**Curriculum of Instrument Engineering Degree Programme (Bachelor's Degree)**

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Module No. | Module | Module Scope, ECTS credits | Final Control Form of the Module | Course | Scope of the Course, ECTS credits | Control Form of the Course | | Semester | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| **Basic Modules (all courses of the module are compulsory for learning)** | | | | | | | | | | | | | | | |
| 1 | Basics of Mathematics | 7 | Comprehensive Examination | Mathematics | 3 | Written Control Work | | 3 |  |  |  |  |  |  |  |
| Mathematics | 4 | Computer-Based Testing | |  | 4 |  |  |  |  |  |  |
| 2 | Foreign Language | 9 | Comprehensive Examination | English (German) Language | 6 | Written Control Work | | 6 |  |  |  |  |  |  |  |
| English (German) Language | 3 | Computer-Based Testing | |  | 3 |  |  |  |  |  |  |
| 3 | Physics 1 | 3 | Examination | Physics | 3 | Computer-Based Testing | |  | 3 |  |  |  |  |  |  |
| 4 | National Language | 9 | Comprehensive Examination | Kazakh (Russian) Language | 6 | Written Control Work | | 6 |  |  |  |  |  |  |  |
| Kazakh (Russian) Language | 3 | Computer-Based Testing | |  | 3 |  |  |  |  |  |  |
| 5 | Recreation Classes (Beginner Level) | 4 | Graded Test | Physical Education | 2 | Graded Test | | 2 |  |  |  |  |  |  |  |
| Physical Education | 2 | Graded Test | |  | 2 |  |  |  |  |  |  |
| 6 | History of the State | 4 | State Exam | Modern History of Kazakhstan | 4 | Written Control Work | |  | 4 |  |  |  |  |  |  |
| 7 | Social and Humanitarian Knowledge | 8 | Comprehensive Examination | Manashtanu | 1 | Reference Paper | | 1 |  |  |  |  |  |  |  |
| Political and Social Studies | 4 | Computer-Based Testing | | 4 |  |  |  |  |  |  |  |
| Cultural Studies and Psychology | 3 | Computer-Based Testing | |  | 3 |  |  |  |  |  |  |
| 8 | Philosophy | 5 | Examination | Philosophy | 5 | Computer-Based Testing | |  |  | 5 |  |  |  |  |  |
| 9 | Information and Communication Technologies | 5 | Examination | Information and Communication Technologies | 5 | Computer-Based Testing | |  |  | 5 |  |  |  |  |  |
| 10 | Recreation Classes (Intermediate Level) | 4 | Graded Test | Physical Education | 2 | Graded Test | |  |  | 2 |  |  |  |  |  |
| Physical Education | 2 | Graded Test | |  |  |  | 2 |  |  |  |  |
| 11 | Electrical Engineering and Basics of Electronics | 10 | Comprehensive Examination | Electrical Engineering | 5 | Control Work | |  |  | 5 |  |  |  |  |  |
| Basics of Electronics | 5 | Computer-Based Testing | |  |  | 5 |  |  |  |  |  |
| 12 | Profound Language Learning | 6 | Comprehensive Examination | Professional Kazakh (Russian) Language | 3 | Computer-Based Testing | |  |  | 3 |  |  |  |  |  |
| Professionally-Oriented Foreign Language | 3 | Computer-Based Testing | |  |  |  | 3 |  |  |  |  |
| 13 | Physics 2 | 5 | Examination | Physics | 5 | Computer-Based Testing | |  |  | 5 |  |  |  |  |  |
| 14 | Basics of Data Measuring Technologies | 3 | Examination | Basics of Data Measuring Technologies | 3 | Computer-Based Testing | |  |  |  |  | 3 |  |  |  |
| 15 | Integrated and Microprocessor Circuitry Engineering | 5 | Examination | Integrated and Microprocessor Circuitry Engineering | 5 | Computer-Based Testing | |  |  |  |  | 5 |  |  |  |
| 16 | Final Internship | 15 | Report Defense | Work Experience Internship 3 | 10 | Report Defense | |  |  |  |  |  |  |  | 10 |
| Pre-Graduation Internship | 5 | Report Defense | |  |  |  |  |  |  |  | 5 |
| 17 | Final Academic Assessment | 15 | State Exam | State examination in the specialty | 4 | Written Control Work | |  |  |  |  |  |  |  | 4 |
| Diploma Thesis Defense | Developing and defending a thesis (project)/State examination in two major courses | 11 | Bachelor’s Thesis Defense | |  |  |  |  |  |  |  | 11 |
| Elective Modules (containing elective courses) | | | | | | | | | | | | | | | |
| 18 | Basics of the Profession | 4 | Comprehensive Examination | Introduction to the Profession / Introduction to the Specialty | 3 | Reference Paper | |  | 3 |  |  |  |  |  |  |
| Practical Training | 1 | Report Defense | |  | 1 |  |  |  |  |  |  |
| 19 | Materials Science | 8 | Comprehensive Examination | Material Science in Instrument Engineering / Basics Material Science, | 4 | Computer-Based Testing | |  | 4 |  |  |  |  |  |  |
| Basics of Nanotechnology / Electroinsulating Equipment | 4 | Reference Paper | | 4 |  |  |  |  |  |  |  |
