

### CATALOG OF ELECTIVE DISCIPLINES

For students in the direction of preparation 8D072 Manufacturing and processing  
 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
D111 - «Food production»	8D07201 - «Food science»	Full-time (PhD 3 years) trimestr	Nanotechnology in food and processing industries	NPPP 7303	AS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agricultural and grain processing machines	I	I	Scientific basis for food production, Modeling of processes of food production, Waste-free production technology of meat and dairy products	Modern instrumental methods of food analysis, PhD student's research work, incl. doctoral thesis, Resource-saving technologies for food and processing industries	Basics of nanotechnology for processing raw materials and using them in food production, including historical aspects of the development of nanotechnology, basic terms and definitions, nano effects and types of nanostructures, methods of their production, directions, examples of use, scientific developments on the use of nanostructured materials in food.	Knows the current trends and patterns of development of domestic science in the context of globalization of knowledge-intensive technologies	Digital technologies in science and industry, Genetic engineering in the food industry
D111 - «Food production»	8D07201 - «Food science»	Full-time (PhD 3 years) trimestr	Digital technologies in science and industry	CTNP 7303	AS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agricultural and grain processing machines	I	I	Modeling of food production, Innovative storage technology of processing plant products	PhD student's research work, incl. doctoral thesis	Digital technologies for the raw material-consumer system using information and communication technologies. Development and implementation of big data collection, processing, and analysis tools. Development and implementation of a single distributed database based on blockchain technology for the integration of scientific research.	Able to conduct research activities in the field of food technology using information and communication technologies	Genetic engineering in the food industry, Nanotechnology in food and processing industries

D111 - «Food production»	8D07201 - «Food science»	Full-time (PHD 3 years) trimestr	Genetic engineering in the food industry	GIPP 7303	AS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agricultural and grain processing machines	1	1	Biotechnological bases of food production, Waste-free production technology of meat and dairy products	PHD student's research work, incl. doctoral thesis	Current trends in the development of genetic engineering: Technology for obtaining genetically modified organisms; Problems and prospects of genetic engineering. The main methods and equipment used for setting up genetic engineering experiments; The formation of skills for analyzing modern data on the use of genetic engineering methods in the food industry; the Specifics of obtaining and processing genetically modified sources and its biological safety.	Knows the current trends and patterns of development of domestic science in the context of globalization of knowledge-intensive technologies	Digital technologies in science and industry, Nanotechnology in food and processing industries
D111 - «Food production»	8D07201 - «Food science»	Full-time (PHD 3 years) trimestr	Scientific basis of combined products creation	NOSKP 7201	BS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agricultural and grain processing machines	1	2	Scientific basis for food production, Principles for developing formulations of new types of food products	PHD student's research work, incl. doctoral thesis	The study, research and development of technology for complex multi-component products with a set of qualitative and quantitative indicators. The main regularities are: biochemical, enzyme-microbiological processes and their influence on the quality characteristics of food products, biotechnological potential of raw materials of animal and plant origin, and ways of its directed regulation to obtain products with the specified properties and composition.	Can make a conclusion and give recommendations on the results of scientific research in the field of food products	International, regional and national certification systems, Scientific aspects of processing plant products

D111 - «Food production»	8D07201 - «Food sciences»	Full-time (PhD 3 years) trimestr	International, regional and national certification systems	MRNSS 7201	BS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agricultural and grain processing machines	1	2	Food safety: inspection, sanitation and HACCP	PhD student's research work, incl. doctoral thesis	Theoretical bases of international, regional and national standardization and certification of products. Technical regulations of the Customs Union. Tasks of the International organization for standardization (ISO). The organizational structure of ISO. Activities of ISO committees. Algorithm for developing an international standard. The main goals and activities of the International organization of Legal Metrology (IOLM), the General agreement on tariffs and Trade (GATT), the European Organization for Quality (EOQ), ILAC, SEN, SENELEC, and others. The scope of the Alimentarius Code.	Can make a conclusion and give recommendations on the results of scientific research in the field of food products. Analyze and apply the most reasonable innovative solutions to improve the safety and efficiency of food production	Scientific aspects of processing plant products, Scientific basis of combined products creation
D111 - «Food production»	8D07201 - «Food sciences»	Full-time (PhD 3 years) trimestr	Scientific aspects of processing plant products	NAPPR 7201	BS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agricultural and grain processing machines	1	2	Scientific basis for food production, Promising technologies of deep processing of vegetable raw materials and the production of biofuels	PhD student's research work, incl. doctoral thesis	The main priority scientific directions of processing industries that considers theoretical issues. The justification of the technological basis for the effective processing of crop products for the production of food and starch products and alcohol.	Can make a conclusion and give recommendations on the results of scientific research in the field of food products	International, regional and national certification systems, Scientific basis of combined products creation
D111 - «Food production»	8D07201 - «Food sciences»	Full-time (PhD 3 years) trimestr	Resource-saving technologies for food and processing industries	RTPPP 7302	AS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agricultural and grain processing machines	1	2	Waste-free production technology of meat and dairy products, Modern technologies for the production of meat and dairy products, Promising technologies of deep processing of vegetable raw materials and the production of biofuels	PhD student's research work, incl. doctoral thesis	Study of modern methods and technologies that ensure resource conservation in food processing and production. The analysis and system approach to resource-saving with the use of waste-free and low-waste technologies is carried out. The issues of recycling food and processing industry wastes are considered	Knows the current trends and patterns of development of domestic science in the context of globalization of methods of food processing	Modern instrumental methods of food analysis, Modern physical and electrophysical methods of food processing

