ЗАТВЕРДЖУЮ
Голова Вченої ради
КПІ ім. Ігоря Сікорського
_____ Михайло ІЛЬЧЕНКО
«28» 01 20__р.
М.П.

# ОСВІТНЬО-ПРОФЕСІЙНА ПРОГРАМА

## Технології
## друкованих і електронних видань

## Technology
## of printed and electronic publications

## Перший (бакалаврський) рівень вищої освіти

| | |
|---|---|
| за спеціальністю | 186 Видавництво та поліграфія |
| галузі знань | 18 Виробництво та технології |
| кваліфікація | Бакалавр з видавництва та поліграфії |

Ухвалено на засіданні Вченої ради університету
від «20» 01 20 20р., протокол № 1

# ПЕРЕДМОВА

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Голова робочої групи
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(протокол № 5 від «16» 01 2022 р.)

Голова Методичної ради
_____ Юрій ЯКИМЕНКО

Вчений секретар Методичної ради
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## До розроблення освітньої програми додатково залучені:

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(вечірня форма навчання), гр. СТ-в91ф, випускниця бакалаврату 2007 року

Талімонов Ярослав Юрійович, Банкнотно-монетний двір Національного банку
України, здобувач ступеня доктора філософії (вечірня форма навчання),
гр. СТ-в91ф, випускник бакалаврату 2009 року

Бардовський Богдан Олександрович, здобувач ступеня бакалавра, гр. МВ-61

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# 1. EDUCATIONAL PROGRAM PROFILE

## on the specialty 186 Publishing and printing

| 1 – General information | |
|---|---|
| Full name of the educational establishment and institute/faculty | National technical university of Ukraine "Igor Sikorsky Kyiv polytechnic institute", Publishing and printing institute |
| Higher education degree and the name of the qualification | Degree – bachelors<br>Qualification – bachelor in publishing and printing |
| National qualification frame level | Ukrainian national qualification frame level – level 7 |
| Official name of the educational program | Printed and digital editions technologies |
| Diploma type and educational program size | Bachelors diploma, singular, 240 credits, training term – 3 years and 10 months |
| Accreditations availability | First time accreditation |
| Preconditions | Full general middle education level |
| Teaching languages | Ukrainian |
| Educational program viability term | Before the next accreditation happens |
| Web-address of the permanent educational program's location | http://vpi.kpi.ua/<br>https://osvita.kpi.ua/node/103 |
| **2 – Educational program goal** | |

The goal of the educational program corresponds to the strategy of the development of Igor Sikorsky KPI for 2020-2025 (https://data.kpi.ua/sites/default/files/files/2020-2025-strategy.pdf):

1) vision – help forming the future society in the concepts of the sustainable development. To be the technical university of the research type on the world level. To create all the means to train the high-qualified (perfect) professionals able to generate modern scientific knowledge and innovational technologies for the human wellbeing and able to set the proven place of Ukraine in the world's society.

2) mission – to contribute a lot into keeping the sustainable development of the society by the means of internationalizing and integrating education, modern scientific research, and innovational developments. To create the possibilities to whole professional, intellectual, social, and artistic personality development on the highest levels of perfection into the educational-scientific environment.

3) goals – to maintain the fundamentality of professionals training based on the physical-technical model, that refers to the synthesis of deep general scientific and naturalistic knowledge and of the engineering art; to strengthen the harmonious multi-vector students education, forming them as all-ways-around developed personalities, able to get to the highest gains in their professional and general human activities, the real Ukraine patriots able to solve the complex specialized tasks and practical problems in the field of publishing and printing, characterized by complexity and conditions uncertainty.

