ID 21733

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE

KYIV NATIONAL UNIVERSITY OF CONSTRUCTION AND ARCHITECTURE

CURRICULUM

"Project management

Project Managemen

of the second (master's) level of higher education

in the specialty 122 “Computer Science

field of knowledge 12 “Information technology

Qualification Master of Science in Computer Science.

APPROVED

by the Academic Council

of the Kyiv National University of

of Civil Engineering and Architecture

with changes

Protocol № 20 from 29/03/2024

The educational and professional program comes into force on September 01, 2024.

Chairman of the Academic Council

_____ P.M. Kulikov

“____” _____ 2024 p.

Kyiv – 2024

LETTER OF APPROVAL

of the Curriculum for higher education applicants

at the second (master's) level

in the specialty 122 “Computer Science”

educational program “Project Management”

1. Approved at the meeting of the QEC in specialty 122 “Computer Science”

(Minutes № from _____2024)

Head of the Department of Information Technologies ___Tetiana HONCHARENKO

Guarantor of the educational and professional program ____ Olena VERENYCH

“___” _____ 2024p.

2. Checked by the educational and methodological department

Head of the Educational and Methodological Department _____ Ihor SKLAROV

“___” _____ 2024 p.

3. Approved at the meeting of the Methodological Council of the University

(Minutes № ____ from _____2024)

Vice-Rector for Academic Affairs _____ Andrii Shpakov

“___” _____ 2024 p.

BACKGROUND

Developed by a project team consisting of:

1. Bushuyev Serhii Dmytrovych, Doctor of Technical Sciences, Professor, Head of the Department of Project Management, Honored Worker of Science and Technology of Ukraine, Kyiv National University of Construction and Architecture
2. Voitenko Oleksandr Stepanovych, PhD, Associate Professor, Associate Professor of the Department of Project Management, Kyiv National University of Construction and Architecture
3. Ivan Obremok, PhD in Engineering, Associate Professor, Associate Professor of the Department of Project Management, Kyiv National University of Construction and Architecture
4. Boyko Yevheniia Hryhorivna, PhD in Engineering, Associate Professor, Associate Professor of the Department of Project Management, Kyiv National University of Construction and Architecture

The guarantor of the educational and professional program is Olena Verenych, Doctor of Technical Sciences, Professor, Professor of the Department of Project Management at the Kyiv National University of Construction and Architecture

Stakeholders:

Academic community

Shakhovska Nataliia Bohdanivna, Doctor of Technical Sciences, Professor, Head of the Department of Artificial Intelligence, Lviv Polytechnic National University

Sharonova Nataliia Valeriivna, Doctor of Technical Sciences, Professor, Head of the Department of Intelligent Computer Systems, National Technical University "Kharkiv Polytechnic Institute"

Myronova Nataliia Oleksiivna, PhD in Engineering, Associate Professor, Associate Professor of the Department of Information Technologies of Electronic Means, National University of "Zaporizhzhia Polytechnic"

Sachenko Anatolii O., Doctor of Technical Sciences, Professor, Professor of the Department of Information and Computer Systems and Management, Western Ukrainian National University

Employers and/or representatives of the professional community

Andriy Anisimov - CEO and co-founder of Info Pulse

Chinwi Mgbere - representative of Primavera Oracle

Yurii Stepanov - Chief Specialist of the Collaborative Governance Planning Department of the Department of Organization and Support of Collaborative Governance of the Department of Military Policy and Strategic Planning of the Ministry of Defense of Ukraine; graduate of the Department of Project Management, 2021.

Applicants.

Oleksii Datsun - Master of Higher Education, class of 2022;

Ihor Lukianchuk - Master of Higher Education, class of 2023;

Nikita Solodey - Master of Higher Education.

