

<b>General description of</b>	
<b>Master's programme</b>	Мехатроника <i>Agromechatronics</i>
<b>Specialization</b>	В агропромышленном комплексе <i>Agromechatronics in agricultural sector</i>
Institution(s)	Федеральное государственное автономное образовательное учреждение высшего образования «Южно-Уральский государственный университет (национальный исследовательский университет)» ФГАОУ ВО «ЮУрГУ (НИУ)», Россия <i>Federal State Autonomous Educational Institution of Higher Education "South Ural State University (national research university)"</i> <i>FSAEIH SUSU (NRU), Russia</i>
Accreditation organization(s)	Ministry Of Education And Science, Russia Federal Service For Supervision In Education And Science (Rosobrnadzor) <a href="http://www.obrnadzor.gov.ru">http://www.obrnadzor.gov.ru</a>
Period of reference	Programme validated for 6 years (starting in March 2018)
Responsible person	Vice rector for education Prof. A. Radionov
Qualification awarded	Master of Science (M. Sc.)
Length of programme	2 years
Number of credits	120 ECTS-credits
Cycle/Level of qualification	QF for EHEA: Second Cycle; EQF level 7; NQF for Russia: Master
Fields of study	Mechatronics, robotics and automation, computer vision and intelligent systems in view of an integrated approach to agricultural Engineering and technologies.
Specific admission requirements	The applicant must have knowledge in the field of higher mathematics, physics, electronics, electrical engineering, theoretical mechanics. For admission the applicant must provide the original bachelor's degree or specialist diploma, an application for admission, 2 photos 3x4.
Specific arrangements for recognition of prior learning	Applicant must pass the entrance test.
Qualification requirements and regulations	Bachelor's degree or specialist diploma.
Mode of study	Full-time, part-time
Examination regulations, assessment and grading	Summative assessment is performed in several ways, according to the characteristics of each Module. Written exams, oral exams, laboratory and project reports, oral presentations, continuing assessments, course work evaluation, final comprehensive exam. Particular emphasis is given to team work, with a variety of assessment methods of results obtained in either a group or individually (by splitting tasks and assignments), by written reports or a presentation. The aim is to develop a research-orientated approach to a problem and to acquire essential skills that are highly valued by employers. Students are informed of the assessment procedure before the courses start, examples of tests from previous years are provided. The degree exam consists of writing a thesis, which must possess the characters of originality, exhaustive documentation and scientific investigation and which will be discussed with a committee of university professors and experts (3 professors and 3 leading experts in this field from the industrial sector).
Obligatory or optional mobility window	Mobility window is not provided. Students have a 5-month placement in companies in Russia for on-field working experiences and research activities.
Work placement(s) if applicable	After successfully completing the master's degree, candidates will be able to move directly into the professional field as a Mechanical engineer or an Automation specialist in a range of capacities. The programme qualifies for work in industry and business, and has direct relevance to agricultural equipment manufacturing or related industrial fields. However, job opportunities are not limited to such activities. Other prospective employers include food producers and distribution companies, power-

	intensive industry, consulting companies, offshore industry, transportation companies and the public sector. In the Chelyabinsk region, examples of such companies are «Uvelka», «Makfa» and other companies in the food industry.
Occupational profiles of graduates	Electrical Engineer, Mechanical Engineer, Automation Specialist.
Access to further studies	The programme also qualifies candidates for a career in research, and doctoral studies in engineering in areas related to the management, regulation and development of mechanical components and systems. It also gives ability to continue education in PhD.

<b>Programme Profile Statement</b>	
<p>The MA Mechatronics is a 24-month Master's programme. This two-year master qualification provides students with specialized knowledge and professional engineering skills to prepare them for a career in the rapidly-growing fields of mechatronics, robotics and automation, computer vision and intelligent systems in view of an integrated approach to agricultural Engineering and technologies. Graduates of the Master Degree in Agromechatronic Engineering are professionally qualified to work scientifically in the field of mechatronics applied to agricultural issues. The programme includes specialized courses in control systems, computer vision, robotics, embedded systems, and data analytics. Students also have the opportunity to select electives from across the University.</p> <p>With their management qualifications, they are able to work in interdisciplinary and international teams to solve complex mechatronic tasks. Graduates have the ability to adapt quickly and are flexible in dealing with a variety of tasks and problems from different fields. Having a qualification in intercultural communication, they are able to communicate easily in different languages with people from different countries.</p>	

<b>Programme Learning Outcomes</b>	
On completion of this programme, students should be able to:	
LO1.	Manage to improve their intellectual and general cultural level. Possess the ability to improve thinking skills in accordance with the laws and requirements of logic.
LO2.	Apply the basic physical and mathematical laws of the functioning of mechatronic complexes and their elements. Use methods of synthesis and research of intelligent control systems, modern scientific methodology, new research methods. Use methods of mathematical modeling of complex mechatronic systems.
LO3.	Use methods of application of intelligent systems in the field of building control systems for mechatronic and robotic devices in agromechatronics. Design and implement intellectual control system according to specified criteria of functioning. Possess the skills of designing information systems and their elements; skills of organization, management and communication with colleagues in the implementation of production and research activities.
LO4.	Apply methods of formal, fuzzy and combinatorial logic; mathematical methods for the construction and training of neural networks, adaptive and self-adjusting systems. Manage to implement intelligent control algorithms using numerical methods of solution; correctly and efficiently choose different types of drives for specific industrial mechatronic systems, use microprocessor control devices in typical drives. Possess the skills to build mathematical models of intelligent systems and their implementation using typical software.
LO5.	Use the basic concepts, definitions, characteristics and classification of controllers, interfaces; system of commands, principles of construction and methods for implementing mechatronic systems based on industrial controllers. Apply the principles of building information systems and their elements, principles of building industrial SCADA-systems.
LO6.	Apply principles of patent research; analyse the current state of the main areas and branches of mechanical engineering; basics of collecting information on research topics. Evaluate patent and other research related to intellectual property. Possess skills in compiling reports on patent and other research in the field of intellectual property.
LO7.	Use the main types and elements of projects; major principles, sources, forms and principles of organization of project financing. Manage to calculate the performance indicators of various project options and choose the best option. Possess planning, cost management and project control skills; project risk management skills.
LO8.	Use the main requirements of regulatory legal acts to production processes, rooms, machines, equipment in terms of ensuring technospheric safety. Manage to use the main methods of protecting production personnel and the public from the possible consequences of accidents, catastrophes, natural disasters. Possess the skills of an informed choice of well-known devices, systems and methods for ensuring technospheric safety.

<b>The Programme Module Structure</b>		
<b>Year 1 (Two semesters of 15 weeks)</b>		
<b>Code</b>	<b>Title</b>	<b>Credits</b>
CU1	Intellectual property protection	3
CU2	Theory of the experiment	2
CU3	Information systems in mechatronics and robotics	5
CU4	CAD systems	5
CU5	Technical equipment for automation and control of mechatronic systems	5
CU6	Internship	10
CU7	Project management	3
CU8	Geopolitics	2
CU9	Software and system functions of controllers	5
CU10	Methods of artificial intelligence in mechatronics	5
CU11	Design of mechatronic systems	5
CU12	Internship	10
<b>Year 2 (Two semesters of 15 weeks)</b>		
CU13	Technosphere safety	4
CU14	SCADA systems in automated production	5
CU15	Management of industrial mechatronic systems	6
CU16	Supercomputer modeling of mechatronic systems	5
CU17	Internship	10
CU18	Undergraduate practice	24
CU19	State final examination (Individual project and thesis)	6
<b>Total credits</b>		<b>120</b>