| 20 | Basics of Simulation | 4 | Examination | Computer Graphics / Computer Simulation | 4 | Creative Examination | | 4 |  |  |  |  |  |  |  |
| 21 | Electrical Engineering | 11 | Comprehensive Examination | Theoretical Basics of Electrical Engineering / Special Chapters of Electrical Engineering, | 3 | Computer-Based Testing | |  |  |  | 3 |  |  |  |  |
| Electromagnetic Capability / Basics of Reliability Theory, | 4 | Written Control Work | |  |  |  | 4 |  |  |  |  |
| Work Experience Internship 1 | 4 | Report Defense | |  |  |  | 4 |  |  |  |  |
| 22 | Automation | 11 | Comprehensive Examination | Technical Means of Automation / Typical Automation Devices | 3 | Computer-Based Testing | |  |  |  | 3 |  |  |  |  |
| Basics of Automation / Automatic Control | 4 | Course Paper | |  |  |  | 4 |  |  |  |  |
| Systems of Computer Mathematics / System Simulation Software | 4 | Course Paper | |  |  |  | 4 |  |  |  |  |
| 23 | Technologies of Technogenic Risk Management | 3 | Examination | Basics of Law and Anti-Corruption Culture/Basics of Financial Literacy/ Economic and Business Studies/ Power Saving Technologies in Modern Industries/Ecology and Sustainable Development/Information and Quality Management/Health and Safety Basics | 3 | Computer-Based Testing | |  |  |  | 3 |  |  |  |  |
| 24 | Electronic Devices in Instrument Engineering | 11 | Comprehensive Examination | Analog and Digital Electronic Devices / Electronics in Instrument Engineering, | 6 | Course Paper | |  |  |  |  | 6 |  |  |  |
| Electroconverting Facilities / Power Sources of Devices | 5 | Computer-Based Testing | |  |  |  |  | 5 |  |  |  |
| 25 | Devices and System Simulation | 10 | Comprehensive Examination | Computer-Aided Design Systems/ Basics of Computer-Aided Design | 6 | Creative Examination | |  |  |  |  | 6 |  |  |  |
| Instrument Engineering Techniques / Production Preparation and Automation Technics | 4 | Computer-Based Testing | |  |  |  |  |  | 4 |  |  |
| 26 | Control and Automation Systems | 9 | Comprehensive Examination | Microcontrollers and Microprocessors / System Design based on Programmable Integrated Circuits, | 5 | Creative Examination | |  |  |  |  |  | 5 |  |  |
| Design of Control and Automation Systems / Design of Measuring Instruments | 4 | Computer-Based Testing | |  |  |  |  |  | 4 |  |  |
| 27 | Metrological Aspects in Instrument Engineering | 9 | Comprehensive Examination | Smart Metering Systems / Intelligent Means of Measurement, | 4 | Computer-Based Testing | |  |  |  |  |  | 4 |  |  |
| Analog and Digital Measuring Instruments / Circuitry of Measuring Instruments | 5 | Control Work | |  |  |  |  |  | 5 |  |  |
| 28 | Designing of Appliances and Devices | 13 | Comprehensive Examination | Electrical Equipment / Parts and Components of Instruments, | 4 | Written Control Work | |  |  |  |  |  | 4 |  |  |
| Sensors of Technological Processes / Converters of Measuring Signals, | 5 | Computer-Based Testing | |  |  |  |  | 5 |  |  |  |
| Work Experience Internship 2 | 4 | Report Defense | |  |  |  |  |  | 4 |  |  |
| 29 | Modern Electromechanical Systems | 10 | Comprehensive Examination | Automation Algorithms and Programs / Mechatronics and Robotics, | 5 | Creative Examination | |  |  |  |  |  |  | 5 |  |
| Electrical Machinery / Electrical Machines | 5 | Computer-Based Testing | |  |  |  |  |  |  | 5 |  |
| 30 | Development and Design of Instruments and Systems | 10 | Comprehensive Examination | Instruments and Methods of Research / Instrumentation, | 5 | Computer-Based Testing | |  |  |  |  |  |  | 5 |  |
| Calculation and Design of Instruments / Design and Construction of Electronic Instruments | 5 | Course Paper | |  |  |  |  |  |  | 5 |  |
| 31 | Commissioning of Instrument-Engineering Products | 10 | Comprehensive Examination | Industrial Safety / Electrical Safety, | 5 | Written Control Work | |  |  |  |  |  |  | 5 |  |
| Installation and Debugging of Instruments and Systems / Installation Works | 5 | Computer-Based Testing | |  |  |  |  |  |  | 5 |  |
|  |  | **Total ECTS per semesters** | | |  | |  | 30 | 30 | 30 | 30 | 30 | 30 | 30 | 30 |
|  |  | **Total Exams (Final Control Forms)** | | |  | | Examinations  State Exam  Report Defense  Graded Test  Course Paper Defense  Bachelor’s Thesis Defense | 1  -  -  1  -  - | 7  1  1  1  -  - | 4  -  -  -  -  - | 4  -  1  1  1  - | 3  -  -  -  1  - | 3  -  1  -  -  - | 3  -  -  -  1  - | -  1  2  -  -  1 |