Profile of the educational and professional program "Project Management" in specialty 122 "Computer Science"

1. General information	
Full name of the higher education institution and structural unit	Kyiv National University of Construction and Architecture, Faculty of Automation and Information Technology Project Management Department
Degree of higher education and qualification title in the original language	Degree of higher education - master's degree Qualification: Master of Science in Computer Science Specialty: 122 "Computer Science"
Forms of education	Full-time, part-time
Official name of the educational and professional program	Project Management
Type of diploma and scope of educational and professional program	Master's degree, single, 90 ECTS credits, Duration of study: 1 year and 4 months.
Availability of accreditation	Certificate of accreditation of the educational program No. 6739 dated 26.12.2023.
Cycle/level	NQF of Ukraine - level 7; FQ-EHEA - second cycle; EQF-LLL - level 7
Prerequisites	Persons who have obtained a bachelor's degree may apply for a master's degree in the specialty 122 Computer Science. The program of professional entrance examinations for persons who have received the previous level of higher education in other specialties should include verification of the acquisition of special (professional) competencies and learning outcomes defined by the standard of higher education in the specialty 122 Computer Science, field of knowledge 12 Information Technology for the first (bachelor's) level of higher education. Admission conditions are determined by the "Rules of Admission to the Kyiv National University of Construction and Architecture" approved by the Academic Council.
Language(s) of instruction	Ukrainian
Duration of the educational and professional program	Validity of the certificate of accreditation of the educational program until 01.07.2029
Internet address for permanent placement of the description of educational and professional programs	http://org2.knuba.edu.ua/, https://www.knuba.edu.ua/faculties/fait/kafedri-fait/kafedra-up/magister-lvl/ https://www.knuba.edu.ua/katalog-osvitnix-program/
2. The purpose of the educational and professional program	

Training of professional and qualified specialists capable of solving the problems of research and innovation in the field of computer science and project management, which involves fluency in planning, organizing and implementing a portfolio of projects and programs for digital changes in systems of various levels, as well as the ability to manage projects using digital tools in the context of the fourth industrial revolution.

3. Characteristics of the educational and professional program	
Subject area (field of knowledge, specialty, specialization)	Field of knowledge 12 “Information technology” Specialty 122 "Computer science
Description of the subject area	***Objects of study and activity***: processes of collecting, presenting, processing, storing, transmitting, and accessing information in computer systems. ***Learning objectives***: acquiring the ability to solve research and/or innovation problems in the field of computer science. ***Theoretical content of the subject area***: modern models, methods, algorithms, technologies, processes, and methods of obtaining, representing, processing, analyzing, transmitting, and storing data in information and computer systems. ***Methods, techniques, and technologies***: methods and algorithms for solving theoretical and applied problems of computer science; mathematical and computer modeling; modern programming technologies; methods of collecting, analyzing, and consolidating distributed information; technologies and methods of designing, developing, and ensuring the quality of information technology components; computer graphics methods and data visualization technologies; knowledge engineering technologies; CASE technologies for modeling and designing IT. ***Tools and equipment***: distributed computing systems; computer networks; mobile and cloud technologies; database management systems; operating systems; information systems; and technology development tools.

Orientation of the educational and professional program	The fourth industrial revolution (Industry 4.0), caused by the development of advanced and intelligent technologies, improves not only industrial production but also methods, techniques, and tools in any activity of people and society, which leads to an increase in the needs and requirements of the educational level of specialists (students of education), who have knowledge of modern computer technologies and information processes and are able to manage IT projects. Accordingly, the educational and professional program is focused on acquiring competencies and achieving the learning outcomes provided for by the program in the form of integration of knowledge and skills in project management and computer science. The organization, provision, and implementation of educational processes in accordance with this educational and professional program reflect the full impact of the technological innovations of Industry 4.0 on the formation of competencies and program learning outcomes. According to the results of the analysis and recommendations of interested parties, two main aspects are taken into account in the

