

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

Approved by the
Academic Council of Igor Sikorsky Kyiv
Polytechnic Institute
(protocol № 1 dated 23.01.2023)
Chairman of the Academic Council
Mykhailo ILCHENKO

Economic Analytics

Educational and Professional Program

Second (Master's) level of higher education

specialty	051 Economics
field of knowledge	05 Social and behavioral sciences
qualification	Master of Economics

Adopted by Order of the Rector of
Igor Sikorsky Kyiv Polytechnic Institute
dated 17.05.2023 № HOH/165/2023

PREFACE

DEVELOPED by a project team:

Project team leader:

Olena Trofymenko, Doctor of Economic sciences, Professor of Economic Cybernetics.

Project team members:

Kateryna Boiarynova, Doctor of Economic Sciences, Head of the Department of Economic Cybernetics, Professor;

Volodymyr Kapustian, Doctor of Physical and Mathematical Sciences, Professor of Economic Cybernetics;

Nadiia Roshchyna, Ph.D. in Economics, Associate Professor of Economic Cybernetics;

Olha Zhukovska, Ph.D. in Physical and Mathematical Sciences, Associate Professor of Economic Cybernetics;

Iryna Lazarenko, Ph.D. in Physical and Mathematical Sciences, Associate Professor of Economic Cybernetics.

Program development participants:

Roman Podolets, Ph.D. in Economics, Head of the Department of Sectoral Forecasts and Market Conditions of the Institute of Economics and Forecasting in the National Academy of Sciences of Ukraine;

Andrii Drozd, Ph.D. in Economics, Head of Analytics in JatApp LLC Software Development Company;

Anastasiia Hordiichuk, student of the second (Master's) level of higher education in Economic Cybernetics.

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

APPROVED

Scientific and Methodical Commission of Igor Sikorsky Kyiv Polytechnic Institute
in specialty 051 Economics

Chairman of the Scientific and Methodical Commission of 051 Economics
(protocol № 5 dated 16.01.2023)

Methodological Council of Igor Sikorsky Kyiv Polytechnic Institute
Chairman of Methodological Council

Anatolii MELNYCHENKO
(protocol № 4 dated 19.01.2023)

TAKEN INTO ACCOUNT:

1. Approved standard of higher education in 051 Economics specialty (by Ministry of Education and Science of Ukraine order №382 of 04.03.2020). URL: <https://mon.gov.ua/storage/app/media/vishcha-osvita/zatverdzeni%20standarty/2020/03/051-ekonomika-M.pdf>
2. Regulation on the development, approval, monitoring, and revision of educational programs at Igor Sikorsky Kyiv Polytechnic Institute (entered into force by order of 07.04.2020 №7 / 70). URL: <https://osvita.kpi.ua/node/137>
3. Comments and suggestions of scientific and educational staff representatives, student self-government, higher education applicants, and employers' representatives shared on the Scientific and Methodical Commission (Igor Sikorsky KPI) meetings dedicated to 051 Economics specialty (№ 2 of 26 Oct 2022, № 3 of 26 Nov 2022, № 4 of 19 Dec 2022, № 5 of 16 Jan 2023).
4. Discussions about the results of reflection, offers, and suggestions from employers, academic community, and the second (Master's) level of HE students during the department meetings (minutes №2 of 14 Sep 2022, №3 of 12 Oct 2022, №4 of 18 Nov 2022, №5 of 16 Dec 2022, №8 of 11 Jan 2023).
5. Reviews, results of public discussion, and feedback from employers and stakeholders.

The educational and professional program "Economic Analytics" was discussed and amended upon receiving all the wishes and suggestions from employers and students of Igor Sikorsky Kyiv Polytechnic Institute and approved at the meeting of the Department of Economic Cybernetics № 8 of 11.01.2023.

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1. EDUCATIONAL PROGRAM PROFILE

