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S.Seifullin Kazakh Agrotechnical University
Dean of the Faculty of Engineering
Akhmetov E.S.
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CATALOG OF ELECTIVE DISCIPLINES

For students in the direction of preparation 8D071 Engineering and engineering trades

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
D103 - «Mechanics and metal working»	8D07105 - «Mechanical Engineering»	Full-time (PhD 3 years) trimestr	Doctoral dissertation		GER	Elective subjects	0.0	Doctoral studies by specialization (scientific & pedagogical direction)		by student's option	Extra term					
D103 - «Mechanics and metal working»	8D07105 - «Mechanical Engineering»	Full-time (PhD 3 years) trimestr	Engineering Experimentation & Uncertainty Analysis	IEAN 7202	BS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Technological machines and equipment	1	1	Master Course: Research Methodology	Doctoral dissertation, Dynamics of processes in mechanical systems, PhD student's research work, incl. doctoral thesis, Research practice	This is knowledge in the field of methodology for conducting engineering experiments and analyzing the uncertainties necessary for research. As a result, the doctoral student has the skills to conduct all stages of a simple active (planned) experiment. Conduct analytical and simulation experimental studies. As well as the ability to critically analyze and evaluate the obtained theoretical and experimental data and draw conclusions	Synchronize the knowledge of theoretical and experimental research at the stages of preparation, planning, conducting and analyzing an engineering experiment, interpret the results obtained and solve problems of optimizing the parameters of technological machines for agricultural and processing industries	Methods of empirical and theoretical research
D103 - «Mechanics and metal working»	8D07105 - «Mechanical Engineering»	Full-time (PhD 3 years) trimestr	Methods of empirical and theoretical research	MET1 7210	BS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Technological machines and equipment	1	1	Master Course: Research Methodology	Dynamics of processes in mechanical systems, PhD student's research work, incl. doctoral thesis, Research practice	Examines the terminology of scientific research in industry: empirical level, theoretical level and procedures of scientific research, problems, hypotheses, concept, problem of demarcation, basic philosophical and methodological concepts, logical empiricism, scientific theory, essence, structure and functions, procedures of scientific research.	Synchronize the knowledge of theoretical and experimental research at the stages of preparation, planning, conducting and analyzing an engineering experiment, interpret the results obtained and solve problems of optimizing the parameters of technological machines for agricultural and processing industries	Engineering Experimentation & Uncertainty Analysis

D103 - «Mechanics and metal working»	8D07105 - «Mechanical Engineering»	Full-time (PhD 3 years) trimestr	Mechanical Performance of Materials	MHM 7203	BS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Technological machines and equipment	1	2	Master's Courses: Materials Science in Food Production, Modern Structural Materials and Protective Coatings in Mechanical Engineering	Doctoral dissertation, PhD student's research work, incl. doctoral thesis, Research practice	This is knowledge in the field of mechanical properties of materials used in mechanical engineering for the design, improvement and hardening of parts, mechanisms, machines and equipment.	Develop skills to identify the physical essence of the phenomenon occurring in materials in the conditions of production and operation of products from them under the influence of external factors	Mechanical characteristics of new structural materials
D103 - «Mechanics and metal working»	8D07105 - «Mechanical Engineering»	Full-time (PhD 3 years) trimestr	Mechanical characteristics of new structural materials	MHNKM 7211	BS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Technological machines and equipment	1	2	Master's Courses: Materials Science in Food Production, Modern Structural Materials and Protective Coatings in Mechanical Engineering	Doctoral dissertation, PhD student's research work, incl. doctoral thesis, Research practice	Classification of nanostructured materials. Basic methods for obtaining nanostructured functional and structural materials. Processes of severe plastic deformation (SPD). Classification of SPD processes. Technological parameters affecting the structure and properties of materials. Analysis of technological features of SPD processes. Examples of implementation of SDI processes. Classification of methods for obtaining nanopowders. Gas-phase synthesis. Method of thermal decomposition of salts. Obtaining nanosized powders by dispersion. Technological characteristics of nanopowders. Cold pressing of nanopowders. Sintering of nanopowders. Hot extrusion of nanopowders. Application of special methods	Develop skills to identify the physical essence of the phenomenon occurring in materials in the conditions of production and operation of products from them under the influence of external factors	Mechanical Performance of Materials
D103 - «Mechanics and metal working»	8D07105 - «Mechanical Engineering»	Full-time (PhD 3 years) trimestr	Theory and Design of Control Systems	TPSU 7204	BS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Technological machines and equipment	1	2	Master's course: Organization and planning of research and innovation	Doctoral dissertation, PhD student's research work, incl. doctoral thesis	This is knowledge in the field of analysis and design of control systems based on classical and modern approaches with an emphasis on applications to mechanical systems. Doctoral students have the opportunity to work with specific systems of automated modeling and design to master the skills of developing mathematical models of processes and control objects in the CAD environment and to improve methods design tools and control systems within the subsystems of CAD	Describe the functions and tasks of automated control systems at the upper and lower levels. Understand and determine the modes of operation of automated process control systems, quantitative assessment of the effectiveness of control systems, describe the tasks and stages of designing control systems.	Theoretical foundations for the design of control systems

D103 - «Mechanics and metal working»	8D07105 - «Mechanical Engineering»	Full-time (PhD 3 years) trimestr	Theoretical foundations for the design of control systems	TOPSU 7212	BS	Elective subjects	3.0	Doctoral studies by specialization (scientific & pedagogical direction)	Technological machines and equipment	1	2	Master's course: Organization and planning of research and innovation	Doctoral dissertation, PhD student's research work, incl. doctoral thesis	Studying the stages of designing automation and control systems from the point of view of modern regulatory and technical documentation and using the most common software and computer equipment in practice, developing skills in compiling various types of technical documentation within a single project. Formation of theoretical and practical skills in the field of designing control systems from the development of technical specifications to the creation of project documentation	Describe the functions and tasks of automated control systems at the upper and lower levels. Understand and determine the modes of operation of automated process control systems, quantitative assessment of the effectiveness of control systems, describe the tasks and stages	Theory and Design of Control Systems
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The catalog of elective subjects was approved by the Academic Quality Council of the Technical Faculty, Protocol No. 10(E) dated June 29, 2022

Head of the Department of Technological Machines and Equipment



M.T.Userbaev