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| **General description of Master’s programme** | |
| **Master’s programme** | 23.04.03 Эксплуатация транспортно-технологических машин и комплексов  *Operation of transport and technological machines and complexes* |
| **Specialization** | Техническая эксплуатация транспортно-технологических машин в агропромышленном комплексе  *Technical operation of transport and technological machines in the agro-industrial complex* |
| Institution(s) | Volgogradskij gosudarstvennyj tekhnicheskij universitet  *Volgograd state technical university* |
| 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 | PhD. Evgeniy Zakharov |
| 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 | Transport and transport-technological machines used in the agro-industrial complex; their units, components, mechatronic systems |
| Specific admission requirements | Required documents: document (s), identifying citizenship; document of the established pattern of higher education (copy or original); 4 photos 3x4 cm; documents, confirming the presence of individual achievements (presented at the discretion of the entering person).  Short description of enrolment procedure: Applicants must have a bachelor or specialists diploma. The examination committee includes at least three professors, one of them is the head of the master's program. Entrance tests are conducted in the form of an exam (using tickets) in writing form. Each ticket contains three questions on fundamental disciplines: the theory and design of transport and technological machines, the basics of technical operation, the control system of transport and technological machines. The maximum score for each question is 100 points. The final number of points of the entrance test is defined as the average value of points of every questions. Thus, the maximum score of the entrance test is also 100 points. Those who score less than 41 points, are eliminated from the competition. An applicant may receive additional points if he/she has publications on a topic, relevant to agromechatronic , certificate of intellectual property, certificates and diplomas of subject olympiads.  List of required courses: physics, advanced mathematics course, electrical engineering and electronics, basic of construction of transport and technological machines.  Level of language skills according to CEFR: B1. |
| Specific arrangements for recognition of prior learning | During the first classes in the core disciplines, students are given a test task to assess the level of training at the previous level. The decision on the recognition of the results of previous training is made by the commission of professors. |
| Qualification requirements and regulations | Bachelor degree or Specialists Diploma |
| Mode of study | Full-time (students are required to be present from 9 am to 3 pm or equivalent every day, except Sunday) |
| Examination regulations, assessment and grading | The final state certification represents the implementation and defense of the master's thesis. Master's thesis should be an independent and logically completed research work related to solving the problems of experimental research activities.  For admission to the thesis defense, a student must be certified in all studied disciplines.  Evaluation of the result of qualifying work is held at a closed meeting of the state examination committee. This committee includes: the head of the master program, two professors from the relevant departments and three representatives of employers. In evaluating a master's thesis, the following criteria are taken as a basis:  • relevance of the topic;  • scientific and practical significance of the topic;  • quality of work;  • report content and answers to questions;  • significance of the results presented.  A generalized assessment of the protection of final qualifying work is determined based on the feedback from the supervisor and a review of the work.  The results of the defense of final qualifying work are evaluated according to the following system:  an “excellent” mark (90–100 points) is awarded for deep disclosure of the topic, high-quality design, content of the report and presentation;  a rating of “good” (76–89 points) is assigned if the work meets the above criteria, but there are some minor flaws or shortcomings in the presentation of the results on defense in terms of the content of the work and its design;  The score “satisfactory” (61–75 points) is assigned for incomplete disclosure of the topic, availability of conclusions and suggestions of a general nature, lack of a clear presentation of the work and difficulty in answering questions;  The rating of “unsatisfactory” (less than 61 points) is assigned for weak and incomplete disclosure of the topic, inconsistency in the presentation of the material, conclusions and suggestions of a general nature, the lack of a clear presentation of the work and answers to questions.  The results of the thesis defense are announced to students after a closed meeting of the state examination commission on the day of the defense. The student may to apply for a review of the results of the defense to the appeal commission of the university.  A graduate after successful completion of the final state certification is awarded the qualification (degree) "master" and a state diploma of higher education. |
| Obligatory or optional mobility window | Students have 1 month at first year and 2 weeks at second year placement in profile companies in Russia for on-field working experiences and research activities. Academic mobility is not provided. |
| Work placement(s) if applicable | Sady Pridonia National Food Group, Federal research and production center "Titan-Barricades", Closed joint stock company "GelioPax", Limited liability company “Agromarketing Network”, Limited liability company Combine plant "Rostselmash”, Collective farm individual entrepreneur Bulankina |
| Occupational profiles of graduates | Graduates have the necessary knowledge and basic skills to solve professional problems in the organization of technological processes for the maintenance and repair of transport-technological machines for agricultural purposes, their units, components and attachments. Graduate of the master's degree can hold the following positions: mechanical engineer, warranty engineer, engineer for the operation of transport and technological machines, design engineer |
| Access to further studies | Graduates of the program may continue their education in postgraduate study in the following directions: "Wheeled and caterpillar vehicles", "Robots, mechatronics and robotic systems", “Heat engines” or other close areas. Graduates can also take retraining or advanced training courses to expand their professional activities. |