	structure of the program: 1) the importance of project management as an applied approach to digital transformation, and 2) the improvement of processes, methods, and tools of multi-project management.
Main focus of the educational and professional program and specialization	Special education in the specialty "Computer Science". The main focus is on the ability to project activity in terms of its management, taking into account the specifics of the subject area. Keywords: IT project management, information technologies, project, program, project portfolio, flexible methodologies, information projects
Program features	Compulsory practice in the specialty in the amount of 10 ECTS credits. The educational and professional program has an interdisciplinary nature, combines classical theoretical training in the field of project management and computer science with versatile, practically oriented professional training using innovative methods and digital tools, which makes it possible to form a highly qualified specialist who is able to: determine the main directions and key digital transformation strategies, to develop and implement projects based on a systemic approach during various stages of their life cycle; know and apply the principles and methods of IT project management for digital transformation, choose and use digital tools for project management, choose an IT environment for collaboration in hybrid teams in the context of the fourth industrial revolution; to have management skills of creation, balancing, risk assessment, monitoring and centralized control of a portfolio of innovative projects, to conduct intellectual data analysis.
4. Suitability of graduates for employment and further education	
Employment	Jobs in IT companies, small businesses, and institutes of the technological and information sector. Graduates are able to perform professional types of work and hold primary positions, the duties of which require the possession of competencies in the field of computer science and project management. The profession obtained by the graduate according to the current version of the National Classifier of Ukraine: Classifier of professions (DK 003:2010) with changes: 1238 Head of projects and programs 2131.2 Developers of computing systems 2132.2 Developers of computer programs 2447.2 Professionals in the field of project and program management The graduate may be admitted to take the certification exam at the Ukrainian Association of Project Management with the issuance of the professional certificate "Professional Project Manager", etc.
Further education	The possibility of studying in the program of the third educational-scientific level of higher education in the relevant field of knowledge or related educational-scientific programs of higher education that are consistent with the received master's degree, in the educational-scientific degree "Doctor of Philosophy".

	Acquisition of additional qualifications in the postgraduate education system.
5. Teaching and assessment	
Teaching and learning	The general teaching style is project-based and/or problem-oriented with possible use of "flipped classroom" approaches. Lectures, seminars, practical classes, laboratories, independent work based on textbooks, abstracts, scientific articles, open sources, and consultations with teachers. Attestation of master's degree holders is carried out in the form of public defense of master's attestation qualification work. The master's qualification work is also presented and discussed with the participation of teachers and classmates, which ends with a public defense.
Assessment	Evaluation methods and criteria are coordinated with learning outcomes and types of educational activities. Evaluation methods - exams, tests, assessment, reports on practice and laboratory work, control, term papers, presentations, current control, project work, defense of course, and certification works.
6. Curriculum competencies	
Integral competence (IC)	The ability to solve problems of a research and/or innovative nature in the field of computer science.
General competences (ZK)	**ZK01.** Ability to abstract thinking, analysis, and synthesis. **ZK02.** Ability to apply knowledge in practical situations. **ZK03.** Ability to communicate in the national language both orally and in writing. **ZK04.** Ability to communicate in a foreign language. **ZK05.** Ability to learn and master modern knowledge. **ZK06.** The ability to be critical and self-critical. **ZK07.** Ability to generate new ideas (creativity).

Special (professional) competences (SK)	**SK01.** Understanding the theoretical foundations of computer science. **SK02.** The ability to formalize the subject area of a certain project in the form of an appropriate information model. **SK03.** Ability to use mathematical methods to analyze formalized models of the subject area. **SK04.** The ability to collect and analyze data (including large data) to ensure the quality of project decision-making. **SK05.** Ability to develop, describe, analyze and optimize architectural solutions of information and computer systems for various purposes. **SK06.** Ability to apply existing and develop new algorithms for solving problems in the field of computer science. **SK07.** Ability to develop software according to formulated requirements, taking into account available resources and constraints. **SK08.** The ability to develop and implement software creation projects, including in unpredictable conditions, with unclear requirements and the

	need to apply new strategic approaches, use software tools to organize teamwork on the project. **SK09.** Ability to develop and administer databases and knowledge bases. **SK10.** The ability to assess and ensure the quality of IT projects, information and computer systems of various purposes, to apply international standards for assessing the quality of software of information and computer systems, models for assessing the maturity of information and computer systems development processes. **SK11.** Ability to initiate, plan and implement the development processes of information and computer systems and software, including its development, analysis, testing, system integration, implementation and support. **SK12.** The ability to analyze and introduce innovations in the organization based on the implementation of information and computer systems and implement digital transformation projects based on them.

