

**Division:** *Institute of Engineering and Technology*

**Academic programme:** *15.04.06 Mechatronics and Robotics. Mechatronics*

**Mode of study:** *full-time*

**Programme cost:** *189 000 RUB*

**Programme length:** *2 years*

**Programme level:** *Master's degree*

**Language of instruction:** *English*

**Programme description:**

*The curriculum of this Master's degree programme is based on the courses studied by students under the Bachelor's degree programme in the field of "Mechatronics and Robotics", profile "Mechatronic Systems in Computer-aided Production". During training, the students have the opportunity to master the theoretical knowledge on the operation of mechatronic and robotic systems on laboratory equipment. In addition, the graduates obtain practical skills while working at big enterprises in the region within the framework of internship.*

*A part of the courses is taught by the representatives of commercial companies involved in the development of mechatronic systems and automation.*

*Areas of professional knowledge of graduates: development of new methods of control, information processing and the search for new design solutions for mechatronics and robotic systems, their subsystems and individual modules, research in the field of mechatronics, robotics, control theory and artificial intelligence methods.*

*The objects of professional activity of graduates are mechatronics and robotic systems, including information and sensor, actuating and control modules, their mathematical and algorithmic support, software, methods and means of their design, modeling, experimental research, debugging and operation, research and production testing of mechatronics and robotic systems with different application areas.*

**Main programme-specific classes:**

*Research:*

- *analysis of scientific and technical information, domestic and foreign experience in the development and research of mechatronics and robotic systems, the study*

- of new methods of the theory of automatic control, artificial intelligence and other scientific areas that make up the theoretical basis of mechatronics and robotics, preparation and publication of reviews and abstracts;*
- *conducting theoretical and experimental research in the field of development of new samples and improvement of existing mechatronics and robotic systems, their modules and subsystems, search for new ways to control and process information using methods of artificial intelligence, fuzzy logic, methods of multi-agent control, artificial neural and fuzzy neural networks;*
  - *conducting patent research accompanying the development of new mechatronics and robotic systems in order to protect objects of intellectual property - the results of research and development;*
  - *development of experimental prototypes of mechatronics and robotic systems, their modules and subsystems for the purpose of verification and justification of the basic theoretical and technical solutions subject to inclusion in to the technical assignment for conducting experimental development works;*
  - *organizing and conducting experiments using existing mechatronics and robotic systems, their subsystems and individual modules in order to determine their effectiveness and determine ways of improvement, processing the results of experimental studies with the use of modern information technologies;*
  - *writing reports, scientific publications and reports; presenting findings at scientific conferences and seminars, participation in the implementation of research and development results into practice;*

*Design and development:*

- *conducting feasibility studies of new mechatronics and robotic systems, their individual subsystems and modules;*
- *calculation and research of mechatronics and robotic systems, information and sensor, actuating and control modules, their mathematical and algorithmic support, software, methods and means of their design, modeling, and testing of operating systems, processing of experimental data using modern information technologies;*
- *development of special software for solving problems of designing mechatronics and robotic systems, development of technical specifications and direct participation in the design of mechanical and mechatronics modules, design of devices and control systems and information processing.*

**Programme manager:** *Maksim Grigoriev, D.Sc. (Engineering), Professor, +7 (351) 272-32-30 (add. 1), grigorevma@susu.ru*