1. General information	
Full name of HEI and the faculty	National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Faculty of Management and Marketing
Higher education level and qualification	Degree – Master Qualification – Master of Economics
Official name of the educational program	Economic Analytics
Type of diploma and scope of EP	Master’s degree diploma, single, 90 credits Length of study – 1 year and 4 months
Accreditation availability	Accreditation certificate 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	Bachelor’s degree
Language of instruction	Ukrainian
Validity period	Valid until 01.07.2025
Educational program permalink	https://osvita.kpi.ua/051 http://ecocyber.fmm.kpi.ua/
2. Purpose of the educational program	
<p>The purpose of the educational program is to establish conditions under which students will be able to grow professionally, intellectually, socially, and creatively to develop into highly qualified professionals in economics that have mastered fundamental knowledge and applied skills in economics and descriptive, predictive, and prospective analysis, analytical and economic thinking skills, and decision support technologies. Upon successful completion of the program, students will be able to:</p> <ul style="list-style-type: none"> – conduct economic, analytical, prediction, and research activities; – solve economic, managerial, and research problems and deal with scientific and practical challenges with the help of analytical methods; – evaluate, analyze, and diagnose socio-economic status, strategize, forecast, and build models for socio-economic systems development, and conduct expertise of quality and efficacy of strategic, operational, and design solutions; – gather, analyze, and manage economic data, using Big Data Analytics methods, Business Intelligence systems, Data Science tools, and specialized software; – identify trends and patterns, build socio-economic processes and phenomena models, and substantiate rational choice of business entities’ economic behavior; – make optimal economic decisions under conditions of uncertainty, ensuring economic sustainability that complies with Igor Sikorsky KPI’s strategy of 2020-2025 y. 	

3. Educational program description

Subject area	<p>Object of study: neoteric economic phenomena and processes; scientific methods of normative, quantitative, and institutional analysis; tools for developing international, national, regional, and sectoral economic policies and corporate economy.</p> <p>Training objectives: training students to become highly qualified professionals in economics that have modern economic thinking, theory knowledge, and applied skills; are able to solve complex research, innovative, and managerial problems of economic systems' multilevel functioning under uncertainty.</p> <p>Subject matter: general laws and trends of economic development, market entities' motivation and behavior; theories of micro-, macro- and international economics; modern quantitative methods of economic processes analysis; institutional and interdisciplinary analysis; patterns of modern socio-economic processes; economic management theories for different production systems and sectors of economy.</p> <p>Methodology and technologies: general scientific and specific methods of cognition and research; mathematical, statistical, and qualitative methods of economic analysis; social and expert surveys method; economic and mathematical predictive modeling; information and communication technologies, specialized software; research methods and showcase.</p> <p>Tools and equipment: modern information and communication technology equipment, intelligent information systems, and software used in economic activities.</p>
Educational program orientation	<p>Educational-professional</p>
Main focus of EP	<p>Professional education in 05 Social and Behavioral Sciences field of knowledge, 051 Economics specialty.</p> <p>The program is aimed at obtaining systematic, interdisciplinary, and integrated knowledge in economics, economic analytics, Big Data, business analytics data systems, and mathematical and computerized modeling for applied problem-solving in economy and development of its entities. It is based on the classical and neoteric scientific provisions of economic science; descriptive, predictive, and prospective economic analysis; Data Science principles and methods; business analytics, economic diagnostics, strategizing and modeling of economic phenomena and processes, and decision support technologies.</p> <p>Key words: economics, economic analytics, Big Data Analytics, diagnostics, modeling, strategizing, business analytics data systems, optimal decision-making, socio-economic processes and systems.</p>

<p>Features of the program</p>	<p>The program provides mastering of general and professional competencies in 051 Economics specialty: interdisciplinary and specialized knowledge, descriptive, predictive, and prospective economic analysis skills as well as decision support technologies. Its uniqueness lies in:</p> <ul style="list-style-type: none"> – the convergence of economic, analytical, and digital thinking provided by forming a meta-competencies set: of an economist, an economist-analyst, and a corporate, systems, and data analyst competencies; – a balanced combination of 051 Economics specialty mastering and acquisition of unique abilities in the fields of Big Data analytics, diagnostics, forecasting, economic expertise, scenario analysis, mathematical modeling, and socio-economic systems and processes strategizing; – building skills using information-analytical systems in professional activity and developing specialized analytical software, applications, platforms, and technologies; – program formation and updates carried out in collaboration with representatives of various enterprises, organizations, and institutions; – the fact that cooperation agreements allow students to master practical skills right in the learning process while performing individual tasks, working on a thesis, undergoing practical training, and acquiring knowledge of economic analytics on the basis of actual economic data; – the fact that the program provides the possibility of involving scholars, professional practitioners, and employers’ representatives in trainings and workshops; – educational staffing that has practical experience and provides research services in the real and financial economy; – cooperation with World Data Center for Geoinformatics and Sustainable Development, “YouControl” analytical system, and “M.E.Doc” that ensures information component of training; – an opportunity for applicants to choose individual educational trajectories: there is a wide range of disciplines within optional educational components of the program that enhance professional training and provide all-round intellectual and creative growth; – an opportunity to participate in internships at various enterprises and institutions as well as World Data Center for Geoinformatics and Sustainable Development; – students’ engagement in research activities via participation in student research groups and scientific and practical conferences, which improves analytical skills and nurtures creative potential; – potential availability of national academic mobility and dual education programs; – an opportunity to intern in organizations working in the field of economic analytics or use credit mobility programs for international internship experience.
<p>4. Suitability of graduates for employment and further study</p>	
<p>Employability</p>	<p>Graduates can work at enterprises of any legal organizational form in the following positions (according to the classifier of professions of Ukraine SC 003:2010, current version dated 29/12/2022):</p> <p>1229.7 Head of other front offices in other business areas/industry sectors;</p> <p>1238 Head of projects and programs in the field of tangible (intangible) production;</p> <p>1312 Head of small enterprises without managerial apparatus in a production sector;</p> <p>2122.2 Economist-statistician;</p> <p>2433.1 Researcher (information analytics).</p> <p>2433.2 Information professionals and information analysts: consolidated information analyst;</p> <p>2441.1 Researchers (economics);</p> <p>2441.2 Economists: investment analyst, economist, planning economist, econometrician, economic adviser, economic reviewer;</p>