| 3 – Educational program characteristics | |
|---|---|
| Subject area | Objects for learning and activities: all types of publishing and printing products – printed and electronic editions, packaging, multimedia and crossmedia informational products and other types of products publishing and printing produces; processes of processing, registry, formation, storing of the text, graphic, audio, video and other multimedia information; production and spreading the products made in publishing in printing.<br><br>Theoretical contents of the subject area: definitions, concepts, principles of publishing treatment of different information types; technological processes development and realization; projecting and setup of the production; creation and improvement of all types of products in publishing and printing; information security in printing; resources reservation in printing.<br><br>Methods, means and technologies: methods and technologies of construction, producing, testing, and control of all types of products in publishing and printing; methods of calculus, designing and realization of the technological processes; methods of securing the printed products.<br><br>Instruments and equipment: materials of publishing and printing production, software-hardware complexes, controlling equipment, projecting and modelling of the technological processes and all the types of products in publishing and printing; means of technological, informational, instrumental, metrological, diagnostic, and organizational production supplies; printing equipment. |
| Educational program orientation | Educational-professional |
| The main focus of the educational program | To prepare the competitive specialists, able to resolve the complex specialized tasks and practical problems in the field of publishing and printing, those characterized by the complexity and conditions uncertainty. The special education for development and projecting the technological processes, constructing and pre-press preparations, also production of printed and digital editions, packaging, multimedia informational product, combined products, artistic, informational and other types of products being created in publishing and printing industries; processing, registry, formation, reproduction, storing of the text, graphic, audio, video and other multimedia information; usage of software-hardware complexes in publishing and printing; producing and spreading the products of publishing and printing.<br><br>Keywords: publishing and printing, technological processes, multimedia, text processing, images processing, pre-press processes, press processes, production processes, production, edition, packaging, printing materials, computer modelling, postpress and finishing processes. |

| | |
|---|---|
| Program features | The components list of the educational program is being approved with the list of the educational programs of the countries providing the training on the similar specialty (Institute of papermaking and printing of Lodz Polytechnics; Institute of mechanics and printing of Warsaw polytechnic; Leipzig university of the applied science, and others, those altogether with the Publishing and printing institute are being included into the International circle of the higher educational establishments preparing the specialists for publishing and printing). |
| **4 – Graduates suitability to further employment and further study** | |
| Employment suitability | 3439 – specialist; <br> 3119 – publishing and printing specialist; <br> 3471 – graphical designer; <br> 3471 – multimedia objects designer; <br> 3471 – packaging designer |
| Further study | The study can be continued on the second (Master) level of the higher education. |
| **5 – Teaching and evaluations** | |
| Teaching and training | Lectures, practices and seminary works, computer practices and laboratory works; course projects and works; mixed training technology, practices and excursions; diploma thesis preparation. |
| Evaluations | Rating-based evaluations system, oral and written exams, testing, etc. |
| **6 – Program competencies** | |
| Integral competency | Ability to resolve complex specialized tasks and practical problems in the professional activities of publishing and printing houses or in the educational process, that means usage of the theories and methods of technical, natural, humanitarian, social sciences and is characterized by the complexity and conditions uncertainties. |
| **General Competencies (GC)** | |
| GC 1 | Ability to learn and master the modern knowledge. |
| GC 2 | Ability and understanding of the field and understanding the professional activities. |
| GC 3 | Ability to apply knowledge to the practical situations. |
| GC 4 | Ability to make the thoughtful decisions. |
| GC 5 | Ability to communicate with the other professions people of different level (with the experts in the other fields of knowledge or business). |
| GC 6 | Ability to conduct safe activities. |
| GC 7 | Ability to work independently. |
| GC 8 | Ability to work in team. |
| GC 9 | Ability to realize own rights and duties as the society member, to understand the values of the people society (free democratic society) and the need of its sustainable development, law governance, rights and freedoms of the person and citizen in Ukraine. |
| GC 10 | Ability to keep and increase the moral, cultural, scientific values and achievements of the society based on understanding the history and regularities for the object field development, its place in the general knowledge system about nature and society and in the societies development, techniques and technologies; to use the different types and forms of moving activities for the active rest and healthy lifestyle. |