7. Learning outcomes (PH)	
Learning outcomes (PH)	**PH1.** Have specialized conceptual knowledge that includes current scientific achievements in the field of computer science and is the basis for original thinking and conducting research, critical thinking of problems in the field of computer science and at the border of fields of knowledge. **PH2.** Have specialized computer science problem-solving skills necessary for conducting research and/or conducting innovative activities to develop new knowledge and procedures. **PH3.** It is clear and unambiguous to convey one's own knowledge, conclusions and arguments in the field of computer science to specialists and non-specialists, in particular to persons who are studying. **PH4.** Manage work processes in the field of information technology, which are complex, unpredictable and require new strategic approaches. **PH5.** To evaluate the results of the activities of teams and teams in the field of information technologies, to ensure the effectiveness of their activities. **PH6.** Develop a conceptual model of an information or computer system. **PH7.** Develop and apply mathematical methods for the analysis of information models. **PH8.** Develop mathematical models and methods of data analysis (including large data). **PH9.** Develop algorithmic and software for data analysis (including large data). **PH10.** To design architectural solutions of information and computer systems for various purposes **PH11.** Create new algorithms for solving problems in the field of computer science, evaluate their effectiveness and limitations on their application **PH12.** Design and maintain databases and knowledge.

	PH13. Assess and ensure the quality of information and computer systems for various purposes. **PH14.** Test the software. **PH15.** Identify the needs of potential customers regarding the automation of information processing. **PH16.** Conduct research in the field of computer science. **PH17.** Identify and eliminate problematic situations during software operation, formulate tasks for its modification or reengineering. **PH18.** Collect, formalize, systematize and analyze the needs and requirements for the information or computer system being developed, operated or supported **PH19.** To analyze the current state and global trends in the development of computer sciences and information technologies **PH 20.** Analyze the organization's needs for digital changes and propose solutions based on innovative projects.

8 - Resource support for program implementation	
Staff support	All scientific and pedagogical workers providing the educational program correspond to the profile and direction of the disciplines being taught. 100% of scientific-pedagogical workers involved in teaching professionally oriented disciplines in the specialty have scientific degrees, and 90% have academic titles and experience of practical work in the specialty. Quantitative and qualitative indicators of the level of scientific and professional activity of scientific and pedagogical workers who provide the educational process under the educational and professional program fully comply with the Licensing conditions for the implementation of educational activities of educational institutions
Material and technical support	Educational facilities allow you to fully ensure the educational process throughout the entire cycle of training under the educational and professional program, as they have a sufficient number of computerized and specialized workplaces and are equipped with the necessary computer facilities and software. Part of the equipment was purchased as part of the implementation of the international project "Virtual (on-line) master's interaction in intelligent data processing (ViMaCs)" (ID: 57602060), which was financed by the German Academic Exchange Service (DAAD) (https://go-study -europe.de/vimacs/; https://www.knuba.edu.ua/faculties/fait/kafedri-fait/kafedra-up/mtb/). Part of the equipment was purchased with funds from the European Union as part of the implementation of the project "Cross-domain competencies for healthy and safe work in the 21st century (Work4Ce)", No. 619034-EPP-1 -2020-1-UA-EPPKA2-CBHE-JP), implemented as part of the ERASMUS+ program (http://work4ce.eu/; https://www.knuba.edu.ua/faculties/fait/kafedri-fait/ chair-up/mtb/).

