Syllabus
Course Program

Scientific and practical seminar Software engineering

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), Mandatory

Semester
7-8

Language of instruction
English, Ukrainian

Lecturers and course developers

First name and surname

Olga.Cherednichenko@khpi.edu.ua
Doctor of Technical Sciences, Associate Professor, Professor of the Department of Software Engineering and Intelligent Management Technologies
Work experience - 25 years. Author of more than 80 scientific and educational and methodological works. The direction of scientific activity: models of search and collection of business information based on multi-agent technologies.
Leading lecturer in the disciplines: "Software of intelligent systems", "Models of artificial intelligence", "Modern models and methods of artificial intelligence".
More about the lecturer on the department's website

General information

Summary

The discipline is aimed at the formation of knowledge, skills and abilities necessary for the use of modern methods and means of software engineering for the completion of diploma theses of the educational and qualification level by students - bachelor

Course objectives and goals

The purpose of teaching the discipline is students' study of modern information technologies, methodological and practical foundations of research work in the direction of the topic of their own diploma thesis.

Format of classes

Seminars, consultations. Final control - credit.

Competencies

K01. Ability to abstract thinking, analysis and synthesis.
K02. Ability to apply knowledge in practical situations.
K03. Ability to communicate in the national language both orally and in writing.
K04. Ability to communicate in a foreign language both orally and in writing.
K05. Ability to learn and master modern knowledge.

K06. Ability to search, process and analyze information from various sources.
K07. Ability to work in a team.
K08. The ability to act on the basis of ethical considerations.
K13. Ability to identify, categorize and formulate software requirements.
K14. Ability to participate in the design of software, including modeling (formal description) of its structure, behavior and functioning processes.
K15. Ability to develop architectures, modules and components of software systems.
K20. Ability to apply fundamental and interdisciplinary knowledge to successfully solve software engineering tasks.
K23. The ability to implement phases and iterations of the life cycle of software systems and information technologies based on appropriate software development models and approaches.
K25. The ability to reasonably choose and master software development and maintenance tools.
K26. Ability to algorithmic and logical thinking.

Learning outcomes

PR01. Analyze, purposefully search for and select the information and reference resources and knowledge necessary for solving professional tasks, taking into account modern achievements of science and technology.
PR02. Know the code of professional ethics, understand the social significance and cultural aspects of software engineering and adhere to them in professional activities.
PR03. Know the main processes, phases and iterations of the software life cycle.
PR04. Know and apply professional standards and other regulatory documents in the field of software engineering.
PR06. Ability to choose and use software development methodology appropriate to the task.
PR09. Know and be able to use methods and tools for gathering, formulating and analyzing software requirements.
PR10. Conduct a pre-project survey of the subject area, system analysis of the design object.
PR12. Apply effective software design approaches in practice.
PR14. Apply in practice instrumental software tools for domain analysis, design, testing, visualization, measurement and software documentation.

Student workload

7th semester:
The total volume of the course is 120 hours. (4 ECTS credits): practical classes – 32 hours, self-study - 88 hours.
8th semester:
The total volume of the course is 90 hours. (3 ECTS credits): practical classes – 20 hours, self-study - 70 hours.

Course prerequisites

Knowledge, skills and previous disciplines in the specialty "Software Engineering" necessary for successful completion of the course.

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

The policy of the course is aimed at covering all aspects of the preparation, design and defense of the qualification work, which is aimed at the acquisition of all software competencies by the applicants and obtaining the results of training in the "Software Engineering" specialty. Teaching and learning methods: practical classes, seminars-discussions, brainstorming, presentations, independent work with literary sources; methods of project learning.

Program of the course

Topics of the lectures

Topics of the workshops

7th semester:
Topic 1. Determination of the main goal of writing a thesis.

