

**Profile of the educational and professional program in the specialty
152 "Metrology and information-measuring technology"**

1 - General information	
Full name of the higher educational institution and structural subdivision	Ternopil Ivan Puluj National Technical University Department of Devices and Control and Measuring Systems
Degree of higher education and title of qualification in the original language	Master of Metrology and Information and Measurement Engineering
The official name of the educational program	Educational and professional program "Metrology and information-measuring technology" of the second level (master's) level of higher education in the field of knowledge 15 "Automation and instrumentation"
Type of diploma and scope of educational and professional program	Master's degree, single, 90 ECTS credits, term of study 1 year 4 months
Availability of accreditation	Accreditation Commission of Ukraine, certificate of accreditation of ND № 2087404 (date of issue of the certificate 02.08.2017) Validity: until 01.07 2024
Cycle / level	NRC of Ukraine - level 8, FQ-EHEA - second cycle, EQF-LLL - level 7
Prerequisites	Having a bachelor's degree
Language (s) of instruction	Ukrainian
Term of the educational program	Till 01.07 2024
Internet address of the permanent post of the description of the educational program	http://tntu.edu.ua/?p=uk/structure/faculties
2 - The purpose of the educational program	
Education of highly qualified specialists with modern creative thinking and advanced competencies, able to solve complex specialized problems and practical problems of metrology and information-measuring technology, characterized by complex and uncertain conditions.	
3 - Characteristics of the educational program	

Subject area	<p>Field of knowledge 15 "Automation and instrumentation" Specialty 152 "Metrology and information-measuring technology" Educational program "Metrology and information-measuring technology"</p> <p><i>Object:</i> means of information and measuring equipment; methods of measurement, control, testing and diagnosis; metrological support of scientific, industrial, social, medical-biological, ecological and other activities, traceability and comparability of results; normative documentation related to measurements and their application, technical, software, mathematical, information support of information and measuring equipment, principles of construction of measuring equipment and their use, principles and methods of reproduction of reference values, standard samples.</p> <p><i>Objectives of education:</i> training of specialists capable of complex solution of complex problems, development of information and measuring equipment; development and practical implementation of standardization systems, conformity assessment; development, revision and harmonization of normative documents on standardization, conformity assessment, metrological support and quality management systems in the performance of organizational and technical work, applied research in the field of metrology and metrological activities.</p> <p><i>Theoretical content of the subject area.</i> Concepts and principles of metrology and information-measuring equipment, construction of measuring equipment, automation of experimental research, principles of standardization and conformity assessment, metrological activities.</p> <p><i>Methods, techniques and technologies.</i> Methods of measurements, methods of their construction, information technology in the creation of software for measuring instruments.</p> <p><i>Instruments and equipment:</i> modern measuring instruments, instruments and equipment for the manufacture and adjustment of measuring instruments, during their testing and laboratory research and in the performance of work related to metrological activities.</p>
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Orientation of the educational program	The structure of the program involves mastering the acquired knowledge of metrological support of instrument systems and information and measurement technology.
The main focus of the educational program and specialization	Emphasis is placed on the formation and development of professional competencies in the field of instrumentation, related to metrology and information and measurement technology; study of theoretical and methodological provisions, organizational and practical tools.
Features of the program	The program consists of in-depth theoretical, special practical and research training, summarizing the results of research, design decisions and is performed in an active research environment aimed at the design, operation and maintenance of metrological systems, equipment equipped with information systems and complexes used in light industry. Regular updating, which allows to take into account the trends of progressive development of metrology and information-measuring technology. Is mobile under the program of academic mobility "Double diploma"
4 - Suitability of graduates to employment and further education	
Suitability for employment	Main positions according to DK 003: 2010: 2149- Professionals in other fields of engineering; 2149.1-Researcher (metrology and measuring equipment); 2149.2-Engineers (other branches of engineering); 22314- Metrology Engineer; 22293-Quality Engineer; 22427- Standardization and Quality Engineer. Key positions by: International Standard Classification of Occupations 2008 (ISCO-08): 2141 - Industrial and production engineers, 2144 - Mechanical engineers, 2152- Electronics engineers, 2512 - Software developers, 3113 - Electrical engineering technicians.
Further education	Obtaining education at the third (educational and scientific) level of higher education. Acquisition of additional qualifications in the system of postgraduate education.
5 - Teaching and assessment	
Teaching and learning	Student-centered learning, self-study, problem-oriented learning, interactive and distance learning, research-based learning, participation in specially designed individual choice courses, participation in specialized seminars, professional discussions, writing scientific texts and preparing publications, Teaching is carried out in the form of: lectures, seminars and practical classes, individual calculation work, course work.
Evaluation	Assessment of student achievement is carried out on a four-point scale - ("excellent", "good", "satisfactory",

