

**The Ministry of Education and Science of Ukraine
Ternopil Ivan Puluj National Technical University**

Higher education level

Second (master)

Field of Knowledge

12 Information Technologies

Specialty

124 System Analysis

Qualification

Master on System Analysis

**EDUCATIONAL PROFESSIONAL PROGRAM
INFORMATION SYSTEMS AND TECHNOLOGIES**

second level of higher education

for the specialty 124 «System Analysis»

of the knowledge field 12 «Information Technologies»

Qualification: Master on System Analysis

APPROVED

by the Academic Council

 /P. Yasniy/

(protocol № 5 of 23 March 2021 y.)

Rector  /P. Yasniy/

(order № 4/7-217 of 26 March 2021 y.)



Ternopil, 2021

APPROVEMENT PAGE

for educational professional program

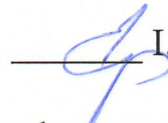
Higher education level	Second (master)
Field of knowledge	12 Information Technologies
Specialty	124 System Analysis
Qualification	Master on System Analysis

COMPOSED AND APPROVED

Discussed and approved by the Academic Council of Computer Information Systems
and Software Engineering

Protocol № 8 of 19 March 2021 p.


Dean


I. Baran

Discussed and approved by the Computer Science department meeting

Protocol № 8 of 25 March 2021 p.

Department head


I. Bodnarchuk

PREFACE

Composed on the base of the higher education standard by work group (for specialty 124 «System Analysis»):

1. Oleksandr MATSIUK – the head of work group, the guarantor, Ph.D. (engineering), Associate prof at Computer Science dept.;
2. Vasyl MARTSENIUK – doctor of science (engineering), professor of Cyber Security dept.;
3. Iryna STRUTYNSKA – doctor of science (economics), professor of Computer Science dept.;
4. Serhii DMYTRYSHYN – director of “Crowding” LLC;
5. Yurii BEREZA – a student of the group CAM-51.

Reviews of external stakeholders:

1. Oleh CHEREVATYI – director of “Yaware” LLC, Ternopil;
2. Andrii PYRIH – director and founder of the company «Wise Solutions», Ternopil.

1. Program specification (Master) of 124 «System Analysis»

1 – General information	
Higher educational institution and department	Ternopil Ivan Puluj National Technical University, Computer Science dept.
Official name of educational program	Educational professional program of second level of higher education on the specialty 124 System Analysis of the knowledge filed 12 Information Technologies
Diploma type and number of credits according to the program	Master's Diploma (Single Honours), 90 credits ЄKTC, term of study 1.5 years
Valid accreditation	Ministry of Education and Science of Ukraine, accreditation certificate НД-IV №2081560 to 02 Mar. 2017 y. valid to 01 Jul. 2022 y.
Cycle/level	HPK of Ukraine – 7 th level, FQ-EHEA – second cycle, QF-LLL – 7 th level
Prerequisites	Bachelor degree is required
Language of study	Ukrainian
Educational program valid to	To 01 Jul. 2022 y.
URL of educational program	http://tntu.edu.ua/storage/pages/00000120/op124m_2021_n.pdf
Main concepts and their definitions	The program contains main concepts and their definitions according to the Law of Ukraine “On the Higher Education”
2 – Program purpose	
Training of professionals capable of designing complex information systems, developing new and applying existing methods of systems analysis to solve complex problems in various fields.	
3 – Program characteristics	
Domain (field of knowledge, specialty)	Field of knowledge: 12 – Information technologies Specialty: 124 – System Analysis
Program orientation	Program is focused on the acquisition by students of professional knowledge, skills, abilities and other competencies for the successful implementation of professional activities.
Program focus and specialization	Special education in the specialty "Systems Analysis". Keywords: decision support technologies, information resources of databases and knowledge, intelligent information analysis systems, Internet technologies of information resources processing.
Program features	The program develops promising areas of computer modeling of processes for the development of modern software packages and decision support systems. Structural and object-oriented approaches to software design are being developed.
4 – Employment and further study	
Employment	Positions according to the classifier of professions of Ukraine. According to the Classifier of Professions ДК 003: 2010 Master's degree in specialty 124 "Systems Analysis" is prepared for the following positions: 1238 Projects and programs leads

	<p>2121.2 Mathematician-analyst in operation research; 2131.1 Researcher-consultant (computer systems); 2131.2 Analyst of computer systems; 2131.2 Data administrator; 2131.2 Analyst of computer databank; 2149.2 System analyst (except computers); 2433.1 Researcher-consultant (information analytics); 2433.2 Analyst of consolidated information. 2447 Professional in project and program management</p>
Aftergraduation study	Continuation of studies at the third (educational-scientific) level of higher education to obtain the Ph.D. level.
5 – Teaching techniques and methods	
Approaches to teaching and study	Lectures, practical classes, research laboratory work, implementation of term papers and projects, independent work, consultations with teachers, preparation of master's thesis
Rating methods	Written and oral exams, exams using the distance learning system, laboratory reports, abstracts, presentations, defense of master's thesis.
6 – Program competence	
Integral	Ability to solve research and / or innovation problems in the field of systems analysis
General (Common)	<p>3K1. Ability to abstract thinking, analysis and synthesis. 3K2. Ability to communicate in a foreign language. 3K3. Ability to search, process and analyze information from various sources. 3K4. Ability to communicate with representatives of other professional groups of different levels (with experts from other fields of knowledge / types of economic activity). 3K5. Ability to develop and manage projects.</p>
Professional competencies of the specialty	<p>CK1. Ability to integrate knowledge and conduct systems research, apply methods of mathematical and information modeling of complex systems and processes of different nature. CK2. Ability to design information systems architecture. CK3. Ability to develop decision support systems and referral systems. CK4. Ability to assess risks, develop risk management algorithms in complex systems of various natures. CK5. Ability to model, predict and design complex systems and processes based on methods and tools of systems analysis. CK6. Ability to apply Data Science theory and methods to perform data mining to identify new properties and generate new knowledge about complex systems. CK7. Ability to manage information technology workflows that are complex, unpredictable and require new strategic approaches.</p>

