**Curriculum of Master's Degree Programme of Instrument Engineering**

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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 |
| **Basic Modules (all courses of the module are compulsory for learning)** | | | | | | | | | | | |
| 1 | Basics of Scientific and Research World View | 6 | Comprehensive Examination | | Foreign Language (Professional) | 3 | Oral Examination | 3 |  |  |  |
| History and Philosophy of Science | 3 | Computer-Based Testing | 3 |  |  |  |
| 2 | Psychological and Pedagogical Education | 6 | Comprehensive Examination | | Psychology | 3 | Oral Examination | 3 |  |  |  |
| Pedagogics | 3 | Computer-Based Testing | 3 |  |  |  |
| 3 | Problems of Measuring Equipment | 3 | Examination | | Contemporary Problems of Data-Measuring Equipment | 3 | Computer-Based Testing |  | 3 |  |  |
| 4 | Scientific Research 1 | 7 | Research Work Report | | Scientific Research | 7 | Scientific Research Report Defense | 7 |  |  |  |
| 5 | Scientific Research 2 | 7 | Research Work Report | | Scientific Research | 9 | Scientific Research Report Defense |  | 9 |  |  |
| 6 | Scientific Research 3 | 3 | Research Work Report | | Scientific Research | 5 | Scientific Research Report Defense |  |  | 5 |  |
| 7 | Teaching Practice | 3 | Practice Report | | Teaching Practice | 3 | Internship Report Defense |  |  | 3 |  |
| 8 | Scientific Research 4 | 7 | Research Work Report | | Scientific Research | 7 | Scientific Research Report Defense |  |  |  | 7 |
| 9 | Research Scientific Training | 8 | Practice Report | | Research Scientific Training | 8 | Internship Report Defense |  |  |  | 8 |
| 10 | Final Academic Assessment | 14 | State Exam | | Comprehensive examination | 4 | Oral Examination |  |  |  | 4 |
| Master’s Thesis Defense | | Development and Defense of Master’s Thesis | 11 | Thesis Defense |  |  |  | 11 |
| Elective Modules (containing elective courses) | | | | | | | | | | | |
| 11 | Current Trends in Instrument Engineering | 3 | Examination | | Technical Means of Data Measuring Devices and Systems/Data Measuring Technologies | 3 | Computer-Based Testing |  |  | 3 |  |
| 12 | Organizing of Scientific Research | 8 | Comprehensive Examination | | Methods of Organizing of Scientific Research/Methods of Organization of Work with Scientific Texts (in Kazakh) | 3 | Oral Examination | 3 |  |  |  |
| Research Management/Commercialization of Scientific Projects | 5 | Computer-Based Testing |  | 5 |  |  |
| 13 | Computer Technology and Intellectualization | 8 | Comprehensive Examination | | Intellectualization of Measuring Equipment/Intelligent Data Measuring Technologies/Models and Methods of Data Mining | 5 | Oral Examination | 5 |  |  |  |
| Information Technologies in Instrument Engineering/Network Technologies | 3 | Computer-Based Testing |  | 3 |  |  |
| 14 | System Simulation Tools | 10 | Comprehensive Examination | | Elements of Artificial Intelligence in Technical Systems/System Simulation/Intelligent Measuring Instruments | 5 | Oral Examination |  | 5 |  |  |
| Systems of Computer Mathematics/ Visual Simulation Systems/ Automated Data Collection Systems | 5 | Computer-Based Testing |  | 5 |  |  |
| 15 | System Design and Interfaces | 8 | Comprehensive Examination | | Theory of Simulation and Scientific Experiment/Computer-Aided Design and Basics of CAD/Wavelet Theory | 5 | Oral Examination |  |  | 5 |  |
| Coupling Devices in Measuring Equipment/Instrument Interfaces/NI Technologies in Data Collection Systems | 3 | Computer-Based Testing |  |  | 3 |  |
| 16 | Control Systems and Robotics | 8 | Comprehensive Examination | | Digital Automation and Control Systems/Modern Microcontrollers and Specialized Microprocessors /Microprocessor-Based Automatic Control Systems | 5 | Oral Examination |  |  | 5 |  |
| Robotic Systems/Mechatronics and Robotics/Information Devices of Robotic Systems | 3 | Computer-Based Testing |  |  | 3 |  |
| 17 | Modern Security Systems | 3 | Examination | | Active Security Systems/Passive Security Systems/Security and Fire Safety Systems | 3 | Computer-Based Testing |  |  | 3 |  |
| 18 | Technical Control of Instrument Engineering | 3 | Examination | | Non-Destructive Testing in Instrument Engineering/Technical Control in the Workplace/Physical Methods of Technical Control | 3 | Computer-Based Testing | 3 |  |  |  |
|  |  | **Total ECTS per semesters** | |  | |  |  | 30 | 30 | 30 | 30 |
|  |  | **Total Exams (Final Control Forms)** | |  | |  | Examinations | 3 | 4 | 4 | - |
| State Exam | - | - | - | 1 |
| Scientific Research Report Defense | 1 | 1 | 1 | 1 |
| Internship Report Defense | - | - | 1 | 1 |
| Master’s Thesis Defense | - | - | - | 1 |