

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
National Technical University of Ukraine
“Igor Sikorsky Kyiv Polytechnic Institute”

APPROVED by the
Academic Council of the Igor Sikorsky
Kyiv Polytechnic Institute
(minutes № 10 from December 13, 2021)
Chairman of the Academic Council
Mykhailo ILCHENKO

EDUCATIONAL PROFESSIONAL PROGRAM

“Economic cybernetics”

Second (Master's) level
of higher education

BRANCH OF KNOWLEDGE	05 Social and behavioral sciences
SPECIALTY	051 Economy
SPECIALIZATION	Economic cybernetics
QUALIFICATION	Master of Economics

Considered and approved
by the Rector's Order
of the Igor Sikorsky Kyiv Polytechnic
Institute
from February 15, 2022 № HOH/75/2022

PREFACE

DEVELOPED by the project team:

Project team leader

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Project team members:

Yereshko Yuliya Oleksandrivna, Doctor of Economics, Associate Professor, Associate Professor of Economic Cybernetics;

Ristov Igor Konstantinovich, Doctor of Physical and Mathematical Sciences, Associate Professor, Associate Professor of the Department of Economic Cybernetics;

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Pishnograev Ivan Alexandrovich, Candidate of Physical and Mathematical Sciences, Associate Professor, Associate Professor of Economic Cybernetics

The following people took part in the development of the program:

Podols of Roman Zdislavovich, Ph.D. Head of the Sector for Forecasting the Development of the Fuel and Energy Complex of the Department of Sectoral Forecasts and Market Conditions of the Institute of Economics and Forecasting of the National Academy of Sciences of Ukraine;

Cherepynets Veronika Mykhailivna, candidate of the second (master's) level of higher education.

The Department of Economic Cybernetics is responsible for the training of higher education students in the educational program.

AGREED:

Scientific and methodical commission of Igor Sikorsky Kyiv Polytechnic Institute in specialty 051 Economics

Scientific and methodical commission of Igor Sikorsky Kyiv Polytechnic Institute in specialty 051 Economics

Chairman of the NMCU 051 Sergey VOYTKO

(Minutes № 4 of December 2, 2021)

Methodical Council of Igor Sikorsky Kyiv Polytechnic Institute

Chairman of the Methodical Council Yuriy YAKYMENKO

(Minutes № 2 of December 9, 2021)

TAKEN INTO ACCOUNT:

1. Approved standard of higher education in specialty 051 Economics (order by the Ministry of Education and Science №382 from 04.03.2020).
2. Regulations on the development, approval, monitoring and review of educational programs at Igor Sikorsky Kyiv Polytechnic Institute (put into effect by order of 07.04.2020 №7 / 70).
3. Comments and suggestions of stakeholders based on the results of the discussion:
 - *scientific and pedagogical workers;*
 - *applicants for higher education;*
 - *representatives of student government;*
 - *representatives of employers;*

Brydun Yevhen Volodymyrovych, Candidate of Economic Sciences, Chairman of the Board of PJSC Insurance Company "Prestige".

Drozd Andriy Oleksandrovych, Candidate of Economic Sciences, Head of Marketing Analytics, Whaleapp.

Reviews and feedback from stakeholders are attached.

The educational and professional program "Economic Cybernetics" was discussed and changed after receiving all the wishes and suggestions from employers and graduates of Igor Sikorsky Kyiv Polytechnic Institute and approved at the meeting of the Department of Economic Cybernetics № 4 from 24.11.2021.

