Project (practice)

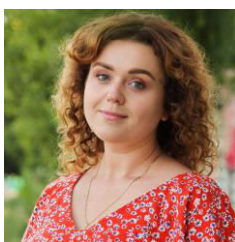|	
Specialty 122 – Computer Science	**Institute** Institute of Computer Science and Information Technology
Educational program Computer Science and Intelligent Systems	**Department** Software Engineering and Management Intelligent Technologies (321)
Level of education Bachelor's level	**Course type** Special (professional), Elective
Semester 6	**Language of instruction** English, Ukrainian

Lecturers and course developers

Iryna Liutenko

iryna.liutenko@khpi.edu.ua

Candidate of Technical Sciences (PhD), Associate Professor, Associate Professor of the Department of Software Engineering and Management Intelligent Technologies of NTU "KhPI"

Prepared and published more than 60 publications, 1 collective monograph, 1 textbook with the university stamp, 3 articles in publications indexed in Scopus (Google Scholar: https://scholar.google.com/citations?user=9EhcsRcAAAAJ; ORCID: https://orcid.org/0000-0003-4357-1826).
More about the lecturer on the department's website

Mariia Bilova

mariia.bilova@khpi.edu.ua

Candidate of Technical Sciences (PhD), Associate Professor, Associate Professor of the Department of Software Engineering and Management Intelligent Technologies of NTU "KhPI"

Prepared and published more than 50 publications (Google Scholar: https://scholar.google.com/citations?user=b3YLGToAAAAJ; ORCID-https://orcid.org/0000-0001-7002-4698; Scopus https://www.scopus.com/authid/detail.uri?authorId=57190442390).
More about the lecturer on the department's website

General information

Summary

Project practice is a part of the educational process and is conducted in the 3rd year of study in the 6th semester for full-time students. The duration of the practice is 180 hours (6 credits). Project practice is aimed at familiarizing students with the main forms of activity in the speciality 122 "Computer Science". The project practice takes place at the Department of Software Engineering and Management Intelligent Technologies and the Innovation Campus training laboratory of the National Technical University "Kharkiv Polytechnic Institute".

Course objectives and goals

Formation of practical skills in team development of a software project, taking into account all stages of its life cycle.

Format of classes

Independent work. The final control is a test.

Competencies

GC1. Ability to think abstractly, analyze and synthesize.
GC2. Ability to apply knowledge in practical situations.
GC3. Knowledge and understanding of the subject area and understanding of professional activities.
GC4. Ability to communicate in the state language both orally and in writing.
GC5. Ability to communicate in a foreign language.
GC6. Ability to learn and master modern knowledge.
GC7. Ability to search, process and analyze information from various sources.
GC8. Ability to generate new ideas (creativity).
GC9. Ability to work in a team.
GC10. Ability to be critical and self-critical.
GC11. Ability to make informed decisions.
GC12. Ability to evaluate and ensure the quality of work performed.
GC13. Ability to act on the basis of ethical considerations.
GC14. Ability to exercise their rights and responsibilities as a member of society, to realize the values of civil (free democratic) society and the need for its sustainable development, the rule of law, human and civil rights and freedoms in Ukraine.
GC15. Ability to preserve and enhance moral, cultural, scientific values and achievements of society based on an understanding of the history and patterns of development of the subject area, its place in the general system of knowledge about nature and society and in the development of society, technology and technology, to use various types and forms of physical activity for active recreation and healthy lifestyle.
PC1. Ability to mathematically formulate and study continuous and discrete mathematical models, justify the choice of methods and approaches for solving theoretical and applied problems in the field of computer science, analysis and interpretation.
PC7. Ability to apply the theoretical and practical foundations of modeling methodology and technology to study the characteristics and behavior of complex objects and systems, to conduct computational experiments with processing and analysis of results.
PC8. Ability to design and develop software using various programming paradigms: generalized, object-oriented, functional, logical, with appropriate models, methods and algorithms of computation, data structures and control mechanisms.
PC9. Ability to implement a multi-level computing model based on client-server architecture, including databases, knowledge and data warehouses, to perform distributed processing of large data sets on clusters of standard servers to meet the computing needs of users, including cloud services.
PC10. Ability to apply methodologies, technologies and tools to manage the life cycle processes of information and software systems, information technology products and services in accordance with customer requirements.
PC11. Ability to intelligently analyze data based on computational intelligence methods, including large and poorly structured data, their operational processing and visualization of analysis results in the process of solving applied problems.
PC13. Ability to develop network software that operates on the basis of various topologies of structured cabling systems, uses computer systems and data networks and analyzes the quality of computer networks.
PC14. Ability to apply methods and tools to ensure information security, develop and operate special software to protect information resources of critical information infrastructure.
PC15. Ability to analyze and functional modeling of business processes, construction and practical application of functional models of organizational, economic, production and technical systems, methods of risk assessment of their design.