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| **Programme Profile Statement** |
| Master's program “Operation of transport-technological machines and complexes” (specialization “Technical operation of transport-technological machines in the agro-industrial complex”) is a 24-month master's program. The aim of the program is to prepare highly qualified specialists in the field of operation of transport and technological machines in the agro-industrial complex, their units, components and systems. Students acquire knowledge and skills in:  - designs of transport and technological machines, their units, hydraulic and pneumatic drives;  - principles of technical operation of transport and technological machines and their elements;  - principles, methods, rules of the project activity in the field of agromechatronics;  - research methodology in the field of agromechatronics, formulation and conduct of experiments, analysis of their results;  - methods for evaluating the effectiveness of the adopted technical, organizational and design decisions.  Graduates of the course can work in representative offices of foreign companies in Russia, in international teams, and also continue their study in postgraduate school, including foreign countries universitys. |

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| **Programme Learning Outcomes** | |
| On competition of this programme, students should be able to: | |
| **LO1.** | Ability to explore agromechatronic systems using mathematical modeling and experimentation |
| **LO2.** | Work effectively both independently and in a team |
| **LO3.** | Effectively engage in project activities in an interdisciplinary context in accordance with regulatory requirements and restrictions, taking into account alternative solutions of problems |
| **LO4.** | Demonstrate knowledge of basic sciences related to agromechatronics |
| **LO5.** | The ability to analyze the processes of maintenance and repair of transport and technological machines and mechatronic systems in order to improve them |
| **LO6.** | Use specialized software products MathLab, LabView, Simulink to develop and control the operation of transport and technological machines for agricultural purposes |
| **LO7.** | The ability to present the results of scientific research in the form of scientific articles and presentations in the native and English languages |
| **LO8.** | Understanding of the principles of control, functioning of hydraulic and pneumatic systems and drives |

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| **The Programme Module Structure** Please, fulfil the section according to **Curricula Guideline**.  Please, note that codes of modules should contain **Latin** characters and numbers. | | |
| **Year 1 (Two semesters of … weeks)** | | |
| **Code** | **Title** | **Credits** |
| CU1 | Philosophy and Methodology of Science | 3 |
| CU2 | Methodology of scientific creativity in transport and in the agro-industrial complex | 3 |
| CU3 | Advanced mathematic course | 6 |
| CU4 | Information and communication technologies | 3 |
| CU5 | Intellectual ownership | 3 |
| CU6 | Operation and maintenance of transport and technological machines in the agro-industrial complex | 2 |
| CU7 | Project activities and project management | 4 |
| CU8 | Mechatronic systems of transport and technological machines | 4 |
| CU9 | Experimental technology | 4 |
| CU10 | Business English | 4 |
| CU11 | Communication in professional activities | 3 |
|  | Basics of business communication |  |
| CU12 | Practice in obtaining professional skills and professional experience | 6 |
| CU13 | Research work | 15 |
| **Year 2 (Two semesters of … weeks)** | | |
| CU14 | Business planning | 3 |
| CU15 | Maintenance and repair of transport and technological machines in the agro-industrial complex | 3 |
| CU16 | Project activities and project management | 2 |
| CU17 | Expertise of the technical condition of transport and technological machines | 4 |
| Technical operation of transport and technological machines |
| Diagnostics of mechatronic systems |
| CU18 | Microprocessor Technology | 4 |
| Applied Programming |
| CU19 | Power plants of transport-technological machines in the agro-industrial complex | 5 |
| Hydraulic systems of transport-technological machines |
| Pneumatic systems of transport-technological machines |
| CU20 | Research work | 24 |
| CU21 | Internship | 6 |
| CU22 | Final state certification | 9 |
| **Total credits** | | **120** |

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| **Programme Key Learning Outcomes Module Map**  Please, fulfil the section according to **Curricula Guideline**. | | | | | | | | | |
|  | Module | LO1 | LO2 | LO3 | LO4 | LO5 | LO6 | LO7 | LO8 |
| **Year 1** | CU1 | **\*** | **\*** |  |  |  |  |  |  |
| CU2 | **\*** | **\*** |  |  |  |  | **\*** |  |
| CU3 |  |  | **\*** | **\*** |  |  |  | **\*** |
| CU4 |  |  |  |  |  | **\*** | **\*** |  |
| CU5 |  |  | **\*** |  |  |  |  |  |
| CU6 |  |  | **\*** | **\*** | **\*** |  |  | **\*** |
| CU7 |  |  | **\*** |  | **\*** |  |  |  |
| CU8 |  |  |  |  | **\*** |  |  |  |
| CU9 | **\*** |  |  | **\*** | **\*** | **\*** |  | **\*** |
| CU10 |  | **\*** |  |  |  |  | **\*** |  |
| CU11 |  | **\*** |  |  |  |  | **\*** |  |
| CU12 | **\*** | **\*** |  |  | **\*** |  | **\*** |  |
| CU13 | **\*** | **\*** |  |  | **\*** | **\*** | **\*** |  |
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| **Year 2** | CU14 |  |  |  |  | **\*** |  |  |  |
| CU15 |  |  | **\*** | **\*** | **\*** |  |  | **\*** |
| CU16 |  |  | **\*** |  | **\*** |  |  | **\*** |
| CU17 |  |  |  | **\*** | **\*** |  |  |  |
| CU18 |  |  |  | **\*** |  | **\*** |  |  |
| CU19 |  |  | **\*** | **\*** | **\*** |  |  | **\*** |
| CU20 | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** |
| CU21 | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** |
| CU22 | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** | **\*** |