Postgraduate study options	Continuing study at the third (educational and scientific) level of higher education, obtaining additional qualifications in the post-graduate and adult education systems.
5. Teaching and assessment	
Teaching and learning	<p>Teaching and learning processes are characterized by academic honesty and freedom, problem-oriented, self- and student-centered learning approaches, and computer workshop sessions.</p> <p>Forms of education are as follows: face-to-face training (lectures, practical classes, computer workshops, consultations); training involving the use of information and communication technologies (e-learning, online lectures, courses on the Sikorsky Distance Learning Platform (G Suite, Moodle), OCW); classes with professional practitioners; students' individual work with 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. Under force majeure circumstances, online distance learning is possible.</p> <p>Teaching methods and technologies applied in the course ensure the acquisition of an ability to integrate knowledge and solve complex problems in multidisciplinary or unfamiliar contexts with incomplete or limited information available.</p> <p>All educational process participants receive well-timed, clear, and accessible information on program objectives, content, and outcomes, including 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, available on the department's official website, in the relevant module of the Electronic Campus.</p>
Assessment	<p>The procedure for conducting formative and summative assessments is regulated by Regulations on current, calendar and semester control of learning outcomes at Igor Sikorsky Kyiv Polytechnic Institute and Regulations on the system of evaluation of learning outcomes at Igor Sikorsky Kyiv Polytechnic Institute. Formative and summative assessments (exams, tests, individual tasks), defense of the practice report, and Master's thesis defense are evaluated according to the defined criteria of the rating system of estimation (RSE).</p> <p>Information about RSE and current, calendar, and semester control is contained in the syllabuses and is communicated to the students in the first lesson.</p> <p>The thesis defense evaluation is undertaken at an open examination board meeting, and its results are announced on the same day.</p>
6. Program competencies	
Integral competence	An ability to identify and solve complex economic problems and make relevant analytical and managerial decisions in the field of economics or a learning process, which involves research and/or innovation under uncertainty. An ability to apply methods and tools of descriptive, predictive, and prospective economic analysis, using information-analytical technologies and computer systems.
General competencies (GCs)	
GC 1	An ability to generate new ideas (creativity).
GC 2	Abstract, analytical, and synthetic thinking skills.
GC 3	An ability to inspire and motivate others toward a common goal.
GC 4	An ability to communicate effectively with others regardless of their professional group or job level (experts in other fields of knowledge or types of economic activity).
GC 5	An ability to work in a team.
GC 6	An ability to create and manage projects.
GC 7	An ability to act in accordance with moral and ethical considerations.
GC 8	An ability to undertake research at an appropriate level.
Professional competencies (PCs)	
PC 1	An ability to apply research, analytical, and methodological tools for substantiation of economic undertakings' development strategies and relevant managerial decisions.