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PC20. Ability to develop the architecture of software systems and their individual components in the construction of intelligent control systems in various fields, to manage the life cycle processes of software of intelligent control systems.

Learning outcomes

PLO9. Develop software models of subject environments, choose a programming paradigm from the standpoint of convenience and quality of application for the implementation of methods and algorithms for solving problems in the field of computer science.
PLO10. To use tools for developing client-server applications, design conceptual, logical and physical models of databases, develop and optimize queries to them, create distributed databases, data warehouses and showcases, knowledge bases, including cloud services, using web programming languages.
PLO11. Have the skills to manage the life cycle of software, products and services of information technology in accordance with the requirements and restrictions of the customer, be able to develop project documentation (feasibility study, terms of reference, business plan, agreement, contract).
PLO13. To know system programming languages and methods of developing programs that interact with components of computer systems, to know network technologies, computer network architectures, to have practical skills in the technology of computer network administration and their software.
PLO15. Understand the concept of information security, the principles of secure software design, ensure the security of computer networks in conditions of incomplete and uncertainty of the source data.
PLO16. Perform parallel and distributed computing, apply numerical methods and algorithms for parallel structures, parallel programming languages in the development and operation of parallel and distributed software.
PLO20. Develop the architecture of software systems and their individual components in the construction of intelligent control systems in various industries, as well as manage the life cycle processes of software of intelligent control systems.

Student workload

The total volume of the course is 180 hours (6 ECTS credits): self-study - 180 hours.

Course prerequisites

Students must complete the required general and professional training courses in 1-5 semesters of study in full.

Features of the course, teaching and learning methods, and technologies

The practice involves the independent work of higher education students in groups of 3-6 people in accordance with the main provisions of the Challenge Based Learning framework and the concept of peer-to-peer learning. In the process, students need to go through all stages of software development from the formation of a business idea to the presentation of the finished product to end users.
Students plan their working hours independently during the 6th semester, taking into account the wishes of the internship supervisor.

Program of the course

Topics of the lectures

Lectures are not provided as part of the practice.

Topics of the workshops

Workshops are not provided as part of the practice.

Topics of the laboratory classes

Laboratory classes are not provided as part of the practice.

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Self-study

During the internship, students must:
- fully fulfill the tasks provided by the internship program;
- study and comply with the rules of labor protection, safety and industrial sanitation;
- participate in the social life of the Department of Software Engineering and Management Intelligent Technologies and the Innovative Campus training laboratory;
- be responsible for the work performed on an equal footing with all students participating in the internship.

Course materials and recommended reading

Training materials and assignments are provided by the supervisors of the internship.

Assessment and grading

Criteria for assessment of student performance, and the final score structure

The main assessment measures are:
- presentation of the developed software to the commission formed from the staff of the department and/or the training laboratory "Innovative Campus" and other higher education students who are undergoing internships;
- review of the project practice report and the practice diary by the practice supervisor and the commission.
The project practice report must contain
- a description of the business idea chosen as the basis for the software project;
- description of the main stages of software design;
- a description of the architecture, functionality, and features of the developed software;
- description of the results of the developed software;
- description of the main opportunities for improving the project and ways of its further monetization.
The main stages of work on the tasks of the internship must be properly presented in the internship diary.
The defense of the internship takes place at the department or in the Innovation Campus training laboratory.

Grading scale

Total points	National	ECTS
90–100	Excellent	A
82–89	Good	B
75–81	Good	C
64–74	Satisfactory	D
60–63	Satisfactory	E
35–59	Unsatisfactory (requires additional learning)	FX
1–34	Unsatisfactory (requires repetition of the course)	F

Norms of academic integrity and course policy

The student must adhere to the Code of Ethics of Academic Relations and Integrity of NTU "KhPI": to demonstrate discipline, good manners, kindness, honesty, and responsibility. Conflict situations should be openly discussed in academic groups with a lecturer, and if it is impossible to resolve the conflict, they should be brought to the attention of the Institute's management.
Regulatory and legal documents related to the implementation of the principles of academic integrity at NTU "KhPI" are available on the website: http://blogs.kpi.kharkov.ua/v2/nv/akademichna-dobrochesnist/

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Approval

Approved by	08.06.2023	Head of the department
		Ihor HAMAIUN
	08.06.2023	Guarantor of the educational program
		Andrii KOPP

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