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1. PROFILE OF THE EDUCATIONAL PROGRAM

in specialty 051 Economics

1 – general information	
Full name of the University and faculty	National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute” Faculty of Management and Marketing
Degree of higher education and title of qualification in the original language	Degree – master Educational qualification – master of economics
The official name of the educational program	Economic cybernetics
Type of diploma and scope of Study Program	Master’s degree, single, 90 credits. Term of study 1 years 4 months
Availability of accreditation	Certificate of accreditation of the specialty ND 1192609, valid until 01.07.2025
Program cycle / level	NQF of Ukraine – level 7 QF-EHEA – the second cycle EQF-LLL – level 7
Prerequisites	Having a bachelor's degree
Language of instruction	Ukrainian
Validity	Until 01.07.2025 p.
Internet address of the permanent location of the educational program	https://osvita.kpi.ua/051 http://ecocyber.fmm.kpi.ua/
2 – The purpose of the educational program	
<p>The aim of the program is to prepare, in the conditions of comprehensive professional, intellectual, social, creative development of personality, highly qualified professionals in economics who have modern economic thinking, fundamental knowledge and applied skills in economic cybernetics, able to conduct analytical, information technology, forecasting and scientific -research activities, develop economic and mathematical models, identify and analyze patterns, justify and predict strategies, the consequences of decision-making, solve economic, managerial, research problems, to solve complex scientific and practical problems of management of socio-economic systems and processes under uncertain conditions and requirements on the basis of mathematical methods and models, tools of data analytics, intelligent systems and modern information technologies, providing sustainable, innovative and digital development strategy of Igor Sikorsky Kyiv Polytechnic Institute for 2020-2025.</p>	

3 – Characteristics of the educational program	
Subject area	<p>Object of study and / or activity: modern economic processes and phenomena, scientific methods of normative, quantitative and institutional analysis, tools for the formation of international, national, regional, sectoral economic policy and business economics.</p> <p>Objectives of training: training of highly qualified economics professionals with modern economic thinking, theoretical knowledge and applied skills, able to solve complex research, innovation and management problems and problems of functioning of economic systems of different levels, characterized by uncertain conditions and requirements.</p> <p>Theoretical content of the subject area: general laws and trends of economic development, motivation and behavior of market participants; theories of micro-, macro- and international economics; modern quantitative methods of analysis of economic processes; institutional and interdisciplinary analysis; patterns of modern socio-economic processes; theories of economic management for different production systems and sectors of the economy.</p> <p>Methods, techniques and technologies: general scientific and specific methods of cognition and research; mathematical, statistical, qualitative methods of economic analysis; sociological, expert evaluation, questionnaires; economic and mathematical modeling of forecasting; information and communication technologies, special software; research methods and presentation of research results.</p> <p>Tools and equipment: modern information and communication equipment, information systems and software products used in economic activities.</p>
Orientation of the educational program	<p>Educational and professional.</p> <p>Focuses on mastering the knowledge and skills of data analytics, economic and mathematical modeling, forecasting, the use of information technology and software platforms for decision-making and solving problems of activity and development of socio-economic systems.</p>
The main focus of the educational program	<p>Special education in the field of 05 "Social and Behavioral Sciences", specialty 051 "Economics".</p> <p>The program aims to gain systematic, interdisciplinary, integrated knowledge of economics, business intelligence, information systems, mathematical and computer modeling. It is based on classical and modern scientific principles of economic cybernetics, modeling of economic systems, phenomena and processes, statistical and data mining, digital project management, implementation and application of information technology in decision making, application, management and development of market economies.</p> <p>Keywords: economic and mathematical modeling, data analysis, decision making, risk conditions, digital technologies, information systems, socio-economic systems and processes.</p>