PC 2	An ability to communicate in a foreign language in professional settings.
PC 3	An ability to gather, analyze, and process statistical, research, and analytical data necessary for solving complex economic problems and draw conclusions from it.
PC 4	An ability to use state-of-the-art information technology as well as methods and practices of socio-economic processes research adequate to the established research needs.
PC 5	An ability to identify key trends of socio-economic and human development.
PC 6	An ability to identify professional problems in the field of economics and solve them by choosing the best practices and taking available resources into account.
PC 7	An ability to justify managerial decisions on the effective development of business entities.
PC 8	An ability to evaluate potential risks and socio-economic impacts of managerial decisions.
PC 9	An ability to apply a scientific approach to design and execute efficient projects in the socio-economic field.
PC 10	An ability to build scenarios and strategies for the development of socio-economic systems.
PC 11	An ability to design and develop projects in the field of economics, ensuring the information, methodological, material, financial, and staffing support.
PC 12	An ability to implement big data analytics methods as well as methods of distributed processing and algorithms to analyze complex economic entities and systems.
PC 13	An ability to assess and systematically evaluate retrospective, present, and prospective macro- and micro-level states of economic systems, strategize their development, and make optimal data-driven decisions.
PC 14	An ability to apply business analytics data systems in analytical studies and develop software products and decision support technologies.
PC 15	An ability to conduct modeling experiments to analyze socio-economic systems and processes with the use of mathematical, statistical, and computer simulation techniques.
7. Program learning outcomes (PLOs)	
Upon completion of the program, students will be able to:	
PLO 1	Formulate, analyze, and synthesize solutions to theoretical and practical problems.
PLO 2	Engineer, justify, and make viable decisions on the development of socio-economic systems and economic undertakings management.
PLO 3	Express themselves fluently and coherently in professional and scientific discussions both in spoken and written forms of the official and foreign languages.
PLO 4	Develop socio-economic projects and an integrated action plan for their implementation, taking into account the objectives, potential socio-economic impacts, risks, and various restrictions, including those related to law and resources.
PLO 5	Adhere to the principles of academic integrity.
PLO 6	Evaluate their performance and demonstrate good leadership, team management, and teamwork skills.
PLO 7	Choose the best practices in economic activity management and justify recommended solutions based on the relevant data and applied scientific research.
PLO 8	Gather, process, and analyze statistical, scientific, and analytical data necessary to solve complex economic problems.
PLO 9	Make viable decisions under conditions of uncertainty that require applying new approaches, methods, and tools of socio-economic research.
PLO 10	Implement state-of-the-art IT solutions and use specialized software for socio-economic system management and research.
PLO 11	Measure and critically evaluate the socio-economic development and its trends; build and analyze models of economic systems and processes.
PLO 12	Substantiate management decisions related to the effective development of economic entities, taking objectives, resources, constraints, and risks into account.
PLO 13	Evaluate potential risks and socio-economic impacts of management decisions.
PLO 14	Build strategies and scenarios of the development of socio-economic systems.