Informational and educational and methodological support	The official website http://www.knuba.edu.ua/ contains information about educational programs, educational and scientific activities, structural subdivisions, admission rules, and contacts. The resources of the scientific and technical library are available through the website: http://library.knuba.edu.ua/ To ensure the educational process, an educational environment based on the Moodle distance learning system is used, where the educational and methodological support materials of the OPP are placed. The TEAMS system is used for distance learning. The use of the remote educational environment of the university and the author's developments as scientific and pedagogical workers; textbooks and teaching aids with the seal of the Scientific Council of the KNUCA. Part of the teaching-methodical and training materials was developed as part of international cooperation during the implementation of the project "Cross-domain competencies for healthy and safe work in the 21st century (Work4Ce)", No. 619034 -EPP-1-2020-1-UA-EPPKA2-CBHE-JP), which is implemented within the framework of the ERASMUS+ program (http://work4ce.eu/) and the international project "Virtual (on-line) master's interaction in intelligent data processing (ViMaCs)" (ID: 57602060) (https://go-study-europe.de/vimacs/) as specified in the work programs of the educational components and/or syllabi. In addition, scientific and pedagogical workers who teach educational components related to the use of specialized software are members of the ORACLE Academy and have the right to use the relevant educational materials of the said academy. Also, during training, educational materials developed by the IT product company Genesis are used; the right to use is given to scientific and pedagogical employees of the department who have successfully completed the appropriate training from the company and received certificates.
9 – Academic mobility	
National credit mobility	The regulations of the university provide for the possibility of national credit mobility.
International credit mobility	The regulations of the university provide for the possibility of international credit mobility within the framework of Erasmus+ Program Inter-institutional agreement Key Action 1 Learning mobility for higher education students and staff and Erasmus+ KA2 projects and international projects financed by the German academic exchange network DAAD. The possibility of obtaining a diploma of higher education at the Dortmund University of Applied Sciences and Arts (Dortmund, Federal Republic of Germany) in accordance with the requirements and approaches of the Dortmund University of Applied Sciences and Arts.
Education of foreign students of higher education	Education of foreign students of higher education is conducted on general terms with additional language training.

