fundamental physiological knowledge about plant life.	To know the ecological- physiological and physiological- biochemical aspects of the resistance of agricultural plants to stress, to characterize the mechanisms of adaptation of plants to adverse environmental factors and to choose ways to manage plant resistance. Analyze and develop optimal conditions for the vital activity of agricultural plants, taking into account biological features.	Molecular and biological foundations bases of crop tolerance
D131 - «Plant growing»	8D08101 - «Genetics and selection of crops»	Full-time (PhD 3 years) tremestr	Molecular and biological foundations bases of crop tolerance	MBOUSK7207	BS	Elective subjects	5.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agriculture and plant growing	1	1	cytology, genetics, plant physiology, ecology, biochemistry, biotechnology	PhD student's research work, incl. doctoral thesis	Formation of knowledge and skills about theoretical and practical knowledge about the methods of molecular biology with the basics of genetics and plant breeding, with the mechanisms of plant survival in extreme conditions. Within the framework of this course, it is planned to consider modern methods in the field of elucidation of molecular and cellular mechanisms of adaptation and survival of plants and the creation of stress-tolerant forms. Application of acquired knowledge and skills in solving professional tasks	To understand approaches to the analysis of the structure-property relationship and to the design of substances and materials with specified chemical, physical, physicochemical properties and/or biological activity. Apply modern experimental methods of working with biological objects in field and laboratory conditions, skills of working with modern equipment. Analyze the principles of cellular organization of biological objects, biophysical and biochemical bases, membrane processes and molecular mechanisms of vital activity. To evaluate information about the biosynthesis of nucleic acids and proteins, about the mechanisms of regulation of gene expression and the relationship of life-determining processes	Physiological bases of plant resistance

approved by the faculty council protocol № 1 of August 27, 2022

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