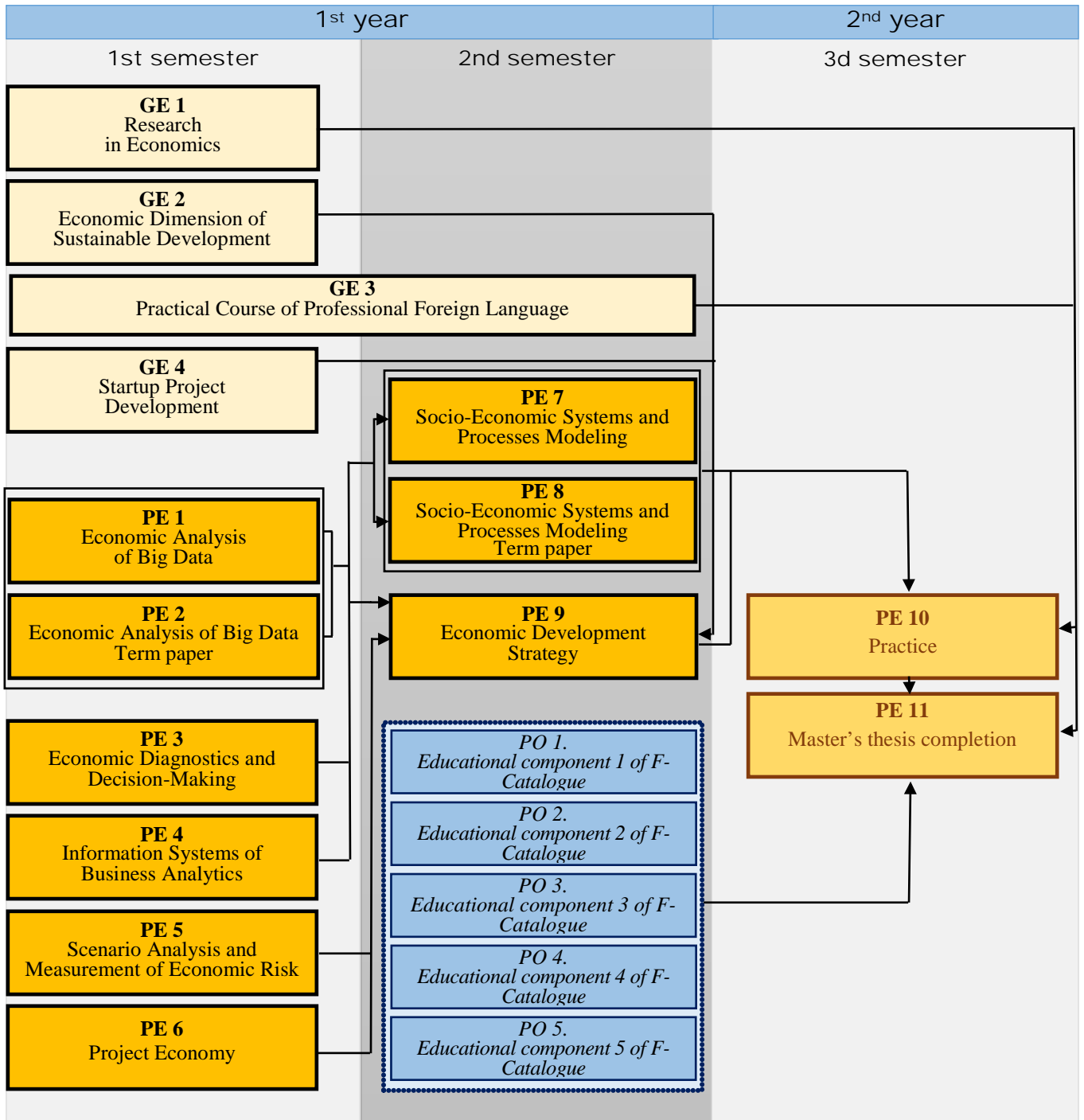
PLO 15	Organize the development and realization of socio-economic projects with consideration to information, methodological, material, financial, and staffing support.
PLO 16	Use Big Data analytics methods as well as methods of machine and deep learning to analyze and process economic data.
PLO 17	Determine the state of the economy, development models, and economic behavior variations of multilevel socio-economic systems on the basis of economic diagnostics, predictive analytics, and strategizing.
PLO 18	Develop information-analytical systems of business analysis through the integration of specialized analytical software, applications, and business intellect platforms; use them for analytical decision-making.
PLO 19	Make optimal economic decisions under conditions of uncertainty and risk, modeling growth trends and perspectives of socio-economic processes, phenomena, and systems development.
8. Program implementation resources	
Staffing	Staffing support is provided per staffing requirements regarding initiation and implementation of educational activities for a relevant HE level approved by decree of the Cabinet of Ministers of Ukraine dated 30/12/2015 №1187 (current version).
Material and technical support	Material and technical support are provided per technological requirements regarding student support regulations of educational activities for a relevant HE level approved by decree of the Cabinet of Ministers of Ukraine dated 30/12/2015 №1187 (current version). The teaching process is conducted in auditoriums supplied with modern multimedia equipment, computer workstations (computer facilities with a life-cycle of no more than eight years), and the appropriate software. The material and technical base of Igor Sikorsky Kyiv Polytechnic Institute is at the students' disposal, including but not limited to academic buildings, library, center of physical education and sports, medical establishments, student summer sports and health camps, cultural arts center, and dormitories. Student social services are functioning and accessible.
Information and methodical support	Information and methodical support are provided per technological requirements regarding student support regulations of educational activities for a relevant HE level approved by decree of the Cabinet of Ministers of Ukraine dated 30/12/2015 №1187 (current version). Information support of the program is provided by the department's official website and Facebook page as well as the Telegram channels of the department and dean's office. Methodical support is accessible owing to the Scientific and Technical Library of Igor Sikorsky Kyiv Polytechnic Institute (the automated library system Aleph500 available thanks to the Web-OPAC license), Electronic Archive of Scientific and Educational Materials ELAKPI, Sikorsky Distance Learning Platform, and Electronic Campus system. Students have access to prepaid scientometric databases and free Internet. EP actively employs analytical systems of World Data Center for Geoinformatics and Sustainable Development, "YouControl" analytical system, "M.E.Doc", project management software, MatLab, EViews, Maple, and Minitab; IDEs and Code Editors for C++, Python, Java, and R programming languages in teaching and learning processes.
9. Academic mobility	
National credit mobility	This opportunity will be available after concluding relevant contracts, such as student mobility or double/joint degree agreements.

