

<b>Programme specification (Master of Science Degree)</b> <i>123 «Computer engineering»</i>			
Higher education program level	FQ-EHEA – the second cycle, EQF LLL – level 7, HPK – level 7 / Master of Science		
Full name of qualification	Master of Science in Information technologies		
Programme official name	Specialty educational program 2131.2 «Computer systems analyst» field of knowledge 12 «Information technologies»		
Diploma type and number of credits according to the program	Master's of Science Diploma (Single Honours) , 90 credits ЄKTC		
Higher educational establishment	Ternopil I.Pulu'y national technical university		
Licence	AE №636492 of 19.06.2015		
Accreditation institution	Accreditation commission of Ukraine (National agency of higher education quality assurance)		
Accreditation period	Certificate of accreditation НД-IV №2023702. Valid to 01.07.2022		
<b>A</b>	<b>Programme purpose</b>		
	Forming and development of general and professional competences in the field of informatics and computer engineering aimed at student's acquiring knowledge and comprehension to solve problems of complex systems analysis and synthesis based on the latest information technologies using modern achievements of fundamental and engineering sciences.		
<b>B</b>	<b>Programme characteristics</b>		
1	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; vertical-align: top;"><i>Subject-matter discipline</i></td> <td> <p><i>Study and (or) activity objects:</i> mathematical and algorithms support, software and hardware which underlie computer systems and networks operation. <i>Study goals:</i> creation of new computer systems, networks and their components and improvement of existing ones based on modern theoretical and practical approaches.</p> <p><i>Theoretical content of:</i> new mathematical models and methods, algorithms, technologies, architectures and conceptions which form the basis of modern computer systems, networks and their components operation; modern methods and technologies of computer systems, networks and their components design and creation.</p> </td> </tr> </table>	<i>Subject-matter discipline</i>	<p><i>Study and (or) activity objects:</i> mathematical and algorithms support, software and hardware which underlie computer systems and networks operation. <i>Study goals:</i> creation of new computer systems, networks and their components and improvement of existing ones based on modern theoretical and practical approaches.</p> <p><i>Theoretical content of:</i> new mathematical models and methods, algorithms, technologies, architectures and conceptions which form the basis of modern computer systems, networks and their components operation; modern methods and technologies of computer systems, networks and their components design and creation.</p>
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2	<i>Programme focus and specializations</i>	<p>General program: «Computer engineering». Focus is made on the development and maintenance of specialized computer systems and networks, their mathematical and algorithms support and software.</p> <p>Main attention is paid to the highly qualified experts training who are able to implement all stages of development and maintenance of specialized computer systems and networks and their software: determination and analysis of customer's requirements, project and general architecture of the system development according to the standards in the field of computer engineering, development of computer systems and networks components, software and hardware, introduction and maintenance.</p> <p>None of specializations is available.</p>
3	<i>Programme orientation</i>	<p>Orientation to the scientific research with considerable constituent of communicative and interpersonal skills in native and foreign languages. The programme is based on the modern scientific achievements of information and computer sciences, taking into consideration peculiarities of work in the field of information technologies, computer technologies, systems and networks and their software, hardware, organizational support, ways and methods of design, testing, production and maintenance in different branches and also at enterprises of various activities under information society conditions.</p> <p>It provides the professional training of computer systems analysts taking into account the requirements to their quality, reliability, manufacturing characteristics</p>
4	<i>Programme features</i>	Regular renewal that allows to take into consideration the tendencies of information technologies progressing development. It is a mobile programme according to the Joint Honours Degree programme,
C	<b>Employment and further study</b>	
1	<i>Employment</i>	<p>Graduates can be employed in design and scientific –research organizations, computer companies, internet providers, educational establishments. Their places of employment may include both the organizations engaged in hardware and software development and maintenance and those which generally use computer technologies. Main jobs include: System Administrator, Network administrator, Database Administrator, Engineer-programmer, system Analyst, system Programmer, the field of computer systems, computer systems and networks</p>

		Architect, computer systems and networks Analyst, system integrator, backend-designer, DevOps
2	After graduation study	Curriculum for training Bachelors in Computer Engineering is based on the international standards and contains consistent list of recommended basic subjects. This ensures obtaining a wide range of knowledge and skills in the field of modern computing facilities and information technologies and gives graduates possibility to increase their qualification level at the enterprises recommended by producers. Those Masters of Science who choose scientific direction may continue their study in post graduate courses to receive P.D.
<b>D</b>	<b>Teaching techniques and methods</b>	
1	<i>Approaches to teaching and study</i>	Teaching process involves both traditional techniques and new technologies. Traditional methods: lectures, tutorials, practical and laboratory classes; new technologies: student-focused study, self-study, distance study using other modern teaching techniques etc.
2	<i>Rating methods</i>	Tests, presentations, reports of laboratory works and internship programs, course (projects) papers, control papers, oral and written exams, diploma thesis
<b>E</b>	<b>Programme competence</b>	
1		3K1. Ability of abstract thinking, analysis and synthesis
		3K2. Ability to speak foreign language
		3K3. Ability of information and communication technologies use
		3K4. Ability to conduct research at proper level
		3K5. Ability of information from different sources search, processing and analysis
		3K6. Ability of new ideas and problems solving versions generation, of combining and experimenting, of original, constructive, efficient and simple decisions making
		3K7. Ability to make reasonable decisions
		3K8. Ability to work in international context
		3K9. Ability to develop and manage projects
		3K10. Ability to perform safety activity