| | Professional Competencies of the specialty (PC) |
|---|---|
| PC 1 | Ability to make thoughtful decisions about the processes, related to all the production states of printed and digital editions, packaging, multimedia informational products and other product types in publishing and printing. |
| PC 2 | Ability to apply appropriate mathematical and technical methods and computer software to solve engineering problems of publishing and printing. |
| PC 3 | Ability to apply the principles of processing, registration, formation, reproduction, storage of text, graphic, audio and video information and features of its use for the production of printed and electronic publications, packaging, multimedia information products and other types of publishing and printing products. |
| PC 4 | Ability to make the optimal choice of technologies, materials, equipment, hardware and software, methods and means of control for designing the technological process of production of printed and electronic publications, packaging, multimedia information products and other types of publishing and printing products. |
| PC 5 | Ability to design the structure, construction and design of printed and electronic publications, packaging, multimedia information products and other types of publishing and printing products, using modern software and hardware, taking into account the requirements for the result, available resources and limitations. |
| PC 6 | Ability to take into account social, environmental, ethical, economic, legal and commercial factors influencing the implementation of technical solutions in publishing and printing. |
| PC 7 | Ability to make effective technical and economical decisions regarding the implementation of a specific project in publishing and printing activities within the publishing, production plans of the firm; development of normative and technical documentation for the production process. |
| PC 8 | Ability to plan and organize production, operation, maintenance, distribution of products in publishing and printing, taking into account problem's specifics. |
| PC 9 | Ability to demonstrate an understanding of metrological support, standardization, problems and areas of production quality assurance and technology. |
| PC 10 | Ability to apply methods and means of image design and its three-dimensional modeling. |
| PC 11 | Ability to develop a security features set, choose technologies, materials, equipment for the production of secured documents and documents with the strict accountability, as well as other printed products. |
| PC 12 | Ability to search for new developments and experience in the operation of technological processes, materials, hardware and software and equipment in the production of publications and packaging. |
| PC 13 | Ability to analyze the cost of time and their normalization to ensure a rational production process of editions. |

| 7 – Program educational results | |
|---|---|
| KNOWLEDGE | |
| KN1 | Theories and methods of mathematics, physics, chemistry, engineering, economics. |
| KN2 | Methods of searching, systematizing, generalizing information from various sources, necessary for solving theoretical and practical problems of publishing and printing and its structured presentation in the form of explanatory notes of projects and works, abstracts, presentations, reports, etc. |
| KN3 | Methods of rational use of raw materials, energy and other resources. |
| KN4 | Methods and principles of a broad interdisciplinary context of educational components for organizing activities independently and in a team. |
| KN5 | Effective forms of professional and interpersonal communication in the team to perform tasks in professional activities. |
| KN6 | State and foreign language for free communication on professional issues orally and in writing. |
| KN7 | Principles of prepress, press and postpress processes, color theory, methods of processing text and multimedia information and their relationship in the production system of reproduction. |
| KN8 | Quality criteria to ensure the quality of printed and electronic publications, packaging, multimedia information products and other types of publishing and printing products. |
| KN9 | Technologies for processing text, graphic and multimedia information using modern information technologies and specialized software. |
| KN10 | Methods and means of evaluating the technical characteristics of printed and electronic publications, packaging, multimedia information products and other types of publishing and printing products. |
| KN11 | Composition, structure, design and apparatus of all types of publishing and printing products to develop the concept and design of the publication; methods of compiling working documentation to ensure the process of publishing publications. |
| KN12 | Procedures (algorithms) for the development and implementation of the technological process and its provision, select appropriate materials, quality control systems, hardware and software, equipment, personnel and other resources. |
| KN13 | Modern means and methods of control to ensure: accuracy and stability of technological processes; proper technical condition of equipment; quality of materials, semi-finished products, finished products. |
| KN14 | Methods of designing workplaces of production units of enterprises of the publishing and printing industry with materials, components, means of control, technological equipment, taking into account the rules of labor protection and life safety. |
| KN15 | Methods for estimating production and non-production costs for the rational provision of production of publishing and printing products. |
| KN16 | Procedures for organizing the operation of printing equipment and technical means of publishing systems to ensure their efficient operation. |
| KN17 | Methods and means of protection of securities and strict accounting documents, as well as other printed products. |
| KN18 | Norms of ecological safety, safety of life, healthy way of life, understanding of consequences of influence of publishing and printing production on environment. |
| KN19 | The essence of methods, tools and systems of printed, electronic, multimedia, combined publications and packaging and their development. |
| KN20 | Fundamentals of design, three-dimensional modeling, modern methods and tools for the development of printed and electronic publications, packaging, multimedia information products and other types of publishing and printing products. |