Features of the program	<p>The program provides mastery of general and professional competencies of specialty 051 "Economics", relevant interdisciplinary, professional knowledge and skills in applied economics, sustainable development, economic and mathematical modeling, business and big data analytics, effective decision making, startup, digital project management, modeling of risks and strategies of socio-economic systems, information technologies that form professional and social skills of a professional in the field of economic cybernetics.</p> <p>The uniqueness of the program is the synergy of knowledge in the formation of a set of meta-competencies: economist-analyst, economist-mathematician and programmer, provided by the convergence of economic, analytical and digital thinking in training professionals in modeling, analytics and management of socio-economic systems and processes. synchronously with the development of the fourth industrial revolution.</p> <p>Applicants are free to choose an individual educational trajectory, a wide range of disciplines is provided within the selective educational components of the component program, which enhances training and comprehensive development.</p> <p>The program provides an opportunity to involve scientists, professionals, employers' representatives in classroom and optional classes.</p> <p>The internship is carried out at enterprises, institutions, as well as in the World Data Center for Geoinformatics and Sustainable Development. Applicants engage in research activities by participating in student research groups, scientific and practical conferences.</p> <p>There is an opportunity for internships in organizations for analytical research in economics, academic internships in foreign universities for credit mobility programs.</p>
4 – Suitability of graduates for employment and further study	
Suitability for employment	<p>Graduates can work at enterprises of any organizational and legal form in positions (according to the classifier of professions of Ukraine SC 003: 2010):</p> <p>1229.7 Head of other major divisions in other areas of activity;</p> <p>1238 Head of projects and programs in the field of tangible (intangible) production;</p> <p>1312 Managers of small enterprises without an administrative apparatus in industry;</p> <p>2122.2 Economist-statistician;</p> <p>2419.2 Professionals in the field of marketing, business efficiency, production rationalization, intellectual property: a professional in economic cybernetics;</p> <p>2433.2 Information professionals and information analysts: consolidated information analyst;</p> <p>2441.2 Economists: Investment Analyst, Economist, Planning Economist, Econometrician, Economic Adviser, Economic Reviewer, Computing Center (Computing) Economist.</p> <p>2441.1 Researchers (economics)</p> <p>2433.1 Researcher (information analytics)</p>
Further training	Continuing education at the third (educational and scientific) level of higher education and gaining additional qualifications in the adult education system.

5 – Teaching and assessment	
Teaching and learning	<p>Application of student-centered, problem-oriented learning, self-study, learning through computer workshops. Provides the following forms of education:</p> <ul style="list-style-type: none"> – classroom classes (lectures, practical classes, computer workshops, consultations), including the use of information and communication technologies (e-learning, online lectures, distance courses on the Distance Learning Platform "Sikorsky" (G Suite, Moodle) , OCW); – conducting classroom classes with the involvement of professionals-practitioners; – independent work of students using methodological and scientific information sources; – internships at enterprises, organizations and institutions; – participation in scientific and practical international conferences, practice-oriented webinars and trainings; – implementation and defense of a master's thesis. <p>Teaching methods and technologies provide the ability to integrate knowledge and solve complex problems in multidisciplinary contexts, problems in new or unfamiliar environments with incomplete or limited information.</p> <p>All participants in the educational process are provided with timely and understandable information on the goals, content and program learning outcomes, the procedure and evaluation criteria within the individual educational components. A detailed description of teaching and learning methods is contained in the syllabuses of educational components, which are posted on the official website of the department, in the relevant module of the "Electronic Campus".</p>
Evaluation	<p>The procedure for conducting control activities is regulated by: “Regulations on current, calendar and semester control of learning outcomes at Igor Sikorsky Kyiv Polytechnic Institute”, “Regulations on the system of evaluation of learning outcomes at Igor Sikorsky Kyiv Polytechnic Institute”. Control measures of current and semester control (exams, tests, individual tasks), protection of the report on practice, protection of qualification work of the bachelor are estimated according to the defined criteria of a rating system of estimation (RSE).</p> <p>Information about RSE, current, calendar and semester control is placed in syllabuses and communicated to students in the first lesson.</p>
6 – Program competencies	
Integral competence	Ability to identify and solve complex economic problems and problems, to make appropriate analytical and managerial decisions in the field of economics or in the learning process, which involves research and / or innovation under uncertain conditions and requirements.
General competences (GC)	
GC 1	Ability to generate new ideas (creativity).
GC 2	Ability to abstract thinking, analysis and synthesis.
GC 3	Ability to motivate people and move towards a common goal.
GC 4	Ability to communicate with representatives of other professional groups of different levels (experts from other fields of knowledge / types of economic activity).
GC 5	Ability to work in a team.
GC 6	Ability to develop and manage projects.

