

<b>General description of</b>	
<b>Master's programme</b>	15.04.06 Мехатроника и робототехника <i>Mechatronics and Robotics</i>
<b>Specialization</b>	<i>Робототехнические и мехатронные системы</i> <i>Robotic and mechatronic systems</i>
Institution(s)	Yuzhno-Rossiyskiy gosudarstvennyy politekhnicheskiy universitet (NPI) imeni M.I. Platova <i>Platov South-Russian State Polytechnic University (NPI)</i>
Accreditation organization(s)	Ministry of Science and Higher Education of the Russian Federation
Period of reference	Programme validated for 2 years for cohorts starting in September 2019
Responsible person	Dr. PhD Tatiana Kruglova
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	Robotics systems and complexes in agriculture, Robots control an unknown environment, Mechanics of agro-industrial mechatronic systems, Methods and technical means of agro-industrial machinery diagnostics.
Specific admission requirements	A bachelor's or specialist's diploma must contain the following disciplines: Mathematics, Physics, Theoretical mechanics, Electrical engineering, Electronics, English language. The following set of documents must be submitted to the Admissions Committee: learning agreement, signed by the student, copy of bachelor or specialist diploma, 4 photos 3x4 cm.  Enrollment in the Master's program by Results of entrance examinations in fundamentals of mechatronics and robotics, automation theory, electrotechnics and electronics . The minimum passing points for each discipline is 51, maximum 100 points. The maximum possible grade sum for the three entrance examinations is 300 points
Specific arrangements for recognition of prior learning	Checking the knowledge of applicants is performed on the entrance exam in special disciplines: Mathematics, Physics, Theoretical mechanics, Electrical engineering, Electronics
Qualification requirements and regulations	Bachelor's degree or specialist diploma
Mode of study	part-time
Examination regulations, assessment and grading	Written examinations or Project works Defense of the Graduate work Master's thesis is checked for plagiarism. The percentage of originality should be more than 75%. The master's thesis is reviewed by the supervisor from University and representatives of employers. The defense of the master's thesis is accepted by the Examination Committee, including professors of the Department and employers.  If the student does not agree with the assessment of the examination Committee, it is necessary to apply petition to the appeal Commission within one week after the defense.
Obligatory or optional mobility window	Students have 1 month at first year and 4 month at second year placement in companies in Russia or abroad for on-field working experiences and research activities. Academic mobility window is not provided.
Work placement(s) if applicable	LLC "Combine plant "Rostselmash" ", CJSC "Agrokomplex", JSC " Millerovoselmash", LLC "EURODON"
Occupational profiles of graduates	The programme qualifies candidates for a career in engineering in areas related to the management, control and development of mechanical components and systems and research.  Possible occupation profiles: electronic equipment technician, tester, programmer, electronic engineer, mechanical engineer
Access to further studies	The programme gives access to some specializing professional courses courses on agricultural machinery diagnosis and control, including PhD in technical sciences

<b>Programme Profile Statement</b>	
The MA Mechatronics is a 24-month Master's programme. Students will develop 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 have the ability not only to adapt quickly- and to be flexible in dealing with a variety of tasks and problems from different technical fields, but also to communicate easily in English and successfully work as part of international team.	
<b>Programme Learning Outcomes</b>	
On completion of this programme, students should be able to:	
LO1	Investigate complex agro-mechatronic systems using analytical, numerical and experimental research methods.
LO2	Development, calculation and analysis of the components of mechatronic systems in agriculture
LO3	Design control systems, according to the technical process requirements.
LO4	Ability to issue research results in the form of scientific articles
LO5	Apply specialized programs ROS and MATLAB for agricultural robot control
LO6	Work effectively in a team
LO7	Prepare and present effective and convincing presentations both in native language and in English

<b>The Programme Module Structure</b>		
<b>Year 1 (Two semesters of 16 weeks and 1 month practical work)</b>		
Code	Title	Credits
V1V.01	Methods and theory of optimization	3
V1.V.02	Information devices in mechatronics and robotics	4
B1.B.04	Methods of artificial intelligence in mechatronics and robotics	4
B1.V.02	Modern methods of computational mathematics in mechatronics and robotics	4
B1.V.03	Mathematical modelling and optimization of multilink systems motion	4
B1.V.04	Control systems of mechatronic and robotic complexes	4
B1.V.DV.01.01	Mechanics of agro-industrial mechatronic systems	4
B1.V.DV.01.02	Mechatronic device in a specialized technique	4
B1.V.DV.02.01	Methods and technical tools for the diagnosis of agro-industrial equipment	4
B1.V.DV.02.02	Reliability and diagnostics of technical systems	4
B1.V.DV.03.01	Control robots in an unknown environment	4
B1.V.DV.03.02	Intelligent robot control	4
B1.V.DV.04.01	Agro-industrial robotic systems and complexes	3
B1.V.DV.04.02	Multi-criteria design of robotic and mechatronic systems	3
B2.B.01(U)	Internship	6
B2.V.02(N)	Semester research work	16
<b>Year 2 (One semesters of 16 weeks, 4 month practical work and Dissertation )</b>		
B1.B.02	The theory of experiment in the study of systems	5
B1.B.03	Statistical dynamics of automatic systems	3
B1.B.06	Computer-aided design and production systems	4
B1.V.01	Research Methodology	4
B1.V.05	Designing mechatronic and robotic systems for special purposes	6
B2.V.02(N)	Semester research work	8
B2.V.03(P)	Research practice in obtaining professional skills and professional experience	12
B2.V.04(Pd)	Internship	9
B3.V.01	Working on Master Thesis	9
<b>Total credits</b>		<b>120</b>

Programme Key Learning Outcomes Module Map								
Module		LO1	LO2	LO3	LO4	LO5	LO6	LO7
Year 1	V1V.01		*		*		*	*
	V1.V.02		*			*	*	
	B1.B.04		*		*		*	*
	B1.V.02			*		*	*	
	B1.V.03	*	*		*			*
	B1.V.04	*	*		*		*	
	B1.V.DV.01.01	*		*		*		
	B1.V.DV.01.02	*		*		*	*	
	B1.V.DV.02.01		*		*		*	
	B1.V.DV.02.02		*				*	
	B1.V.DV.03.01	*		*		*		*
	B1.V.DV.03.02			*			*	
	B1.V.DV.04.01			*	*	*		*
	B1.V.DV.04.02			*			*	
	B2.B.01(U)			*	*	*		*
B2.V.02(N)	*	*	*	*	*	*	*	
Year 2	B1.B.02		*	*		*	*	
	B1.B.03				*			*
	B1.B.06	*	*	*	*	*	*	*
	B1.V.01		*				*	
	B1.V.05	*		*		*		*
	B2.V.02(N)	*	*	*	*	*	*	*
	B2.V.03(P)	*	*	*	*	*	*	*
	B2.V.04(Pd)	*	*	*	*	*	*	*
	B3.V.01	*	*	*	*	*	*	*