| | ABILITIES |
|---|---|
| AB1 | Apply theories and methods of mathematics, physics, chemistry, engineering, economics to solve complex problems and practical problems of publishing and printing. |
| AB2 | Find, evaluate and use information from various sources needed to solve theoretical and practical problems of publishing and printing. |
| AB3 | Rational use of raw materials, energy and other resources. |
| AB4 | Organize your activities to work independently and in a team. |
| AB5 | Apply effective forms of professional and interpersonal communication in the team to perform tasks in professional activities. |
| AB6 | Communicate freely on professional issues in the state and foreign languages orally and in writing. |
| AB7 | Understand the principles and skills of using technologies of prepress, printing and postpress processes, color theory, methods of processing text and multimedia information. |
| AB8 | Ensure the quality of printed and electronic publications, packaging, multimedia information products and other types of publishing and printing products. |
| AB9 | Process text, graphic and multimedia information using modern information technologies and specialized software. |
| AB10 | Evaluate the technical characteristics of printed and electronic publications, packaging, multimedia information products and other types of publishing and printing products. |
| AB11 | Develop the concept of the publication; composition, structure, design and apparatus of all types of publishing and printing products, working documentation to ensure the process of their creation. |
| AB12 | Develop, provide and implement the technological process, reasonably choosing materials, quality control systems, hardware and software, equipment, personnel and other resources. |
| AB13 | To control the accuracy and stability of technological processes, technical condition of equipment, quality of materials, semi-finished products, finished products with the help of modern means and methods of control. |
| AB14 | To design workplaces of production subdivisions of publishing and printing enterprises and to organize their operation taking into account the rules of labor protection. |
| AB15 | Assess production and non-production costs to ensure the production of publishing and printing products. |
| AB16 | Organize and ensure efficient operation of printing equipment and technical means of publishing systems. |
| AB17 | Apply methods and means of protection for the development of a protective set of securities and strict accounting documents, as well as other printed products. |
| AB18 | Apply the rules of environmental safety, safety of life, to determine the effects of publishing and printing production on the environment. |
| AB19 | To choose appropriate methods, means and systems of printed, electronic, multimedia, combined editions and packings for construction of rational technological process. |
| AB20 | Ability to apply the principles of design, three-dimensional modeling, design, design to develop the concept, design of printed and electronic publications, packaging, multimedia information products and other types of publishing and printing products. |

| 8 – Resource support for program implementation | |
|---|---|
| Staffing | In accordance with the personnel requirements for ensuring the implementation of educational activities for the relevant level of HE, approved by the Resolution of the Cabinet of Ministers of Ukraine from 30.12.2015 y. № 1187 |
| 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 from 30.12.2015 y. № 1187 |
| Information and educational and methodical support | In accordance with the technological requirements for educational and methodological and informational support of educational activities of the relevant level of HE, approved by the Resolution of the Cabinet of Ministers of Ukraine from 30.12.2015 y. № 1187 |
| 9 – Academic mobility | |
| National credit mobility | Possibility of academic mobility, double graduation |
| International credit mobility | Possibility of international academic mobility, double graduation, inclusive student education (Institute of Papermaking and Polygraphy of Lodz Polytechnic, Institute of Mechanics and Polygraphy of Warsaw Polytechnic, Leipzig University of Applied Sciences and others included in the International Circle with the Publishing and Printing Institute specialists of publishing and printing production), as well as other free economic zones under the program "Erasmus +" and other programs of Igor Sikorsky KPI. |
| Training of foreign applicants for higher education | Teaching in a foreign language |

# 2. EDUCATIONAL PROGRAM COMPONENTS LIST

| Code | Components of the educational program (academic disciplines, practices, qualification work) | Credits number | Final control form |
|------|------|------|------|
| 1 | 2 | 3 | 4 |
| **1. NORMATIVE educational components** | | | |
| **1.1. General training cycle** | | | |
| GT 1 | Principles of oral professional speech (rhetorics) | 2 | Test |
| GT 2 | Ukraine in the context of the historical development of Europe | 2 | Test |
| GT 3 | Physical training | 5 | Test |
| GT 4 | Foreign language | 6 | Test |
| GT 5 | Higher mathematics | 16,5 | Exam |
| GT 6 | Physics | 8 | Test |
| GT 7 | Physico-chemical bases of printing production | 8,5 | Exam |
| GT 8 | Engineering graphics | 3 | Test |
| GT 9 | Applied computer graphics | 4 | Test |
| GT10 | Theoretical and applied mechanics | 3 | Test |
| GT11 | Informatization of publishing and printing production | 4 | Test |
| GT12 | Fundamentals of electrical engineering and electronics | 3 | Test |
| GT13 | Economics and production organization | 4 | Test |
| GT14 | Labor protection and civil protection | 4 | Test |
| GT15 | Materials of publishing and printing | 8,5 | Exam |
| GT16 | Quality management, metrology, standardization and certification in publishing and printing | 4 | Exam |
| GT17 | Color theory | 3,5 | Exam |
| GT18 | Equipment in publishing and printing | 5 | Test |
| GT19 | Information processing technologies | 13 | Exam |
| GT20 | Introduction to the specialty | 4,5 | Exam |
| GT21 | Course work in information processing technologies | 1 | Test |
| **1.2. Professional training cycle** | | | |
| PT1 | Publishing and printing technologies | 23 | Exam |
| PT2 | Digital editions technologies | 11 | Exam |
| PT3 | Printed products security technologies | 5 | Exam |
| PT4 | Design of publishing and printing production | 9 | Exam |
| PT5 | Editions design | 5,5 | Test |
| PT6 | Pre-diploma practice | 6 | Test |
| PT7 | Diploma project | 6 | Defence |
| PT8 | Course work on publishing and printing technologies | 1 | Test |
| PT9 | Course work on the design of publishing and printing production | 1 | Test |

