## 2.5.21. Machines, aggregates and technological processes

Group of scientific specialties *Mechanical engineering*
Number of seats: 2 (contract)
The term обучения of study is 4 years, full-time.

***Machines, aggregates and technological processes*** – a field of science and technology that includes the development of scientific and methodological foundations for the design, production, repair and operation of machines, aggregates and processes; theoretical and experimental research; feasibility study of the use of certain types and standard sizes of machines, high-performance sets of machines and mechanisms, and mechanized tools at all stages of the life cycle (calculation, design, installation/dismantling, adjustment, operation, repair and testing).

**Research areas**

1. Development of scientific and methodological foundations for the creation, modernization and operation of machines, aggregates, production transport and technological systems, mechanized (automated and robotic) technological equipment and tools for the purpose of complex mechanization, automation and robotization of main and auxiliary technological processes and operations in accordance with modern requirements of the domestic and foreign markets, production technology and other technologies. operation, quality, reliability, ergonomics, labor protection, industrial and environmental safety.
2. Development of parametric series of machines based on unification, standardization and optimization of individual components, mechanisms and aggregates, optimization synthesis of production transport and technological systems.
3. Development of scientific and methodological foundations for the formation of a qualitative and quantitative structure of sets and fleets of machines and aggregates, depending on their purpose and functional and technological relationships, regional organizational, production and technological parameters, natural and climatic and technical conditions of production and operation.
4. Improvement of production technological processes, including loading and unloading, transport, reloading and storage operations, based on new technical solutions for machine structures, transport and technological systems, aggregates, mechanized (automated and robotic) technological equipment and tools.
5. Development and improvement of methods for physical and mathematical modeling of work processes, forecasting, calculation of structural and technological parameters, computer-aided design, optimization, management, quality control of technological processes, experimental research and testing, diagnostics and monitoring, interaction with the environment and the operator (service personnel), risk analysis and risk-oriented analysis. approach to the operation of machines, sets of machines, transport and technological systems, aggregates, mechanized technological (automated and robotic) equipment and tools.
6. Development of scientific and methodological foundations for improving the productivity of machines, sets of machines, transport and technological systems, aggregates and mechanized technological (automated and robotic) equipment, as well as evaluating their economic efficiency and consumer characteristics.
7. Development and improvement of efficiency of maintenance methods, installation/dismantling, repair technology, diagnostics and monitoring, labor protection, industrial and environmental safety at the stage of operation of machines, sets of machines, transport and technological systems, aggregates, mechanized (automated and robotic) technological equipment and tools.
8. Development of methods for calculating and designing systems that ensure the safety of functioning during the operation of machines, sets of machines, transport and technological systems, aggregates and technological processes.
9. Development of a regulatory framework for the design, testing, operation and disposal of machines, sets of machines, transport and technological systems, aggregates, mechanized technological equipment and tools.