Curriculum's components list and their logical sequence

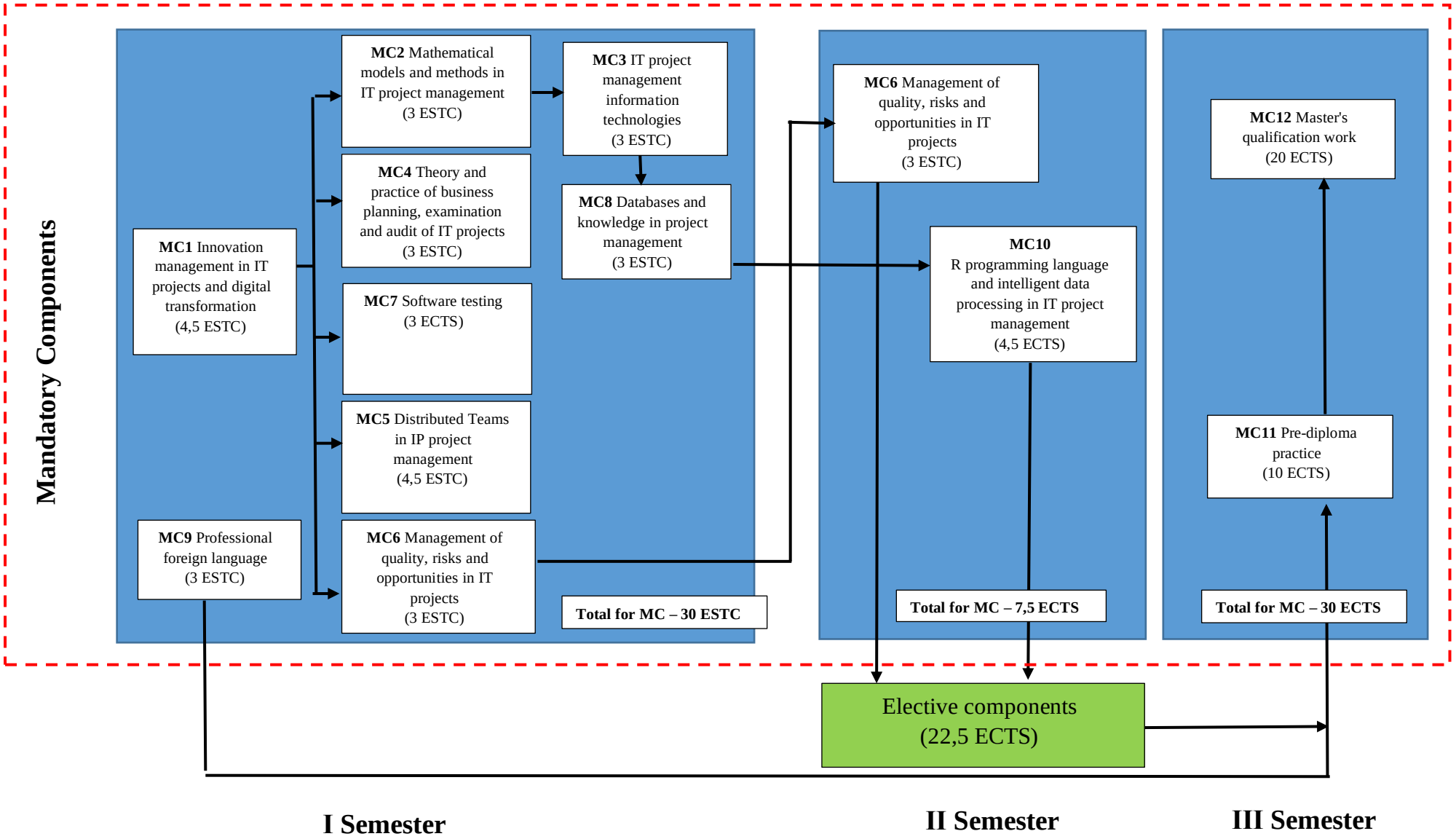
2.1 Mandatory components list

Code	Curriculum's components	Credits number (ECTS)	Final control form
1	2	3	4
Curriculum's mandatory components			
MC1	Innovation management in IT projects and digital transformation	4,5	exam
MC2	Mathematical models and methods in IT project management	3,0	credit
MC3	IT project management information technologies	3,0	credit
MC4	Theory and practice of business planning, examination and audit of IT projects	3,0	credit
MC5	Distributed Teams in IP project management	4,5	credit
MC6	Management of quality, risks and opportunities in IT projects	6,0	credit/credit
MC7	Software testing	3,0	credit
MC8	Databases and knowledge in project management	3,0	exam
MC9	Professional foreign language	3,0	credit
MC10	R programming language and intelligent data processing in IT project management	4,5	exam
MC11	Pre-diploma practice	10,0	credit
MC12	Master's qualification work	20,0	
THE TOTAL VOLUME OF MANDATORY COMPONENTS:		**67,5**	
Curriculum's elective components *(the student chooses disciplines with a total volume of 22.5 credits)*			
ВК	Disciplines of the elective component	22,5	credit
Загальний обсяг вибіркових компонент:		**22,5**	
TOTAL VOLUME OF THE CURRICULUM		**90,0**	

The student of higher education independently chooses the disciplines of the elective component in accordance with the "Regulations on the procedure for the selection of disciplines by students of the Kyiv National University of Construction and Architecture" from the university-wide catalog posted on the official website of KNUBA https://www.knuba.edu.ua/.

.

2.2. Structural and logical scheme of the educational and professional program "Project Management"



3. Form of attestation of students of higher education

The master's qualification work involves solving a complex specialized task or practical problem in the field of development and implementation of modern information and computer systems based on the application of project management approaches.

Attestation of graduates of the educational and professional program "Project Management" specialty 122 "Computer Science" is carried out in the form of defense of the master's qualification work and ends with the issuance of a document of the established model on awarding him with a master's degree. Attestation is carried out openly and publicly. The proposed work is checked for plagiarism beforehand.

There should be no academic plagiarism, falsification and fabrication in the certification work.

The qualifying thesis must be published on the official website of the institution of higher education or its structural subdivision, or in the repository of the institution of higher education.

4. Requirements for the existence of a system of internal quality assurance of higher education

Institutions of higher education should have a system for ensuring the quality of educational activities and the quality of higher education (internal quality assurance system), which provides for the implementation of the following procedures and measures:

1) determination of the principles and procedures for ensuring the quality of higher education;

2) monitoring and periodic review of educational programs;

3) annual assessment of higher education applicants, scientific and pedagogical staff of the institution of higher education, and regular publication of the results of such assessments on the official website of the institution of higher education, on information stands, and in any other way;

4) provision of advanced training of pedagogical, scientific and scientific-pedagogical workers;

5) ensuring the availability of the necessary resources for the organization of the educational process, including the independent work of students, for each educational program;

6) ensuring the availability of information systems for effective management of the educational process;

7) ensuring publicity of information about educational programs, degrees of higher education and qualifications;

8) provision of an effective system of prevention and detection of academic plagiarism in scientific works of employees of higher education institutions and students of higher education;

9) other procedures and measures.