| 2. SELECTABLE educational components | | | |
|---|---|---|---|
| **2.1. General training cycle (Selectable educational components form the general university catalogue)** | | | |
| GS 1 | Educational component 1 GU catalogue | 2 | Test |
| GS 2 | Educational component 2 GU catalogue | 2 | Test |
| GS 3 | Educational component 3 GU catalogue | 2 | Test |
| GS 4 | Educational component 4 GU catalogue | 2 | Test |
| GS 5 | Professional foreign language | 6 | Exam |
| **2.2. Professional training cycle (Selectable educational components from the interfaculty/faculty/department catalogue)** | | | |
| PS 1 | Educational component 1 K-Catalogue | 6 | Test |
| PS 2 | Educational component 2 K-Catalogue | 5 | Test |
| PS 3 | Educational component 3 K-Catalogue | 5 | Test |
| PS 4 | Educational component 4 K-Catalogue | 5 | Test |
| PS 5 | Educational component 5 K-Catalogue | 5 | Test |
| PS 6 | Educational component 6 K-Catalogue | 5 | Test |
| PS 7 | Educational component 7 K-Catalogue | 5 | Test |
| PS 8 | Educational component 8 K-Catalogue | 5 | Test |
| PS 9 | Educational component 9 K-Catalogue | 5 | Test |
| Total size of **the general training cycle** | | **126,5** | |
| Total size of **the professional training cycle** | | **113,5** | |
| Total size of **the necessary components** | | **180** | |
| Total size of **the selectable components on the student's choice** | | **60** | |
| **TOTAL SIZE OF THE EDUCATIONAL PROGRAM** | | **240** | |

