Area of study:

15.04.06 Mechatronics and Robotics

Program

Management of Mechatronic and Robotic Systems

Degree: master

Program length and study mode: 2 years, intramural

Language: Russian

Credits: 120

Start date: September 1, 2020

Location: Taganrog

Entry requirements:

Knowledge in the following areas:

1. Control over robots and robotic systems. Mathematical models of manipulators. Problems of kinematics.
2. Robot drives
3. Microprocessor robot control devices and their software
4. Design of robots and robotic systems
5. Robotic manufacturing technology

Program overview:

The educational program is focused on training experts in the field of robotics and mechatronics.

The types of professional activity of the graduates:

- research;
- drawing and designing;
- administrative;
- service and operational.

In accordance with the types of professional activity, the graduate is ready to solve the following professional tasks:

- research activity:
  - — analysis of scientific and technical information in the field of development and research of mechatronic and robotic systems;
  - — 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;
  - — carrying out theoretical and experimental research in development of new models of mechatronic and robotic systems, their modules and subsystems, search for new ways to control and process information using artificial intelligence, fuzzy logic, artificial neural and neuro-fuzzy networks;
  - — development of experimental samples of mechatronic and robotic systems, their modules and subsystems, conducting experiments to determine their effectiveness;
- drawing and designing activity:
  - — preparation of feasibility study, calculation and design of new mechatronic and robotic systems and subsystems;
  - — development of special software for design of mechatronic and robotic systems, development of technical

Careers:

1. A roboticist
2. Mobile robotics specialist
3. Industrial robotics designer
4. Home robot designer
5. Children's robotics designer
6. Medical robot designer
7. Designer-ergonomist of robotic systems
8. Intelligent system developer
9. System engineer
10. Mechatronic engineer
11. Design engineer
12. Automation and mechanization of operating processes engineer
13. Electronics engineer

Get in touch:

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	specifications and design of mechanical and mechatronic modules; • administrative activity: — development of organizational and technical documentation and established reporting on approved forms; — organization of work of small groups of performers, control over implementation of measures for the prevention of industrial injuries, prevention of environmental violations in operation of mechatronic and robotic systems; • service and operational activity — participation in verification, adjustment and evaluation of various mechatronic and robotic systems and subsystems, in configuration of control hardware and software systems; — preventive control of technical condition and functional diagnostics of various mechatronic and robotic systems and subsystems; — preparation of operating instructions for mechatronic and robotic systems and hardware/software, development of routine testing programs. The orientation of the program gives a graduate an opportunity to build a career in a wide range of enterprises and organizations. **Typical units of study may include:** • Philosophy of technical sciences and modern problems of electrical energy industry and mechatronics • Economic aspects and life safety in management of manufacturing processes of an enterprise • Computer, network and information technology • Systems analysis and special chapters of mathematics in energetics and mechatronics	

	Research areas: • Managing moving objects in defined and undefined environments; • Positional and trajectory control systems based on artificial neural networks; • Positional and trajectory control systems based on fuzzy logic; • Moving a single UAV in an environment with stationary and non-stationary obstacles; • Adaptive and robust control systems; • Systems of group control of mobile objects; • Moving a group of UAVs in the mode of following a leader in an environment with stationary and non-stationary obstacles; • Intelligent planning and group management of multicopters; • Robotic airships; • Robotic helicopter; • The control system of a surface mini-boat; • Development of control and navigation systems for unmanned boats; • Development of control and navigation systems for autonomous uninhabited underwater vehicles; • Design automation of advanced robots and robotic systems based on aeronautical platforms, aircraft, underwater and surface vessels, land mobile platforms.	