

7M07201 – Automation and Digitalization of Metallurgical Processes

Program Uniqueness:

The distinguishing feature of the master's program lies in its comprehensive education on metallurgical processing of mineral raw materials (metal extraction, tailings utilization, and key metal production technologies), as well as modern control systems, including digital, adaptive, optimal, microprocessor, and intelligent systems.

It also covers modern methods and software tools for research and design of automation systems for technological processes, and technical tools used in process automation.

The mission of the program is to develop students' social-personal qualities and professional competencies to successfully address production, technological, organizational, and design challenges in the automation and digitalization of metallurgical processes.

7M07204 – Metallurgy and Mineral Processing

Program Uniqueness:

The program is aimed at developing comprehensive engineering and scientific competencies in master's students, covering the entire cycle of mineral raw material processing. Special focus is given to modern methods for intensifying metallurgical processes, such as plasma-chemical, hydro- and pyrometallurgical technologies, automated control, and digitalization of production flows.

The curriculum integrates analytical, design, and research components that enable students to develop, model, and justify their own technical solutions, considering energy efficiency, environmental safety, and economic feasibility. Students acquire skills in mathematical modeling, systems analysis, and process optimization, which allows them to participate in the development of new technological schemes and the modernization of existing operations.

7M07226 – Mineral Beneficiation

Program Uniqueness:

The program focuses on training highly qualified specialists in advanced mineral beneficiation, emphasizing the latest research approaches and technologies. The education is centered around cutting-edge fields such as fine grinding, flotation using intelligent reagents, dry beneficiation methods, biogeotechnologies, and quality control technologies for concentrates.

The curriculum includes a robust analytical, design, and research component aimed at developing critical analysis skills and generating innovative engineering solutions. Special emphasis is placed on numerical modeling of processes, digital twins, machine learning for beneficiation process optimization, and the development of custom project solutions for specific deposits or enterprises.

7M07229 – Extractive Metallurgy

Program Uniqueness:

This educational program provides international, practice-oriented training for master's students capable of independently conducting research and innovation project activities. It is a dual-degree program in partnership with NUST MISIS (Moscow, Russia). The curriculum focuses on developing competencies in the production of energy-generating metals, and on transforming existing non-ferrous metallurgy technologies toward environmentally friendly, comprehensive raw material processing in the context of ore and waste depletion, all while incorporating production digitalization.

The program aims to develop expertise in new metallurgical technologies and promising raw material processing directions for heavy, light, rare, noble, refractory, and energy metals. It also includes training in lean R&D methodologies and practical skills for assessing innovation readiness for commercialization.