# 3. STRUCTURE-LOGICAL SCHEME OF THE EDUCATIONAL PROGRAM
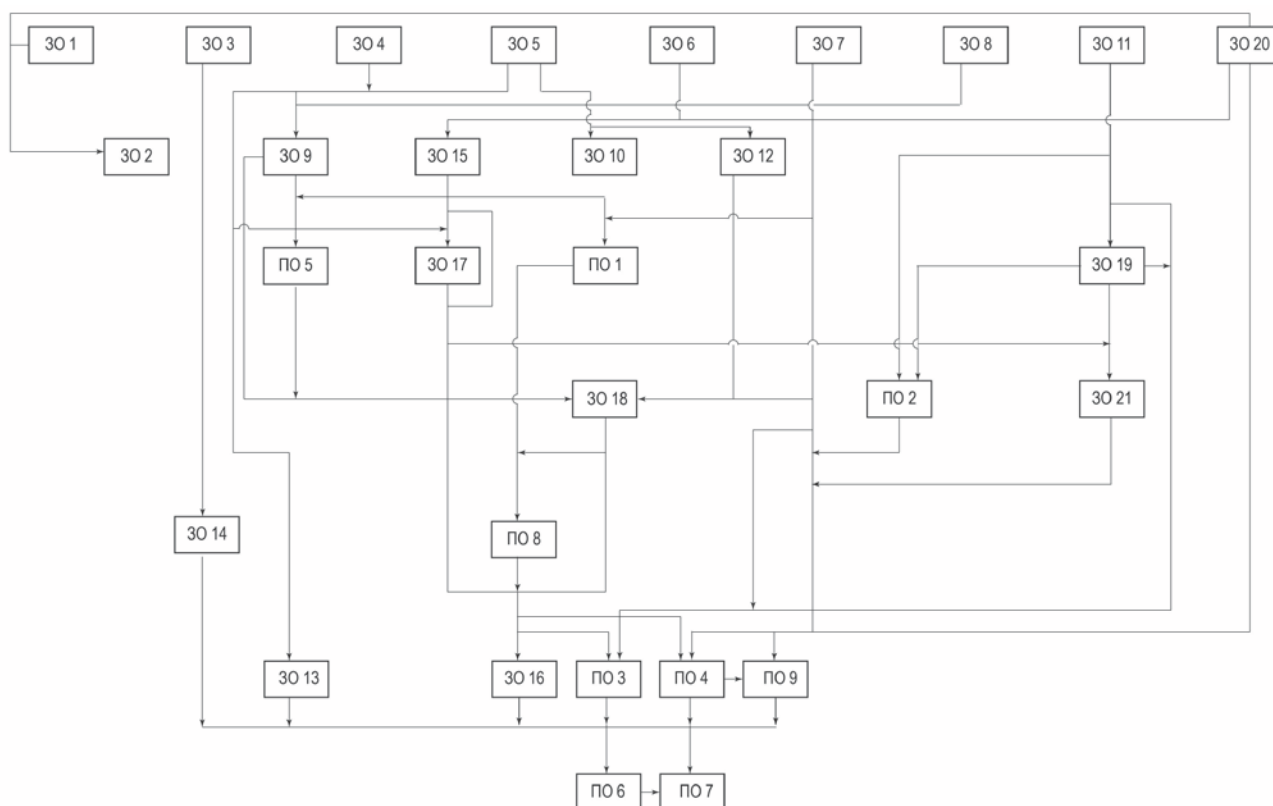


# 4. FORM OF GRADUATE CERTIFICATION OF HIGHER EDUCATION APPLICANTS

Graduation certification of applicants for higher education under the educational-professional program "Printed and digital editions technologies" specialty 186 Publishing and printing is carried out in the form of defense of qualification work - diploma thesis, and ends with issuing the standardized document type stating reaching the Bachelor's degree in publishing and printing, according to the educational-professional program "Printed and digital editions technologies".

Graduation certification is open and public.

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

| | GT 1 | GT 2 | GT 3 | GT 4 | GT 5 | GT 6 | GT 7 | GT 8 | GT 9 | GT10 | GT11 | GT12 | GT13 | GT14 | GT15 | GT16 | GT17 | GT18 | GT19 | GT20 | GT21 | PT 1 | PT 2 | PT 3 | PT 4 | PT 5 | PT 6 | PT 7 | PT 8 | PT 9 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GC 1 | + | + | | + | + | + | + | | + | | | | | | + | | | | + | | + | + | + | + | + | | | + | + | + |
| GC 2 | | | | + | | | + | + | + | | + | | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + | + |
| GC 3 | + | | | + | | | + | | + | | | | | + | + | | | + | + | | + | | | | | | + | | + | + |
| GC 4 | + | | | + | | | | | | | | | + | + | + | + | | | | | + | | | | | | + | + | + | + |
| GC 5 | + | | | + | | | | | | | | | | | | | | | | | | | | | | | | | | |
| GC 6 | | | + | | | | | | | | | + | | | + | | | | | | | | | | | + | | + | | |
| GC 7 | + | | | + | | | | + | + | | | | | | | | | | | + | | | | | | | + | + | + | + |
| GC 8 | | | | | | | + | | | | | | | | | | | | | + | | | | | + | | | | | |
| GC 9 | | + | | | | | | | | | | | | + | | | | | | | | | | | | | | + | | |
| GC 10 | | + | + | | | | | | | | | | | | | | | | | + | | | | | | | | + | | |
| 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 | | | | | | | | | | | | | | + | | | | | | | | | | | | + | | + | + | + |