The system of ensuring the quality of educational activities and the quality of higher education (the system of internal quality assurance) is evaluated by the National Agency for Quality Assurance of Higher Education (NAZYAVO) or independent institutions for the assessment and quality assurance of higher education accredited by it for the purpose of its compliance with the requirements for the system of higher education quality of higher education approved by the National Agency for Quality Assurance of Higher Education and international standards and recommendations for quality assurance of higher education.

5. Matrix of correspondence of program competences to the curriculum's components

	IC	ZK1	ZK2	ZK3	ZK4	ZK5	ZK6	ZK7	SK1	SK2	SK3	SK4	SK5	SK6	SK7	SK8	SK9	SK10	SK11	SK12
MC1	√	√	√			√		√		√		√								√
MC2	√	√	√			√					√									
MC3	√	√	√						√	√									√	√
MC4	√	√	√																√	
MC5	√		√	√		√	√	√								√			√	√
MC6	√	√	√			√										√		√	√	√
MC7	√		√			√									√				√	
MC8	√	√	√			√			√				√				√			
MC9	√		√		√	√														
MC10	√	√	√			√			√			√							√	√
MC11	√	√	√	√		√	√	√	√	√	√	√	√			√			√	√
MC12	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

6. The matrix of ensuring learning outcomes with the relevant curriculum's components

	PH1	PH2	PH3	PH4	PH5	PH6	PH7	PH8	PH9	PH10	PH11	PH12	PH13	PH14	PH15	PH16	PH17	PH18	PH19	PH20
MC1	√	√		√		√				√					√	√		√	√	√
MC2					√		√													
MC3		√		√	√															√
MC4				√											√					
MC5			√		√										√		√			√
MC6				√								√	√				√			√
MC7														√			√			
MC8	√								√		√	√								
MC9			√		√										√					
MC10	√	√					√	√	√						√	√		√		√
MC11	√		√			√				√					√	√	√	√	√	√
MC12	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

7. Used sources

1. Law of Ukraine "On Education" [Electronic resource]. - Access mode: http://zakon3.rada.gov.ua/laws/show/2145-19.

2. Law "On Higher Education" [Electronic resource]. - Access mode: http://zakon4.rada.gov.ua/laws/show/1556-18.

3. Levels of the National Framework of Qualifications [Electronic resource]. – Access mode: https://mon.gov.ua/ua/osvita/nacionalna-ramka-kvalifikacij/rivni-nacionalnoyi-ramki-kvalifikacij.

4. Licensing conditions for carrying out educational activities.

5. Methodological recommendations for the development of higher education standards. MONU Order No. 600 dated 01.06.2017 (as amended by MONU Orders No. 1648 dated 12.21.2017).

6. Letter of MONU dated 06/05/2018 No. 1/9-377 "Regarding providing clarifications regarding educational programs".

7. Letter of MONU dated April 28, 2017 No. 1/9-239 "Sample educational and professional program for the first and second levels of higher education"

8. Seventh edition of the Project Management Body of Knowledge (PMBOK Guide) and Project Management Standard - Project Management Institute, 2021.

9. IPMA ICB4 Reference Guide in an Agile World (Version 2.3) ISBN (Print): 978-966-986-147-4. Translation into Russian edited by Prof. Bushueva S.D., 2019, 72 p.

10. Development of the system of quality assurance of higher education in Ukraine: informational and analytical overview / Compilers: Dobko T., Zolotaryova I., Kalashnikova S., Kovtunets V., Kurbatov S., Linyova I., Lugovoi V., Prokhor I., Rashkevich Yu., Sikorska I., Talanova Zh., Finikov T., Sharov S.; in general ed. WITH. Kalashnikova and V. Lugovoi - Kyiv: SE "NVC "Prioritety", 2015. - 84 p., ISBN 978-617-7288-01-4

11. Order dated 10/25/2021 No. 810 "On approval of Amendments No. 10 to the national classifier DK 003:2010 "Profession Classifier". Access mode: https://zakon.rada.gov.ua/rada/show/v0810930-21#Text

12. Standard of higher education in specialty 122 "Computer science" field of knowledge 12 "Information technologies" for the second (master's) level of higher education (Order of the Ministry of Education and Culture of Ukraine No. 393 dated 04/28/2022).