GC 7	Ability to act on the basis of ethical considerations (motives).
GC 8	Ability to conduct research at the appropriate level.
Professional competencies (PC)	
PC 1	Ability to use scientific, analytical, methodological tools to justify the development strategy of economic entities and related management decisions.
PC 2	Ability to communicate professionally in the field of economics in a foreign language.
PC 3	Ability to collect, analyze and process statistical data, scientific and analytical materials needed to solve complex economic problems, work on their conclusions.
PC 4	Ability to use modern information technologies, methods and techniques of research of economic and social processes, adequate to the established needs of research.
PC 5	Ability to identify key trends in socio-economic and human development.
PC 6	Ability to formulate and solve professional problems in the field of economics, choosing the appropriate directions and appropriate methods for their solution, taking into account available resources.
PC 7	Ability to justify management decisions for the effective development of economic entities.
PC 8	Ability to assess possible risks, socio-economic consequences of management decisions.
PC 9	Ability to apply a scientific approach to the formation and implementation of effective projects in the socio-economic sphere.
PC 10	Ability to develop scenarios and strategies for the development of socio-economic systems.
PC 11	Ability to plan and develop projects in the field of economics, to implement its information, methodological, material, financial and personnel support.
PC 12	Ability to conduct economic analysis using intelligent and information methods, business analysis technologies, data analysis and Big Data.
PC 13	Ability to develop economic and mathematical models, model the behavior and development of socio-economic systems, economic processes and phenomena based on mathematical and computer modeling.
PC 14	Ability to implement and apply software and computer platforms in the economic activities of economic entities.
7 – Program learning outcomes (PLO)	
PLO 1	Formulate, analyze and synthesize solutions to scientific and practical problems.
PLO 2	Develop, justify and make effective decisions on the development of socio-economic systems and management of economic entities.
PLO 3	Free to communicate on professional and scientific issues in state and foreign languages orally and in writing.
PLO 4	Develop socio-economic projects and a system of integrated actions for their implementation, taking into account their goals, expected socio-economic consequences, risks, legislative, resource and other constraints.
PLO 5	Adhere to the principles of academic integrity.
PLO 6	Evaluate the results of their own work, demonstrate leadership skills and ability to manage staff and work in a team.

