

# Subjects taught at the department

## Bachelor's degree

<b>N<sup>o</sup></b>	<b>Name of the subject</b>	<b>Brief information about the subject</b>
1.	Algorithms and programming	<p>The purpose of the subject is to teach students to be able to read software tools developed for microcontrollers and microprocessors, to make appropriate changes to these software tools, to adjust, develop, compile and load them into memory.</p> <p>The task of science is to study the current state and prospects of microcontrollers and microprocessors software in our country and internationally, to apply modern microcontrollers and microprocessors, digital techniques and advanced information technologies to the field of water management and irrigation.</p>
2.	Theoretical foundations of electrical engineering	<p>The purpose of the subject is to form and learn the skills of competent calculation of electric and magnetic circuits of electrotechnical equipment and devices.</p> <p>The task of the subject is to study the laws of the theoretical foundations of electrical engineering, direct current, alternating current, linear and non-linear circuits and the calculation of the electromagnetic field, to study the analysis and synthesis of electrical circuits, widely used in practice in the field of education. , is to study the calculation of the equivalent electrical circuits of electronic devices and various electrical transformers.</p>
3.	Fundamentals of electrical engineering and electronics	<p>The purpose of the science is to support the formation of an engineer-bachelor who can apply the achievements of science and technology in the field of electrical engineering, electronics and automation to agricultural production.</p> <p>The task of the subject is electrical engineering, the basic laws of electronics, the methods of analysis and calculation of electrical and electronic circuits, the construction and operation modes of electrotechnical devices used in the field of farm organization and its technical service, the selection, connection to the source, and control of electrotechnical equipment and machines. and learning and gaining practical experience in ensuring safe and effective work.</p>

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| 4. Electric machines and electric drive                   | <p>The purpose of the subject is to prepare theoretically and practically from the science of electric machines and electric drives, to form and teach competent calculation skills of the principle of operation of electric machines and electric drives used in production and their correct selection.</p> <p>The task of science is to study the structure, principle of operation, assembly and connection of electric machines and electric vehicles, their characteristics, principles of starting and braking, drawing up control schemes, calculating the correct selection of their power and their effective use. is learning.</p>  |
| 5. Metrology and electrical measurements                  | <p>It consists of introducing the normative and legal documents related to metrology and electrical measurements, studying the science of metrology, which is the theoretical basis of measurement, studying the universality of measurements and tools and methods of achieving the required accuracy.</p> <p>The task of the science is to study the current state and prospects of electrical measurement and metrology in our country and internationally, to apply digital techniques and advanced technologies to the field.</p>  |
| 6. Fundamentals of digital technology and digital systems | <p>The purpose of the science is to form and teach students the fundamentals of modern digital technology, the theoretical foundations of microprocessor and microcontroller systems based on binary, decimal and hexadecimal number systems in digital technology, principles of operation and digital systems based on them, their competent design and use.</p> <p>The task of science is to enrich students with theoretical knowledge and practical skills, to form the basis of integrated circuits for converting analog signals into digital signals, microcontrollers and microprocessors, advanced software tools of digital technology, a scientific and methodological approach and their scientific worldview.</p> |
| 7. Fundamentals of microelectronics                       | <p>The purpose of the subject is to form and teach students about modern microelectronics elements, their physical processes, element production technologies, development of various microelectronics devices with their help, and skills such as their competent design and use.</p> <p>The task of science is to enrich students with theoretical knowledge and practical skills about the elements of modern microelectronics and physical processes in them, to form a scientific and methodological approach to agricultural and water production, and to form their scientific worldview.</p>  |

### At master's level

- | № The name of the subject | Brief information about science |
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1. Object-oriented programming languages

The goal of the science is to develop and teach skills such as developing effective software tools for using intelligent measurement systems and devices in various technological processes, creating programs for technical tools such as modern microcontrollers and microprocessors in measurement systems, and their competent design.

The task of science is to enrich the masters with theoretical knowledge and practical skills, to form a scientific and methodological approach to the effective application of intellectual measurement systems and their software tools to the fields of agriculture and water production, and to form their scientific worldview.
2. Electrical measurements of non-electric quantities. Intelligent sensors.

The purpose of the science is to provide the masters with knowledge about the methods of electrical measurement of non-electric quantities, their technical means, technical descriptions, modern intelligent sensors and their structure principle.

The task of science is to enrich the masters with theoretical knowledge and practical skills about the methods and technical means of electrical measurement of non-electric quantities, to acquire practical skills in using modern intellectual measurement sensors and their software tools, and to form their scientific outlook.
3. Microelectronic circuits

The purpose of the subject is to form and teach skills such as modern microelectronics elements, physical processes in them, element production technologies, development of various microelectronics devices with their help, their competent design and use.

The task of science is to enrich the masters with theoretical knowledge and practical skills about the elements of modern microelectronics and physical processes in them, to form a scientific and methodological approach and their scientific worldview in the application to the fields of agriculture and water production.
4. Fundamentals of digital technology and digital systems

The purpose of the science is to form and teach skills such as the fundamentals of modern digital technology, the theoretical foundations of microprocessor and microcontroller systems based on binary, decimal and hexadecimal number systems in digital technology, principles of operation and digital systems based on them, their competent design and use.

The task of the science is to enrich the masters with theoretical knowledge and practical skills, to form the basis of integrated schemes of converting analog signals into digital signals, microcontrollers and microprocessors, advanced software tools of digital technology, a scientific and methodological approach and their scientific worldview.
5. Engineering experiments and experimental statistics

The purpose of the subject is to teach masters about organizing engineering experiments, correct use of measuring instruments used in experiments, processing experimentally obtained statistical results, and regression analysis.

The task of science is to train masters to analyze and confirm the results of experimental research, to develop effective models and to use measuring instruments correctly.

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| 6. Electrotechnical materials in tool making                 | <p>The purpose of the subject is to provide theoretical knowledge and practical skills to masters in the use of electrotechnical materials in instrumentation and measurement systems, their structure, physical properties, and principles of operation.</p> <p>The task of the science is to create theoretical knowledge, practical skills, skills for practical use of types, properties, structure, indicators of electrotechnical materials of instrumentation.</p>   |
| 7. Modeling of electrical and electronic circuits (SIMULINK) | <p>The purpose of the subject is to form and teach master's theoretical knowledge of modeling, practical skills, modeling of physical phenomena occurring in electric and electronic circuits with modern software tools, including SIMULIK.</p> <p>The task of the science is to enrich the masters with theoretical knowledge and practical skills, to teach the methods of developing mathematical models of electric and electronic circuits, including the development of mathematical models in SIMULIK, and to ensure the reliability of electric and electronic circuits, as well as the methods of determining their optimal solutions, agriculture and water management. scientific and methodical approach in application to production areas and formation of their scientific outlook.</p> |
| 8. Adaptive control of electric drive                        | <p>The purpose of the subject is to provide theoretical and practical knowledge of the principles, methods and elements of adaptive management of various electrical systems, external influences on it during the operation of electrical systems, and adaptive decision-making.</p> <p>The task of the science is to enrich the masters with theoretical knowledge and practical skills, and to create practical skills for the practical use of various adaptive control methods of electrical systems.</p>  |