	<p>CK8. Ability to develop and implement scientific and applied projects in the field of information technology and related interdisciplinary projects.</p> <p>CK9. Ability to protect intellectual property rights, commercialize research and innovation.</p> <p>CK10. Ability to self-education and professional development.</p>
7 – Program learning outcomes	
Knowledges, skills, communication	<p>PH1. Specialized conceptual knowledge, which includes modern scientific achievements in the field of systems analysis and information technology and is the basis for original thinking and research.</p> <p>PH2. Build and research models of complex systems and processes using methods of systems analysis, mathematical, computer and information modeling.</p> <p>PH3. Apply methods to reveal uncertainties in the problems of systems analysis, to reveal situational uncertainties and uncertainties in the problems of interaction, counteraction and conflict of strategies, to find a compromise in revealing conceptual uncertainty.</p> <p>PH4. Develop and apply methods, algorithms and tools for forecasting the development of complex systems and processes of different nature.</p> <p>PH5. Use risk assessment measures and apply them in the analysis of multifactorial risks in complex systems.</p> <p>PH6. Apply machine learning and data mining techniques, mathematical apparatus of fuzzy logic, game theory, and distributed artificial intelligence to solve complex systems analysis problems.</p> <p>PH7. To develop intelligent systems in the conditions of poorly structured data of different nature.</p> <p>PH8. Identify and evaluate the parameters of mathematical models of control objects.</p> <p>PH9. Develop and apply models, methods and algorithms for decision-making in conflict, fuzzy information, uncertainty and risk.</p> <p>PH10. Clearly and unambiguously convey one's own knowledge, conclusions and arguments to specialists and non-specialists, in particular to students</p> <p>PH11. Freely present and discuss orally and in writing the results of research and innovation, other issues of professional activity in the state and English languages.</p>
8 – Resources for program implementation	
Main characteristics of staff	90% of research and teaching staff involved in teaching professionally-oriented disciplines in the specialty 124 "Systems Analysis" have degrees and academic titles, with experience of practical work in the specialty 100%.
Main characteristics of logistics	Use of modern computer tools and software.
Main characteristics of educational and	Use of distance learning environment of Ternopil Ivan Puluj National Technical University and author's developments of

methodological and informational support	scientific and pedagogical workers; textbooks and manuals with the stamp of the Academic Council of Ternopil Ivan Puluj National Technical University.
9 – Academic mobility	
National credit mobility	Based on bilateral agreements between Ternopil National Technical University named after Ivan Pulyuy and technical universities of Ukraine.
International credit mobility	On the basis of bilateral agreements between Ternopil National Technical University named after Ivan Pulyuy and higher educational institutions of foreign partner countries.
Study of foreign students	Conditions have been created for training of foreign students.

2. Program components list and their logical sequence

2.1. Program components list

Code	Program components	Credits	Form of final control
Compulsory components			
Cycle of general training			
OK1	Professional Ethics and Fundamentals of Pedagogy	4	test
OK2	Intellectual Property	4	test
OK3	Occupational Health and Safety in the Branch	4	exam
Cycle of professional training			
OK4	Internet Technologies Processing of Consolidated Information Resources	4	exam
OK5	Consolidated Information Resources of Database and Knowledge Management	4	test
OK6	Data Warehousing	4	exam
OK7	Technologies of Information Management	4	exam
OK8	Decision Support Technologies	4	test
OK9	Project Management of Systems with Consolidated Information	4	test
OK10	Digital Transformation	4	test
Practical training			
OK11	Specialty Practice	9	diff. test
OK12	Qualifying Paper-related Internship	7,5	diff. test
OK13	Master's Graduation Thesis Defense	1,5	
OK14	Master's Graduation Thesis Writing	7,5	
Total amount of compulsory components:		65,5	
Optional components			
Cycle of general training			
BB1	Business Planning	4	exam
Cycle of professional training			
BB2	Intelligent Systems of Consolidated Information Analysis	4	exam
BB3	Methods, Systems of Data Signal and System Simulation Modeling	4	test
BB4	Fundamentals of Discrete Dynamic Systems	4	test
BB5	Queuing Systems	4	exam
BB6	IT Development Management Based on Enterprise Business Architecture	4,5	exam

Total amount of optional components:	24,5	
TOTAL AMOUNT OF PROGRAM	90	

3. Form of certification of applicants for higher education

Attestation of graduates of the educational program of specialty 124 "Systems Analysis" is carried out in the form of protection of master's qualification work and ends with the issuance of a standard document on awarding him a master's degree with the qualification: Master of Systems Analysis.

Qualification work should involve solving a complex problem of research and/or innovation in the field of systems analysis.

Qualification work should not contain academic plagiarism, fabrication, falsification.

Qualification work must be published on the official website of the higher education institution or its subdivision, or in the repository of the higher education institution.

Publication of qualification works containing information with limited access shall be carried out in accordance with the requirements of the legislation.