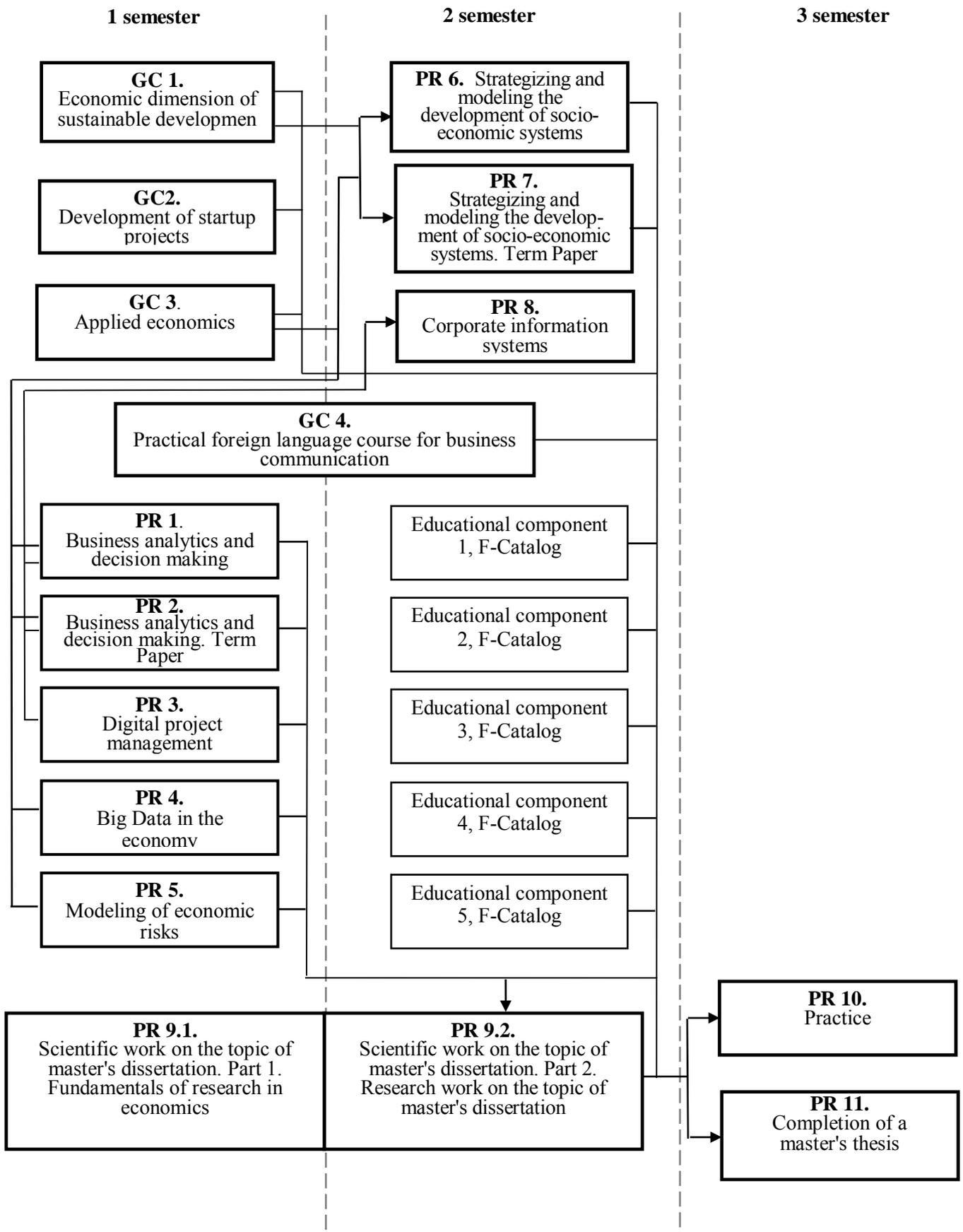
PLO 7	To choose effective methods of economic activity management, to substantiate the offered decisions on the basis of relevant data and scientific and applied researches.
PLO 8	Collect, process and analyze statistical data, scientific and analytical materials needed to solve complex economic problems.
PLO 9	Make effective decisions under uncertain conditions and requirements that require the application of new approaches, methods and tools of socio-economic research.
PLO 10	Apply modern information technologies and specialized software in socio-economic research and management of socio-economic systems.
PLO 11	Identify and critically evaluate the state and trends of socio-economic development, form and analyze models of economic systems and processes.
PLO 12	Justify management decisions for the effective development of economic entities, taking into account the goals, resources, constraints and risks.
PLO 13	Assess possible risks, socio-economic consequences of management decisions.
PLO 14	Develop scenarios and strategies for the development of socio-economic systems.
PLO 15	Organize the development and implementation of socio-economic projects taking into account information, methodological, material, financial and personnel support.
PLO 16	Analyze unstructured economic information, identify relationships and patterns, using mathematical models, business analytics, big data analytics, interpret the results to make effective management decisions.
PLO 17	Develop optimization, simulation and forecasting models, model the behavior and development of socio-economic systems in conditions of uncertainty, using mathematical and computer apparatus.
PLO 18	Apply computer technology, software and programming in model experiments, solving economic problems, analytics and management of socio-economic systems.
8 – Resource support for program implementation	
Staffing	The main staff of teachers consists of the Department of Economic Cybernetics, which meet the staffing requirements set by the License Terms approved by the Cabinet of Ministers of Ukraine from 30.12.2015 № 1187 as amended in accordance with the Resolution of the Cabinet of Ministers of Ukraine №365 from 24.03.2021.
Logistics	In accordance with the technological requirements for material and technical support of educational activities of the relevant level of HE, approved by the Resolution of the Cabinet of Ministers of Ukraine of 30.12.2015 № 1187 as amended in accordance with the Resolution of the Cabinet of Ministers of Ukraine №365 of 24.03.2021 y. Use of material and technical base of Igor Sikorsky Kyiv Polytechnic Institute, in particular, educational buildings, library, center of physical education and sports, medical center, recreation centers, center of culture and arts, dormitories. There is a student social service. The learning process takes place, including in classrooms with multimedia equipment, computer workstations (computer equipment with a service life of not more than eight years) and related software..