<p>International credit mobility</p>	<p>Students can take advantage of the international credit mobility programs provided by the University, including the Erasmus+ K1 programs, the offers from which are published by the Department of Academic Mobility of Igor Sikorsky Kyiv Polytechnic Institute. In addition, there are educational offers from the foreign HEIs within the boundaries of partnership agreements, with the University of Economy in Bydgoszcz and Nicolaus Copernicus University in Toruń (both in Poland) in particular.</p> <p>Upon the conclusion of contracts with other educational institutions, the expansion of exchange program's options can be anticipated.</p>
<p>Training of international applicants</p>	<p>International applicants proficient in Ukrainian can study in general groups, while others may join separate groups with English as a language of instruction and Ukrainian as a foreign language course.</p>

2. EDUCATIONAL PROGRAM COMPONENTS

Code	Educational program components (academic disciplines, term papers, practice, thesis)	Number of ECTS credits	Summative assessment type
1. Compulsory components of EP			
1.1. General training cycle			
GE 1	Research in Economics	3	test
GE 2	Economic Dimension of Sustainable Development	2	test
GE 3	Practical Course of Professional Foreign Language	3	test
GE 4	Startup Project Development	3	test
1.2. Professional training cycle			
PE 1	Economic Analysis of Big Data	4,5	exam
PE 2	Economic Analysis of Big Data Term paper	1	test
PE 3	Economic Diagnostics and Decision-Making	4,5	exam
PE 4	Information Systems of Business Analytics	4,5	exam
PE 5	Scenario Analysis and Measurement of Economic Risk	4	test
PE 6	Project Economy	4	test
PE 7	Socio-Economic Systems and Processes Modeling	4	exam
PE 8	Socio-Economic Systems and Processes Modeling Term paper	1	test
PE 9	Economic Development Strategy	3	test
PE 10	Practice	14	test
PE 11	Master's thesis completion	12	thesis defense
2. Optional components of EP			
PO 1	Educational component 1 of F-Catalogue	4,5	test
PO 2	Educational component 2 of F-Catalogue	4,5	test
PO 3	Educational component 3 of F-Catalogue	4,5	test
PO 4	Educational component 4 of F-Catalogue	4,5	test
PO 5	Educational component 5 of F-Catalogue	4,5	test
Total of compulsory credits:		67,5	
Total of optional credits:		22,5	
Total of education credits ensuring the acquisition of competencies defined by Higher Education Standard:		67,5	
TOTAL NUMBER OF EDUCATIONAL PROGRAM CREDITS:		90	

3. STRUCTURAL-LOGICAL SCHEME OF EDUCATIONAL PROGRAM



4. STUDENT CERTIFICATION FORM

Certification form for higher education student	Higher education student certification in the Economic Analytics educational program, 051 Economics specialty, is carried out as public thesis defense followed by the issuance of a standard document confirming that a student has been awarded a Master's degree in Economics.
Thesis requirements	<p>Work on a thesis includes solving a subject-oriented task, complex practical problem, or problem in economics that require research and/or innovation and are characterized by the uncertainty of conditions and requirements. (Regulations on the examination commission and certification of applicants for higher education in Igor Sikorsky KPI)</p> <p>A thesis is checked for plagiarism following the Regulations on the system of prevention of academic plagiarism at the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". After the defense, it is placed in the repository of NTL University for free access.</p> <p>Publication of theses containing limited access information is carried out per the requirements of current legislation.</p> <p>In the event of the remote mode of education, certification is performed in compliance with Regulations for semester tests and defenses of research projects and qualifying examinations in the remote mode.</p>

5. MATRIX OF CORRESPONDENCE BETWEEN COMPETENCIES AND COMPONENTS OF EDUCATIONAL PROGRAM

	GE 1	GE 2	GE 3	GE 4	PE 1	PE 2	PE 3	PE 4	PE 5	PE 6	PE 7	PE 8	PE 9	PE 10	PE 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								+						+	+
PC 15									+		+	+		+	+

6. MATRIX OF CORRESPONDENCE BETWEEN LEARNING OUTCOMES AND COMPONENTS OF EDUCATIONAL PROGRAM

	GE 1	GE 2	GE 3	GE 4	PE 1	PE 2	PE 3	PE 4	PE 5	PE 6	PE 7	PE 8	PE 9	PE 10	PE 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								+						+	+
PLO 19									+		+	+		+	+