D111 - «Food production»	8D07201 - «Food science»	Full-time (PHD 3 years) trimestr	Modern physical and electrophysical methods of food processing	SFEMOPP 7302	AS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agricultural and grain processing machines	1	2	Modern equipment for food production, Promising technologies of deep processing of vegetable raw materials and the production of biofuels	PhD student's research work, incl. doctoral thesis	Physical and electrophysical methods of processing crop products, modes, parameters of raw material processing. Innovative technological schemes for processing crop products. Innovative technologies for reducing grain losses as a result of the use of electrophysical methods of processing it in elevators and grain processing enterprises	Analyze the most reasonable innovative solutions to improve the safety and efficiency of food production	Modern instrumental methods of food analysis, Resource-saving technologies for food and processing industries
D111 - «Food production»	8D07201 - «Food science»	Full-time (PHD 3 years) trimestr	Modern instrumental methods of food analysis	SIMAPP 7302	AS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agricultural and grain processing machines	1	2	Methods for analyzing products of deep processing of vegetable raw materials and biofuels, Methods for assessing the quality of processing products	PhD student's research work, incl. doctoral thesis	Development of advanced methods of research of food raw materials and products in modern devices and equipment. Providing analytical training that helps students develop professional thinking for solving problems in food analysis. A modern approach to instrumental methods for determining the quality and safety of food systems (definition, including an in-depth study of methods for analyzing contaminants of various origins.	Can make a conclusion and give recommendation s on the results of scientific research in the field of food products. Analyze and applies the most reasonable innovative solutions to improve the safety and efficiency of food production	Modern physical and electrophysical methods of food processing, Resource-saving technologies for food and processing industries
D111 - «Food production»	8D07201 - «Food science»	Full-time (PHD 3 years) trimestr	Theory of food technology	TPT 7205	BS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agricultural and grain processing machines	1	2	Scientific basis for food production, Modeling of processes of food production, Modern technologies for the production of meat and dairy products	PhD student's research work, incl. doctoral thesis	A methodological approach to developing food technology appropriate for modern aspects of functional product design. Innovative high-tech technologies developed in the last decade. Modern concepts of the theory of mechanical, hydro-mechanical, heat and mass transfer and biotechnological processes of food production. Generalized and systematized ideal models of leading food technology processes	Offers methodological approaches to improving food technology	The advanced technologies of obtaining of biologically active substances and nutraceuticals of animal and vegetable raw materials

D111 - «Food production»	8D07201 - «Food science»	Full-time (PhD 3 years) trimestr	The advanced technologies of obtaining of biologically active substances and nutraceuticals of animal and vegetable raw materials	PTPBBSZhrP 7205	BS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agricultural and grain processing machines	1	2	Scientific basis for food production. Modeling of processes of food production. Modern technologies for the production of meat and dairy products	PhD student's research work, incl. doctoral thesis	Biotechnology for the production of food additives and biologically active substances. Methods for obtaining food biologically active substances (from raw materials of plant, animal and microbiological origin) that based on organic synthesis. Classification and properties of nutraceuticals, BAS. Physical and chemical properties and biological functions of nutraceutical. Food protein preparations of plant and animal origin.	Analyze and applies the most reasonable innovative solutions to improve the safety and efficiency of food production	Theory of food technology
D111 - «Food production»	8D07201 - «Food science»	Full-time (PhD 3 years) trimestr	Methodology of mathematical processing of scientific results	MMONR 7304	AS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Agricultural and grain processing machines	1	2	Modeling of processes of food production. Technical systems for the production of products of deep processing of vegetable raw materials and biofuels	PhD student's research work, incl. doctoral thesis	Original models of mathematical management of scientific results, which carry out planning and conducting research using modern methods of processing scientific results, allowing you to effectively solve scientific and technical problems in the field of food technology.	Able to manage with technology, scientific research and commercialization of ideas in solving problems in professional sphere of activity	Commercialization of innovative technologies
D111 - «Food production»	8D07201 - «Food science»	Full-time (PhD 3 years) trimestr	Commercialization of innovative technologies	KIT 7304	AS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)		1	2	Business planning in the storage and processing of agricultural products	PhD student's research work, incl. doctoral thesis	Concept of commercialization of innovative projects, assessment of potential demand. Fundamentals of commercialization of research and development results. Methods and technological techniques for the professional commercialization of innovative technologies. Methods of marketing communications in the commercialization of innovative technologies. Organization of intellectual property protection in the process of commercialization of innovative solutions. Organization of security in the process of commercialization of innovative developments.	Able to manage with technology, scientific research and commercialization of ideas in solving problems in professional sphere of activity	Methodology of mathematical processing of scientific results

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