Syllabus
Course Program

Pre-diploma practice

Specialty
121 – Software Engineering

Institute
Institute of Computer Science and Information Technology

Educational program
Software Engineering

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

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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

General information

Summary

The undergraduate internship is part of the educational process and is conducted in the 4th year of study in the 6th semester for full-time students. The duration of the internship is 180 hours (6 credits). The undergraduate internship is aimed at developing professional skills of students majoring in 121 "Software Engineering" and collecting factual material for their thesis.
Pre-diploma practice takes place at enterprises (organizations, institutions) on the basis of concluded agreements with the regulation of the main issues of organizing the work of interns.

Course objectives and goals

Deepening and consolidation of theoretical knowledge acquired by higher education students in the process of studying a certain cycle of theoretical disciplines, practical skills, familiarization directly at the enterprise with the production process of the IT sphere, improvement of skills and abilities in the specialty 121 "Software Engineering", as well as collection of material for the thesis.

Format of classes

Independent work. The final control is a test.

Competencies

К01. Ability to think abstractly, analyze and synthesize.
К02. Ability to apply knowledge in practical situations.
К03. Ability to communicate in the state language both orally and in writing.
К04. Ability to communicate in a foreign language both orally and in writing.
К05. Ability to learn and master modern knowledge.
К06. Ability to search, process and analyze information from various sources.
К07. Ability to work in a team.
К08. Ability to act on the basis of ethical considerations.
К09. The desire to preserve the environment.
К10. Ability to act in a socially responsible and conscious manner.
К12. Ability to preserve and increase 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.
К13. Ability to identify, classify and formulate software requirements.
К14. Ability to participate in software design, including modeling (formal description) of its structure, behavior and processes of functioning.
К15. Ability to develop architectures, modules and components of software systems.
К16. Ability to formulate and ensure software quality requirements in accordance with customer requirements, terms of reference and standards.
К17. Ability to comply with specifications, standards, rules and guidelines in the professional field when implementing life cycle processes.
К18. Ability to analyze, select and apply methods and tools to ensure information security (including cybersecurity).
К19. Knowledge of data information models, ability to create software for storing, extracting and processing data.
К20. Ability to apply fundamental and interdisciplinary knowledge to successfully solve software engineering problems.
К21. Ability to evaluate and take into account economic, social, technological and environmental factors that affect the field of professional activity.
К22. Ability to accumulate, process and systematize professional knowledge of software development and maintenance and recognize the importance of lifelong learning.
К23. Ability to implement phases and iterations of the life cycle of software systems and information technologies based on appropriate software development models and approaches.
К24. Ability to carry out the system integration process, apply change management standards and procedures to maintain the integrity, overall functionality and reliability of the software.
К25. Ability to reasonably choose and master the tools for software development and maintenance.
К26. Ability to think algorithmically and logically.

Learning outcomes

PLO01. Analyze, purposefully search and select information and reference resources and knowledge necessary for solving professional problems, taking into account modern achievements of science and technology.
PLO02. To know the code of professional ethics, to understand the social significance and cultural aspects of software engineering and to adhere to them in professional activities.
PLO03. Know the basic processes, phases and iterations of the software life cycle.
PLO04. To know and apply professional standards and other regulatory documents in the field of software engineering.
PLO05. To know and apply relevant mathematical concepts, methods of domain, system and object-oriented analysis and mathematical modeling for software development.
PLO06. Ability to select and use a software development methodology appropriate to the task.
PLO07. To know and apply in practice the fundamental concepts, paradigms and basic principles of functioning of language, tools and computing tools of software engineering.
PLO08. Be able to develop a human-machine interface.
PLO09. To know and be able to use methods and tools for collecting, formulating and analyzing software

requirements.
PLO10. Conduct a pre-project survey of the subject area, system analysis of the design object.
PLO11. Select input data for design, guided by formal methods of requirements description and modeling.
PLO12. Apply effective approaches to software design in practice.
PLO13. Know and apply methods of developing algorithms, designing software and data structures and knowledge.
PLO14. Apply in practice software tools for domain analysis, design, testing, visualization, measurement and documentation of software.
PLO15. Motivated to choose programming languages and development technologies to solve the problems of creating and maintaining software.
PLO16. Have the skills of team development, coordination, design and production of all types of program documentation.
PLO17. Be able to apply methods of component software development.
PLO18. To know and be able to apply information technologies for data processing, storage and transmission.
PLO19. To know and be able to apply methods of software verification and validation.
PLO20. Know approaches to assessing and ensuring software quality
PLO21. To know, analyze, select, and competently apply means of ensuring information security (including cybersecurity) and data integrity in accordance with the applied tasks and software systems being created.
PLO22. To know and be able to apply project management methods and tools.
PLO23. Be able to document and present the results of software development.
PLO24. Be able to calculate the economic efficiency of software systems.
PLO25. Apply the principles of moral, cultural, scientific values and increase the achievements of society, use various types and forms of physical activity for a healthy lifestyle and professional activities in the field of information technology.

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 1-8 semesters of study in full.

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

The practice involves individual work of higher education students.
During the internship, higher education students should consider:
- the structure of the IT enterprise, the functions of its individual subsystems, organizational and information relationships between these subsystems, the corresponding scheme of information flows;
- technological processes in the IT sphere, in particular, information processing;
- main characteristics of modern equipment and tools for developing, testing and maintaining software systems used in the practice;
- means of organizing and planning work on the basis of practice, determine the role of existing software systems, in particular intelligent systems, in improving labor efficiency;
- means of labor protection and safety.

During the internship, students must familiarize themselves with the promising areas of development of information processing systems based on the internship; responsibilities of employees of a particular unit (at the place of internship); standards, norms and other regulatory and reference documentation used in a particular unit; prospects for the development of the enterprise and the industry.
In the course of undergraduate practice, students must participate in the performance of production tasks; in seminars, excursions, problematic lectures, trainings and other classes held at the practice site.
An individual task is drawn up with the participation of the university internship supervisor, the company internship supervisor and is agreed with the supervisor of the student's thesis after the interns are assigned to workplaces.

At the end of the internship, the student must prepare all the necessary reporting documentation, including a practice diary, a practice report and a presentation.
The working time of the internship is 30 hours per week.

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.

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 enterprise - the base of practice;
- be responsible for the work performed on an equal footing with all employees.

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 control measures are:
- obtaining feedback from the supervisor of the internship from the company;
- Presentation of the results of the internship (using a prepared presentation) to the commission, which is formed from the staff of the department authorized to evaluate the internship;
- review of the undergraduate internship report and the internship diary by the university internship supervisor and the committee.

The undergraduate internship report must contain:
- a qualitative statement of the problem;
- a description of the main technologies used to solve the problem;
- description of the main stages of software design;
- description of the architecture, functionality, features of the developed software;
- description of the results of the developed software;
- description of the results of software testing;
- description of work with data (data processing) for control examples.

The main stages of work on the tasks of the internship must be properly presented in the internship diary.
The defense of the practice takes place at the department.

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/

Approval

Approved by 08.06.2023 Head of the department
Ihor HAMAIUN

08.06.2023 Guarantor of the educational program
Uliya LITVINOVA