# 6. MATRIX CORRELATING THE PROGRAMMED EDUCATIONAL RESULTS TO THE RESPECTFUL EDUCATIONAL PROGRAM COMPONENTS

| | GT 1 | GT 2 | GT 3 | GT 4 | GT 5 | GT 6 | GT 7 | GT 8 | GT 9 | GT10 | GT11 | GT12 | GT13 | GT14 | GT15 | GT16 | GT17 | GT18 | GT19 | GT20 | GT21 | PT 1 | PT 2 | PT 3 | PT 4 | PT 5 | PT 6 | PT 7 | PT 8 | PT 9 |
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| KN 1 | | | | | + | + | + | + | + | + | + | + | + | | | + | + | + | + | | + | + | + | + | + | | | + | + | + |
| KN 2 | | + | | + | | | | | | | | | + | | + | | | + | + | + | + | + | + | | + | | | + | + | + |
| KN 3 | | | | | | | | | | | | + | + | | + | | | + | | | | + | + | | + | | | + | + | + |
| KN 4 | + | + | + | + | + | + | + | + | + | | | | | | | | | | | | | + | | | + | | + | + | | |
| KN 5 | + | | | | | | | | | | | | | | | | | | | + | | | | | + | | + | | | |
| KN 6 | + | | | + | | | | | | | | | | | | | | | | | | | | | | | + | + | | |
| KN 7 | | | | | | | | | | | | | | + | | + | | | + | | + | + | + | | | | | + | + | |
| KN 8 | | | | | | | | | | | | | | | + | | | | | | | + | + | + | + | | | | + | + |
| KN 9 | | | | | | | | | | | | | | | | | | + | + | | + | + | + | | | | + | + | | |
| KN 10 | | | | | | | | | | | | | | | | | | | | | | + | + | + | + | | + | + | + | + |
| KN 11 | | | | | | | | | | | | | | | | | | | | | | + | + | | | + | | + | + | |
| KN 12 | | | | | | | | | | | | + | | | | | | | | | | + | + | | + | | | + | | + |
| KN 13 | | | | | | | | | | | | | | + | + | + | | + | | | | + | + | | + | | + | + | | + |
| KN 14 | | | | | | | | | | | | | + | + | | | | | | | | | | | + | | | + | | + |
| KN 15 | | | | | | | | | | | | | + | | | | | | | | | | | | + | | | + | | + |
| KN 16 | | | | | | | | | | + | | | | + | | | | | + | | | | | | | | | | | |
| KN 17 | | | | | | | | | | | | | | | | | | | | | | | | + | | | | | | |
| KN 18 | | | + | | | | | | | | | | | + | | | | | | | | | | | | | + | | | |
| KN 19 | | | | | | | | | | | | | | | | | | | | + | | + | + | + | + | + | | + | + | + |
| KN 20 | | | | | | | | | | | | | | | | | | | + | + | + | | + | | + | + | | | | + |
| AB 1 | | | | | + | + | + | + | + | + | + | + | + | | | + | + | + | + | | + | + | + | + | + | | | + | + | + |
| AB 2 | | + | | + | | | | | | | | | + | | + | | | + | + | + | + | + | + | | + | | | + | + | + |
| AB 3 | | | | | | | | | | | | | + | + | | + | | | + | | | | + | + | | + | | | + | + | + |
| AB 4 | + | + | + | + | + | + | + | + | + | | | | | | | | | | | | | | + | | | + | | + | + | |
| AB 5 | + | | | | | | | | | | | | | | | | | | | + | | | | | + | | + | | | |
| AB 6 | + | | | + | | | | | | | | | | | | | | | | | | | | | | | + | + | | |
| AB 7 | | | | | | | | | | | | | | + | | + | | | + | | + | + | + | | | | | + | + | |
| AB 8 | | | | | | | | | | | | | | | + | | | | | | | + | + | + | + | | | | + | + |
| AB 9 | | | | | | | | | | | | | | | | | | + | + | | + | + | + | | | | + | + | | |
| AB 10 | | | | | | | | | | | | | | | | | | | | | | + | + | + | + | | + | + | + | + |
| AB 11 | | | | | | | | | | | | | | | | | | | | | | + | + | | | + | | + | + | |
| AB 12 | | | | | | | | | | | | + | | | | | | | | | | + | + | | + | | | + | + | + |
| AB 13 | | | | | | | | | | | | | | + | + | + | | + | | | | + | + | | + | | + | + | + | + |
| AB 14 | | | | | | | | | | | | | + | + | | | | | | | | | | | + | | | + | | + |
| AB 15 | | | | | | | | | | | | | + | | | | | | | | | | | | + | | | + | | + |
| AB 16 | | | | | | | | | | + | | | | + | | | | + | | | | | | | | | | | | |
| AB 17 | | | | | | | | | | | | | | | | | | | | | | | | | | + | | | | |
| AB 18 | | | + | | | | | | | | | | | + | | | | | | | | | | | | | | + | | |
| AB 19 | | | | | | | | | | | | | | | | | | | | + | | + | + | + | + | + | + | + | + | + |
| AB 20 | | + | | | | | | | | | | | | | | | | | + | + | + | | + | + | + | + | | | | + |