Information and educational and methodological support	<p>In accordance with the technological requirements for material and technical support of educational activities of the relevant level of HE, approved by the Resolution of the Cabinet of Ministers of Ukraine of 30.12.2015 № 1187 as amended in accordance with the Resolution of the Cabinet of Ministers of Ukraine №365 of 24.03.2021 y.</p> <p>Information support of the program is provided by the website of the EC department, telegram channels of the department and the dean's office, Facebook page of the department.</p> <p>Educational and methodological support is located in the Scientific and Technical Library of Igor Sikorsky Kyiv Polytechnic Institute (Aleph Automated Library System (License Web-OPAC (user)), Electronic Archive of Scientific and Educational Materials "ELAKPI", Distance Learning Platform "Sikorsky", System "Electronic Campus". Applicants have access to prepaid scientometric databases, free access to the Internet.</p>
9 – Академічна мобільність	
National credit mobility	Possibility of concluding agreements on academic mobility and double diplomacy.
International credit mobility	<p>Applicants have the opportunity to take advantage of international credit mobility programs provided by the University, the proposals of which are published by the Department of Academic Mobility of Igor Sikorsky Kyiv Polytechnic Institute, in particular the Erasmus + K1 program.</p> <p>There is an opportunity to take advantage of educational offers of foreign free economic zones within the framework of cooperation agreements with the Higher School of Economics in Bydgoszcz (Poland), State University. Nicolaus Copernicus in Torun (Poland).</p> <p>It is envisaged to expand the opportunities for academic exchange when concluding agreements with other educational institutions.</p>
Training of foreign applicants for higher education	Subject to proficiency in the Ukrainian language - study in general groups, or in separate groups with teaching in English with the provision of learning Ukrainian as a foreign language.

2. LIST OF COMPONENTS OF THE EDUCATIONAL PROGRAM

Code n/a	Components of the educational program (academic disciplines, term papers, practices, qualification work)	Number of loans ECTS	Form of final control
Mandatory (regulatory) components of the educational program			
<i>1.1. General training cycle</i>			
GC 1	Economic dimension of sustainable development	2	test
GC 2	Development of startup projects	3	test
GC 3	Applied economics	3	test
GC 4	Practical foreign language course for business communication	3	test
<i>1.2. Cycle of professional training</i>			
PR 1	Business analytics and decision making	4,5	exam
PR 2	Business analytics and decision making. Term Paper	1	test
PR 3	Digital project management	4,5	exam
PR 4	Big Data in the economy	4	test
PR 5	Modeling of economic risks	4,5	exam
PR 6	Strategizing and modeling the development of socio-economic systems	4	exam
PR 7	Strategizing and modeling the development of socio-economic systems. Term Paper	1	test
PR 8	Corporate information systems	3	test
PR 9.1	Scientific work on the topic of master's dissertation. Part 1. Fundamentals of research in economics	2	test
PR 9.2	Scientific work on the topic of master's dissertation. Part 2. Research work on the topic of master's dissertation	2	test
PR 10	Practice	14	test
PR 11	Completion of a master's thesis	12	protection
2. Вибіркові компоненти ОП			
PS 1	Educational component 1 of the F-Catalog	4,5	test
PS 2	Educational component 2 of the F-Catalog	4,5	test
PS 3	Educational component 3 of the F-Catalog	4,5	test
PS 4	Educational component 4 of the F-Catalog	4,5	test
PS 5	Educational component 5 of the F-Catalog	4,5	test
Total required components:		67,5	
Total amount of sample components:		22,5	
The amount of educational components that provide the acquisition of competencies of certain SVO:		67,5	
TOTAL VOLUME OF THE EDUCATIONAL PROGRAM		90	

