

# S.Seifullin Kazakh Agrotechnical University



## CATALOG OF ELECTIVE DISCIPLINES

For students in the direction of preparation 7M081 Agronomy  
Brief description of the elective disciplines of the educational program

EP G	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-requisites	Post-requisites	Brief content of the discipline	Key learning outcomes	Name of the alternative discipline
M131 - «Plant growing»	7M08101 - «Field crops breeding»	Full-time (MS 2 years) trimester	Integrated crop protection	IZR 5200	BS	Elective subjects	5.0	Master's program by specialization (Scientific & pedagogical direction)	Biology, Plant Protection and quarantine	1	2	Plant protection, phytopathology, entomology, herbology, breeding and seed production of agricultural crops	Physiological fundamentals of growth and development of field crops, Research practice	The course is aimed at studying the system of measures to combat harmful organisms, taking into account the economic thresholds of their harmfulness, using primarily limiting natural factors, along with the use of all other methods, that meet environmental, Toxicological requirements. The discipline is based on a rational combination of methods that provide a high economic effect, maximum use of natural regulatory factors, obtaining environmentally friendly crop production.	Ability to solve the problems of ensuring the safety of crops from pests, diseases, weeds and sustainable land use using modern technologies, innovative formulations of pesticides	
M131 - «Plant growing»	7M08101 - «Field crops breeding»	Full-time (MS 2 years) trimester	Optimizing nutrition of crops	OPSK 5200	BS	Elective subjects	5.0	Master's program by specialization (Scientific & pedagogical direction)	Soil science and agricultural chemistry	1	2	Biology, agrochemistry, soil science, fertilizer application system, crop production, agriculture	Farming systems and crop production, Physiological fundamentals of growth and development of field crops, Research practice	The discipline is aimed at the formation of theoretical knowledge and practical skills to regulate and optimize the mineral nutrition of field crops on the basis of dietary and environmentally safe use of fertilizers and meliorants, taking into account soil fertility.	Ability to assess the agrochemical properties of soils, soil fertility, in the features of food and fertilizer crops, in the method of calculation of agronomic, economic and energy efficiency of fertilizers	
M131 - «Plant growing»	7M08101 - «Field crops breeding»	Full-time (MS 2 years) trimester	Bioinformatics	Bio 6300	AS	Elective subjects	5.0	Master's program by specialization (Scientific & pedagogical direction)	Microbiology and biotechnology	2	1	biology, information and communication technologies	Master student's research work, including implementation of master's thesis, Patenting and Intellectual Property Protection	Bioinformatics studies genetic and mathematical methods of biology and considers the issues of computer analysis in comparative genomics, mathematical methods, preparation of algorithms and (structural bioinformatics) and prediction of programs of spatial structures of proteins, strategies, research of necessary computational methodologies, centralized management of complex information of biological systems.	Ability to use molecular biological methods of breeding and seed production of agricultural plants. Ability in physiological and biochemical mechanisms of plant adaptation to stress factors and their regulation to obtain potentially high yields.	

M131 - «Plant growing»	7M08101 - «Field crops breeding»	Full-time (MS 2 years) trimester	Molecular and cellular biology of plants	MK BR 6300	A S	Elective subjects	5.0	Master's program by specialization (Scientific & pedagogical direction)	Biology, Plant Protection and quarantine	2	1	biology, genetics cytology, organic chemistry, breeding, molecular biology	Genetics with the basics of selection and seed breeding, Master student's research work, including implementation of master's thesis	Discipline examines the current problems of modern cell biology of plants. This course gives undergraduates an idea of the fundamentals of cell structure, molecular mechanisms of plant cells, interaction of cells with the environment, energy, mechanisms of cell movement, reproduction and differentiation, reflects the achievements and current problems of plant cell biology, modern molecular genetic, biotechnological methods of cell research.	Ability in the laws of inheritance of traits, modern ideas about the structure of the genome of plants. Have the skills, methods of crop research and selection and genetic analysis. Ability to use molecular biological methods of breeding and seed production of agricultural plants
M131 - «Plant growing»	7M08101 - «Field crops breeding»	Full-time (MS 2 years) trimester	Physiological fundamentals of growth and development of field crops	FORR PK 6306	A S	Elective subjects	5.0	Master's program by specialization (Scientific & pedagogical direction)	Agriculture and plant growing	2	1	plant physiology, biochemistry	Master student's research work, including implementation of master's thesis, Patenting and Intellectual Property Protection	The discipline of "Physiological aspects of growth and development of plants" studies the characteristics and the mechanism underlying physiological processes: photosynthesis, respiration, water metabolism, mineral nutrition, patterns of growth and development of cultivated plants, their stability to unfavorable conditions of the external environment, the causes of violations of physiological processes in plants and ways of overcoming them; methods of increasing productivity of agricultural plants	Ability in physiological and biochemical mechanisms of plant adaptation to stress factors and their regulation to obtain potentially high yields
M131 - «Plant growing»	7M08101 - «Field crops breeding»	Full-time (MS 2 years) trimester	Genetics with the basics of selection and seed breeding	GOSS 6305	A S	Elective subjects	5.0	Master's program by specialization (Scientific & pedagogical direction)	Agriculture and plant growing	2	2	Cytology, genetics, plant physiology, biochemistry, biotechnology	Master student's research work, including implementation of master's thesis	Breeding as a science. Cytological basis of heredity Mendelism. Principles and methods of genetic analysis. Chromosomal and non-chromosomal theory of heredity Molecular basis of heredity Structure and function of nucleic acids. Implementation of genetic information. Genetic code. Gene structures DNA markers for use in breeding. Gene injection. The variability of organisms, Intraspecific and distant hybridization. Inbreeding and heterosis Organization of breeding and seed production as a branch of agricultural production Seed production on an industrial basis Technology of cultivation and standards for the quality of varietal seeds.	Ability in the laws of inheritance of traits, modern ideas about the structure of the genome of plants. Have the skills, methods of crop research and selection and genetic analysis. Ability to use molecular biological methods of breeding and seed production of agricultural plants

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Head of the department

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