

## The annotation of the master's program "Mechanics of gas transmission systems"

Training direction: 01.04.03 Mathematics

Faculty: Mechanical and mathematical

Training form: Full-time education

Duration of the program: 2 years

Language of education: Russian/English

### Program concept

The master's program will allow to gain knowledge, the skills and abilities to become a highly qualified specialist in the gas transportation sector. Such specialist is ready to meeting with the requirements of modern high-tech production, to performing at a high technical level design and technological activities in this area, to engage in organizational and managerial work in interdisciplinary areas of the gas transportation industry, including in international team.

The education that received within the framework of this program forms a specialist's high professional competencies, fundamental knowledge in the field of physical and mathematical sciences.

Such specialist has ability to generate professional solutions and is capable of scientific, rationalization and inventive activity in the gas transportation industry to take into account environmental issues, energy saving and compliance with safety regulations.

The education on the master's program promotes continuous professional self-improvement and self-learning.

A graduate of the master's program receives a diploma of state sample - the diploma of a Master of mechanics of the Tomsk State University.

The training will take place on the basis of the TSU for 4 semesters. All 4 semesters of study undergraduates undergo theoretical training, and practical skills are acquired in the course of research or industrial practices that are carried out during the entire training, culminating in the writing and defending the master's thesis.

### Mission of program

The main goal of the program is to train specialists for gas transportation industry with a deep fundamental basis in natural sciences. Modern realities in the context of the development of science-intensive technologies, also requirements to the depth of elaboration of design work and economic calculations require from specialists to have knowledge of the physical phenomena used in production, PC skills and knowledge of CAD (ANSYS, AUTOCAD, COMSOL, etc.), which cannot be used without understanding of simulated physical processes, knowledge of higher mathematics, general physics, numerical methods and computer science.

Therefore, in addition to developing high professional, social, intellectual, ethical and communication qualities (including knowledge of foreign languages), within the framework of the classical university education, the main focus is on training specialist who is capable of not only effectively perform their duties an employee of a gas transportation company, but to carry out rationalization, inventive and research work within the profile production activity.

## Area of professional activity

The main directions of professional activity are the following:

1. The operation of production facilities of a gas transmission enterprise, associated with usage of modern CAD;
2. design and engineering activities in enterprises developing equipment and materials for the gas transportation industry
3. rationalization and inventive activity in the gas transportation enterprise;
4. research work related to solving problems in the areas fluid and gas mechanics, deformable solid mechanics, heat and mass transfer,
5. mathematical modeling of physical phenomena and technological processes;
6. technical aspects in managerial and economic production activities;
7. teaching activity in the field of classical physical and mathematical disciplines.

## Brief description of the program's content

The program contains general scientific disciplines ("Philosophy and methodology of scientific knowledge", "Foreign language in the professional field of activity", "Mathematical modeling physical phenomena and technological processes", "Geometric modeling and modern CAD", "Theoretical physics", "Fluid mechanics and gas", "Modeling and forecasting of emergency situations in industry", "History and methodology of mechanics and technologies") and special disciplines ("Technical thermodynamics", "Gas dynamics and mechanics of turbulent flows", "Theory of elasticity and plasticity", "Modern numerical methods in Oil and Gas Hydrodynamics", "Heat and Mass Transfer in Gas Transport Systems", "Aerodynamics of compressor units and turbomachines", "Aerothermochemistry and mechanics of reacting media", "Theory of mechanisms and machines", "Mechanics of multiphase media and the theory of filtration", "Mathematical methods in problems of production automation", "Molecular physics", "Design and engineering calculation of technical systems and equipment").

Some of the courses are taught with usage of multimedia equipment.

The final state certification (the defence of master's theses) according to the program is held at the Tomsk State University at a meeting of the state examination commission.

## Program resources

A graduate of the master's program receives an education that is in demand when working related to the fundamental aspects of the engineering and technical activities of gas transmission companies.

The master's program satisfies to all the requirements of Russian and international standards and is a prerequisite for employment in positions intended for highly qualified specialists in the gas transportation industry.

Specialists after this master's program will be in demand in organizations that lead design and engineering activities, in the gas transportation industry (expert organizations, design institutes, research centers, design bureaus, and others), in manufacturers of materials and equipment for the gas transportation industry.

Master's qualification in this program allows you to carry out teaching, analytical and research activities. There is an opportunity to continue education in postgraduate study at TSU or other universities.

#### Admission conditions

The student is enrolled on a competitive basis.

The following documents are submitted for the competition: application - motivational letter of the applicant, a diploma with a bachelor's degree or a specialist in mathematics and mechanics and their equivalent, letters of recommendation from the last place of study (work), the necessary documents approved by the admission committee of the TSU.

Applicants take the entrance exam in mechanics and are interviewed in the chosen section of mechanics.

Program leader:

Bubenchikov A.M.

Dr. of Phys. and Math. Sciences, professor,

<mailto:Michael121@mail.ru>, 529740

Program manager:

Bubenchikov M.A.

Dr. of Phys. and Math. Sciences, professor,

<mailto:Michael121@mail.ru>, 979399

Location address:

634050, Russia, Tomsk, Lenin's avenue, Tomsk State University, Mechanical and mathematical faculty, 2-nd learning campus, room 417 (dean's office)