3. STRUCTURAL AND LOGICAL SCHEME OF THE EDUCATIONAL PROGRAM



4. FORM OF CERTIFICATION OF HIGHER EDUCATION ACCESSORIES

Forms of certification of applicants for higher education	Certification of the applicant for higher education in the educational program "Economic Cybernetics" specialty 051 "Economics" is carried out in the form of open and public defense of the thesis and ends with the issuance of a standard document on awarding him a master's degree with a master's degree: Master of Economics.
Requirements for qualification work	Qualification work should involve solving a specialized task, practical problem or problem in the economic field that requires research and / or innovation and is characterized by uncertainty of conditions and requirements. There should be no academic plagiarism, falsification or writing off in the qualification work. Qualification work is tested for plagiarism in accordance with the Regulations on the system of prevention of academic plagiarism at the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute" and after protection is placed in the repository of NTL University for free access. Publication of qualification works containing information with limited access is carried out in accordance with the requirements of current legislation.

5. MATRIX OF CONFORMITY OF PROGRAM COMPETENCES TO THE COMPONENTS OF THE EDUCATIONAL PROGRAM

	GC 1	GC 2	GC 3	GC 4	PR 1	PR 2	PR 3	PR 4	PR 5	PR 6	PR 7	PR 8	PR 9.1	PR 9.2	PR 10	PR 11
GC 1		+					+			+	+			+		+
GC 2			+		+	+		+	+	+	+	+	+	+	+	+
GC 3	+	+					+			+	+					
GC 4		+		+									+	+	+	
GC 5		+					+									
GC 6		+					+					+				+
GC 7	+		+				+		+	+	+			+		+
GC 8		+	+		+	+		+	+	+	+		+	+	+	+
PC 1			+		+	+		+	+	+	+			+	+	+
PC 2				+									+	+	+	+
PC 3			+		+	+		+					+	+	+	+
PC 4					+	+	+	+	+			+	+	+	+	+
PC 5	+		+					+		+	+		+	+	+	+
PC 6	+		+		+	+	+			+	+			+	+	+
PC 7		+	+		+	+	+	+	+	+	+			+	+	+
PC 8					+	+	+		+							+
PC 9		+					+							+	+	+
PC 10	+								+	+	+				+	+
PC 11		+					+					+			+	+
PC 12					+	+		+						+	+	+
PC 13									+	+	+			+	+	+
PC 14					+	+	+					+			+	+

6. MATRIX FOR PROVIDING SOFTWARE LEARNING RESULTS

COMPONENTS OF THE EDUCATIONAL PROGRAM

	GC 1	GC 2	GC 3	GC 4	PR 1	PR 2	PR 3	PR 4	PR 5	PR 6	PR 7	PR 8	PR 9.1	PR 9.2	PR 10	PR 11
PLO 1			+		+	+	+	+					+	+	+	+
PLO 2	+		+		+	+	+			+	+			+	+	+
PLO 3		+		+									+	+	+	+
PLO 4		+					+		+					+	+	+
PLO 5													+	+		+
PLO 6		+					+									
PLO 7			+		+	+	+	+		+	+		+	+	+	+
PLO 8	+		+		+	+		+		+	+		+	+	+	+
PLO 9			+		+	+			+	+	+			+		+
PLO 10					+	+	+	+				+	+	+	+	+
PLO 11	+				+	+	+	+		+	+			+	+	+
PLO 12	+	+	+		+	+	+	+	+	+	+			+	+	+
PLO 13									+	+	+			+		+
PLO 14	+		+							+	+			+	+	+
PLO 15		+					+					+			+	
PLO 16					+	+		+						+	+	+
PLO 17								+	+	+	+			+	+	+
PLO 18					+	+	+	+				+	+	+	+	+