

Energy and Resource Conservation Processes in Chemical Technology

South Ural State University

Degree or qualification is awarded: **Bachelor's degree**

Language of study: **Russian**

Mode of study: **full-time**

Duration: **4 years**

Availability of free education: **yes**

Price: **151 800 rubles**

Programme webpage at the university website:

<https://www.susu.ru/en/education/bachelors-specialist-degree-programs/180302-energy-and-resource-conservation-processes>

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Graduates gain relevant skills in the field of chemical-engineering methods of environmental protection. This involves studying the properties of new substances, introducing into existing technologies energy- and resource-saving principles, obtaining catalysts and sorbents for neutralizing and destroying anthropogenic pollution, assessing the state and engineering methods of environmental protection.

The name of the discipline indicates that graduates are in high demand in a wide range of industries, including petrochemistry, metallurgy, mechanical engineering, pharmaceutical, food industry, and of course, in science. Our graduates work throughout all of Russia. Many of our graduates work at large-scale enterprises, in consulting and design firms.

Modern education is impossible to imagine without knowledge of professional English. The curriculum provides for the study of professional English. This allows students to participate in the academic mobility program and study at a foreign university for a semester.

Our students conduct research using the capabilities of the Nanotechnology Research and Education Center. Thus the university maintains a worldwide level of research and the students present their scientific works at conferences abroad. Over the past 5 years, students have participated in conferences held in such countries as Bulgaria, Germany, the Netherlands, Spain, Slovakia, Finland, and the USA. Approximately 10 articles written by students and postgraduates are published annually and indexed by international databases.

Our graduates have excellent career opportunities both in industry and in science.

Specializations within this programme

Energy and Resource Conservation Processes in Chemical Technology, Petrochemistry and Biotechnology

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Energy and Resource Saving Processes in Traditional Technologies, Petrochemistry and Biotechnology (Complex Usage of Water Resources)

The aim of the program is to train highly qualified specialists in the field of energy efficiency and resource conservation, who possess sufficient skills to work for high-tech enterprises, as well as for continuing research in any part of the world.

Program objectives:

- formation of competences in the field of energy and resource saving and environmental design;
- formation of knowledge and skills in the field of solving modern problems of energy and resource saving;
- teaching information retrieval both in regulatory documents and in scientific journals;
- teaching how to solve non-standard problems of energy and resource conservation, requiring the application of a scientific approach.

The area of professional activity: design in the field of energy and resource conservation, research, environmental marketing, consulting, environmental-economic, environmental-legal, training activities.

Objects of professional activity: processes and devices in chemical technology, petrochemistry and biotechnology; industrial plants and technological schemes, including automated control systems; automated research systems and computer-aided design systems; facilities for sewage treatment and gas emissions, waste treatment, utilization of heat and energy flows and secondary materials; methods and tools for assessing the state of the environment and protecting it from human impact; artificial intelligence systems in chemical technology, petrochemistry and biotechnology; multi-assortment production of chemical and related industries.

Types of professional activity:

- production and technology;
- research,
- organizational and managerial.

Program strengths:

1. International internships during studies with the opportunity to participate in double degree programs (two degrees - SUSU and a foreign university). Participation in conferences on a national and international level with oral presentations on the topic of the master's thesis.
2. Undergraduates study for free at the Lingua courses, which involve teaching both written and spoken common English.
3. Specialists in this field of study are in demand both in design and control organizations, and in enterprises of the real sector of the economy (metallurgical, machine-building, oil and gas processing and transporting, pharmaceutical enterprises), as well as in scientific organizations.
4. Mastering modern world research technologies. Undergraduates in the performance of dissertations actively use the equipment of world-class scientific and educational center Nanotechnology.
5. Teaching is conducted in the second half of the day, which makes it possible to study full-time in the magistracy

without separation from the main work.

Future employers:

Production enterprises and scientific organizations of various regions of Russia and the world, in particular:

ОАО Gazpromtrans, ROSATOM, ОАО Lukoil, ОАО Chelyabinsk Zinc Plant, ОАО Energroprom – Chelyabinsky Elektrodny Zavod, ОАО Mechel, ОАО Mechel-Koks, ОАО Chemk, Magnezit Group, ChelPipe, Chelyabinsk Tractor Plant – URALTRAC Limited, Rospirodnadzor, Ministry of Economic Development of the Russian Federation, Ministry of Ecology of the Russian Federation, Chelyabinsk Center for Hydrometeorology and Environmental Monitoring; design, survey and research institutes: ООО YuzhuralPKB, ООО Eko-Proekt, Ecosolutions, ООО NII BTMET and etc.

Partners:

- Major industrial partners:
- Magnitogorsk Iron & Steel Works,
- Mechel,
- ООО IT-Service,
- Materia Medica,
- ОАО MMZ,
- ОАО Fort Tehnologii,
- FGUP Zavod Plastmass,
- ОАО Lafarge Cement,
- Ural Engineering Center,
- PAO Konar,
- ОАО Vostochno-Sibirskiy kombinat stroitelynikh materialov,
- ZAO Metran group,
- The South Urals Chamber of Commerce and Industry,
- ООО Akva.

Major scientific partners:

1. Institutes under the Russian Academy of Sciences

- N. D. Zelinsky Institute of Organic Chemistry Russian Academy of Sciences,
- Institute of Petrochemistry and Catalysis,
- Sobolev Institute of Geology and Mineralogy,
- Institute of Solid State Chemistry UB RAS,
- Komi Science Center UB RAS Institute of Chemistry.

1. Russian Universities

- Moscow Institute of Physics and Technology,
- Moscow State University,
- Dmitry Mendeleev University of Chemical Technology of Russia,
- ITMO University.

1. Foreign Universities

- University of Central Florida (USA),
- Lappeenranta University of Technology (Finland),
- St. Andrews University (UK, Scotland),
- University College London (UK, England),
- University of Cyprus (Cyprus),
- University of Oviedo (Spain),
- University of Palermo (Italy).

Special projects

Undergraduates participate in research work carried commissioned by industrial enterprises or scientific foundations on the following topics:

- New nanostructured catalysts for resource-saving technologies.
- Development of methods for determining the composition of deposits and corrosion products of structural materials of petrochemical production.
- Determination of the effectiveness of the implementation of environmental measures to reduce the impact of polluted runoff from the watershed of rivers on the water quality of reservoirs.
- Testing of samples of powders of drugs and their preformed forms using the DSC method and the method of X-ray phase analysis.
- Development of technology and experimental installation of advanced water treatment to remove phenols and cyanides, without the use of chemical reagents.