		3K11.	Ability to act on the ethics position (reasons)
2	<i>Special (professional)</i>	CK1.	Ability to apply practical methods, methodological aspects and computer design logic at computer systems and networks design, construction and circuit engineering taking into consideration requirements of life security, fire prevention and labor protection and following them in professional activity
		CK2.	Ability to build efficient algorithms of formal forecast, models and methods of informative forecasting in science and engineering using principles of hardware structure and functioning, mathematical models, branch development history and logic concerning certain values, phenomena, models, methods, functions and structures of hardware, formal and informative forecasting methods of functions, structures, characteristics and parameters of computer systems and networks
		CK3.	Ability to conduct development and research of theoretical and experimental models of professional activity objects
		CK4.	Ability to perform author's maintenance of information systems and technologies design and introduction
		CK5.	Ability to analyze, optimize and simulate computer systems and networks architecture complexity using modern principles of software, mathematical, linguistic, engineering and information support development
		CK6.	Ability of experimental and theoretical research planning, of choosing algorithms of digital signals processing, and obtained results interpretation
		CK7.	Ability to develop design strategies, design aims, efficiency criteria, usage limitations determining, be skillful in developing new methods and aids of computer systems and networks design
		CK8.	Knowledge of main principles of computer systems and networks construction, construction and functioning principles of their peripheral aids
		CK9.	Ability to apply theoretical and practical skills to solve set of questions from axiomatic conditions of possibility of computer systems and networks construction to their parameters estimation
		CK10.	Knowledge and comprehension of information security mathematical models and estimation methods of computer network systems security

		CK11.	Ability to conduct scientific research and complex computer systems and networks optimization based on mathematical and computer modelling methods
		CK12.	Ability of processes and objects simulation using standard program technologies
		CK13.	Ability to find original innovative decision aimed at certain problem of computer engineering solving
<b>F</b>	<b>Programme learning outcomes</b>		
	<p>Skill to apply knowledge and comprehension to solve problems of analysis and synthesis in the systems specific for chosen field.</p> <p>Be skillful in fluent use native and foreign languages.</p> <p>Skill to use modern computer aids of system, functional, engineering and technological design.</p> <p>Skill to conduct experimental research and apply research experience in professional activity.</p> <p>Be skillful in collecting, analyzing of scientific-technical information of national and foreign experience on research subject-matter.</p> <p>Skill of obtained professional knowledge use to find new, non-standard decisions and aids for their implementation at experimental research conducting to solve set problems.</p> <p>Skill to make reasonable decisions and estimate their results.</p> <p>Skill of public, business and scientific communication</p> <p>Skill to process the obtained results, analyze and comprehend them, present the results of work and substantiate the suggested decisions at modern scientific-engineering and professional level.</p> <p>Skill to use and know facilities of standards, requirements and rules of life security and labor protection in professional activity to provide safety of work.</p> <p>Skill to follow the code of professional ethics, moral norms and valuables in behavior, keep to etiquette rules.</p> <p>Be skillful in scientific research in computer engineering results applying in complex hardware and software development as high quality engineering product by means of improved technological rules, procedures and techniques.</p> <p>Be well-trained to use existing and develop new mathematical methods to solve problems on computer systems and networks design and use</p> <p>Ability of processes study, taking place in computer systems, networks and their components based on mathematical models and computation methods.</p> <p>Be skillful in work with normative and legal documents, patents at material writing and submitting of application for an industrial property object (invention, useful model, industrial pattern, goods and services trademark), and also license to use the invention.</p> <p>Ability to analyze, estimate and develop new design methods and algorithms of software and hardware components of computer systems and networks.</p>		

Skill to analyze the results of made experiments, choose optimal decisions, prepare and write reviews, reports and scientific articles

Skill in functional and circuit engineering construction, efficiency estimation of computer systems and networks, and also their components (structure, parameters and characteristics of certain devices, circuit engineering features of their construction) under priori certain and uncertain conditions.

Skill to use computer aids at design and creation of computer systems and networks software and hardware.

Skill to analyze and design highly efficient computer systems with different structural organization using principles of parallel and distributed information processing

Skill to choose mathematical models of information security reasonably and estimate computer network systems security on the basis of different metrics.

Skill to carry out development and research of techniques of analysis, synthesis, optimization and forecasting of information systems and technologies functioning quality.

Skill of using modern programming languages aids to create software product, know how to apply them in the programming of professional problems algorithms

Skill to plan and organize work and manage projects at high technology decisions making in the field of computer engineering taking into account life cycles of software and hardware creation, taking into consideration design methods and proper tools use.