	<p>"unsatisfactory"); 2-level national scale ("credited" / "not credited");</p> <p>100-point; ECTS scale (A, B, C, D, E, F, FX).</p> <p>Assessment methods: oral and written exams, practice, presentations, project work.</p> <p>Types of control:</p> <ul style="list-style-type: none"> • by levels: self-control, control at the level of the teacher, control at the level of the head of the department, control at the level of the dean's office, control at the level of the rectorate, state control; • by term: operational (incoming, current, intermediate, final) and deferred. Modular learning format. <p>State certification in the form of qualification master's thesis.</p>
6 - Program competencies	
Integral competence	Ability to solve complex specialized tasks and problems in the field of metrology and information and measurement technology, which involves research and / or innovation and is characterized by uncertainty of conditions and requirements.
General Competences (GQ)	<p>GQ1. Knowledge and understanding of the subject area and understanding of professional activity.</p> <p>GQ2. Ability to communicate in a foreign language.</p> <p>GQ3. Skills in the use of information and communication technologies.</p> <p>GQ4. Ability to conduct research at the appropriate level.</p> <p>GQ5. Ability to search, process and analyze information from various sources.</p>
Professional competencies of the specialty (FC)	<p>FC1. Ability to select and apply suitable mathematical methods, computer technology, as well as approaches to standardization and certification to solve problems in the field of metrology and information and measurement technology.</p> <p>FC2. Practical skills in solving complex problems and problems of metrology, information and measurement technology, standardization in assessing product quality.</p> <p>FC3. Ability to apply a systematic approach to solving scientific and technical problems of metrology and information and measurement technology.</p> <p>FC4. Ability to apply a comprehensive approach to solving experimental problems with the use of information and measurement technology and application software.</p> <p>FC5. Ability to demonstrate knowledge and understanding of mathematical principles and methods necessary for the creation of virtual measuring instruments and information-measuring techniques.</p>

	FC6. Ability to develop software, hardware and metrological software for computerized information and measurement systems.
7 - Program learning outcomes	
Regulatory component Selective component	<p>PIP01. Know and understand modern research methods, organization and planning of experiments, computerized research methods and processing of measurement results.</p> <p>PIP02. Know and understand the basic concepts of measurement theory, apply it in practice and in computer modeling of objects and phenomena.</p> <p>PIP03. Understand the interdisciplinary connections and contexts of the specialty.</p> <p>PIP04. Be able to perform analysis of engineering products, processes and systems according to established criteria, select and apply the most appropriate analytical, computational and experimental methods for research, interpret research results.</p> <p>PIP05. Be able to formulate and solve problems in the field of metrology related to procedures for observation, measurement, control, diagnosis and forecasting, taking into account the importance of social constraints (society, health and safety, environment, economy, industry, etc.).</p> <p>PIP06. Be able to develop regulatory and technical documents and standards of metrological focus on engineering products, processes and systems.</p> <p>PIP07. Be able to design and develop engineering products, processes and systems of metrological orientation, choose and apply methods of computerized experimental research.</p> <p>PIP08. know modern methods and techniques of design and research, as well as analysis of the results.</p> <p>PIP09. Have the skills to organize and conduct technical tests of engineering products.</p> <p>PIP10. Analyze and evaluate the impact of information and measurement technology and metrological activities on the environment and safety of human life.</p>

	<p>ΠΠ11. Understand the methodological and philosophical aspects of modern science and their place in the research process.</p> <p>ΠΠ12 Freely present and discuss scientific results in the official language and English or one of the languages of the European Union in oral and written forms, as well as conduct a scientific discussion.</p> <p>ΠΠ13. Apply hardware and software of modern information technologies to solve problems in the field of metrology and information and measurement technology.</p> <p>ΠΠ14. Understand the basics of patent science and have the skills to protect intellectual property.</p>
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