

Division: *Institute of Engineering and Technology*

Academic programme: *22.03.01 Materials Science and Materials Engineering, Engineering of new materials and technologies*

Mode of study: *Full time*

Programme length: *4 years*

Programme level: *Bachelor's degree*

Language of study: *Russian*

Programme description: *SUSU's undergraduates in the field of Materials Science and Materials Engineering are trained in order to conduct research and technological activities at research organizations and industrial enterprises in the sphere of metallurgy and machine-building, their research technical centers and laboratories. The department of Materials Science and Physicochemistry of Materials is equipped with modern equipment for laboratory and research work as well as final bachelor's work: optical and electron microscopes, test equipment (tensile machines, impact machines, hardness testers), instruments and machines for determining physical properties, equipment for obtaining new materials and their processing.*

Undergraduates participate in Russian Olympiads in the field of Materials Science; when solving cases – complex tasks related to the choice of the necessary material for specific, generally extreme conditions, its production, processing, and accompanying economic calculations of the necessary cost. For several years in a row our students have won prizes in such nationwide competitions. Based on the results of research many articles are published annually in the Bulletin of SUSU (Metallurgy series) and other publications. Every year, the metal scientists and materials scientists, the best students become laureates of the Ya.P. Osadchy Prize (Chelyabinsk Pipe Rolling Plant).

Our graduates, thanks to their thorough scientific and practical training at the university, are in high demand at the enterprises. Due to the expanding range of products being produce, new materials are needed (for example, for the nuclear industry and nuclear power plants) and, accordingly, new technologies for their processing.

Our region, including Chelyabinsk, is known to have quite a few ferrous and non-ferrous metallurgy enterprises, mechanical engineering, research organizations, such as RosNITI. Graduates of the department of Materials Science and Physicochemistry of Materials work at all aforementioned enterprises.

List of main special disciplines:

- *Automation of heating processes*
- *Amorphous and quasi-crystalline materials. Functional glasses*
- *Data analysis, modeling and artificial intelligence methods*
- *Tools for solving inventive problems*
- *Intelligent measuring systems*
- *Information and communication technologies in materials science*
- *Quantum computing*
- *Corrosion and metal protection*
- *Mathematical planning of experiment*
- *Materials science*
- *Materials of electronic engineering*
- *Metallurgy of ferrous metals*
- *Nanomaterials*
- *Organization of productive thinking*
- *Fundamentals of quantum mechanics*
- *Fundamentals of project activities*
- *Fundamentals of technology for obtaining structural materials*
- *Fundamentals of refining and alloying of metals*
- *Fundamentals of technology for obtaining non-metallic materials*
- *Fundamentals of digital signal processing*
- *Programming for data analysis*
- *Heat and mass transfer in materials and processes*
- *Thermal equipment*
- *Heat treatment of structural and tool steels*
- *Digitalization technologies and internet of things*
- *Phase equilibria and structure formation*
- *Physics of strength and mechanical properties of materials*
- *Solid state physics*
- *Physical and chemical studies of processes and materials*
- *Physical chemistry of processes and systems*
- *Physical chemistry*
- *Physical methods of substance control*
- *Chemical methods of substance analysis*
- *Digital measuring devices*
- *Digital electronic devices*
- *Electrical and electronics*

Programme manager: *Denis Vinnik*