Topic 2. Consideration of the subject of graduation papers and tasks for their implementation for the educational and qualification level "bachelor".
Topic 3. Formation of a calendar plan-schedule for the completion of the thesis.
Topic 4. Consideration of the general structure and approximate content of the main sections of the explanatory note to the bachelor's thesis.
Topic 5. Determination of the relevance of software development and software systems for various subject areas - in industry, in the economy, in production, at the current stage of the development of society, the purpose and methods of completing a bachelor's thesis.
Topic 6. Providing a concise qualitative (verbal) description of your subject area.
Topic 7. Highlighting the main problems of developing modern software systems that are used in the subject area chosen in the thesis.
Topic 8. Analytical review of some existing PS, which can be used to solve the problems identified in the thesis and to determine one's own approach to solving the given task and motivation of the expediency of its implementation.
8th semester:
Topic 1. Construction of the general system architecture of the target software system.
Topic 2. Carrying out a motivated selection of instrumental software and information technologies, which should be used in the thesis.
Topic 3. Consideration of the peculiarities of the direct software implementation of the developed systems, their testing and support processes.
Topic 4. Assessment of the extent to which the final goal of the thesis was achieved with the help of the developed software.
Topic 5. Use of additional modern information sources during the design of work: textbooks, monographs, articles in scientific and technical publications and Internet resources.
Topic 6. Application of recommendations for the development and display of a multimedia presentation and the structure of a student's thesis defense.
Topic 7. Building logical connections of the presentation slides and the student's report on the thesis defense.
Topic 8. Requirements for the documentation of the qualification work of the bachelor's degree.
Topic 9. Familiarization with the system of prevention and detection of academic plagiarism in final qualification papers of higher education applicants.

Topics of the laboratory classes

Self-study

For independent work, the student is invited to consider the following topics.
7th semester:
General requirements for the qualification work for the educational and qualification level "bachelor". Agreement on the topic of final theses. Formation and agreement of the calendar plan-schedule for the completion of the thesis. Formation of a specific statement of the task of completing the thesis. Formation of the section "Introduction" to the qualification work. Brief review of some existing approaches and analysis of solutions to similar problems. Development of an appropriate model (or set of models) necessary for the formalization of business processes in the subject area.
Individual task 7 semester KR/ 8 semester KP), Evaluation form - final evaluation.
8th semester:
Development of algorithmic and information support for the implementation of models (methods), which are proposed in the second chapter of the thesis.
Searching for ways that exist for continuing work on one's own thesis topic and possible improvement of the obtained results
Compilation of the list of main information sources, taking into account the specifics of one's thesis.
Formation of conclusions for qualification work.
Creation of own multimedia presentation and report to it for the defense of the thesis.
Preparation for the defense of the qualification work.
Individual task of CP. The evaluation form is the final evaluation.

Course materials and recommended reading

Basic literature:

1. Methodological guidelines for the completion of diploma theses of the educational and qualification level - bachelor in the field of knowledge 12 "Information technologies" for students of specialty 121 "Software engineering" // comp. Godlevskyi M.D., Tkachuk M.V., Sokol V.E., Cherednichenko O.Yu., Shmatko O.V. - Kharkiv: NTU "KhPI" - 2018. - 53 p.
2. Fundamentals of software engineering: a study guide / E. O. Zaitsev - K.: KNTEU, 2017. - 423 p. URL: https://www.researchgate.net/publication/322028393_Navcalnij_posibnik_Teoreticni_osnovi_programnoi_inzenerii
3. Software engineering: A guide for students of higher educational institutions / I. L. Borodkina, G. O. Borodkin; Ministry of Education and Science of Ukraine, National University of Bioresources and Nature Management of Ukraine. - Kyiv: , 2018. - 254 p.
4. Standard of higher education of Ukraine: first (bachelor) level, field of knowledge 12 - Information technologies, specialty 121 - Software engineering. Approved and put into effect by the order of the Ministry of Education and Science of Ukraine dated October 29, 2018 No. 1166. https://mon.gov.ua/storage/app/media/vishcha-osvita/zatverdzeni%20standarty/12/21/121-inzheneriya- programnogo-zabezpechennya-bakalavr.pdf
5. Relevance and novelty of scientific research [Electronic resource]. – Access mode: http://pidruchniki.com/70330/buhgalter-skiy_oblik_ta_ audit/aktualnist_novizna_naukovogo_doslidzhennya.

Additional literature:

1. Regulations on the organization of the educational process at the National Technical University "Kharkiv Polytechnic Institute" http://blogs.kpi.kharkov.ua/v2/nv/dokumenti-ntu-hpi-2/
2. Code of Ethics of Academic Relations and Integrity of the National Technical University "Kharkiv Polytechnic Institute" http://blogs.kpi.kharkov.ua/v2/nv/wp-content/uploads/sites/17/2019/11/04_code_ethics.pdf
3. Provisions on the system of prevention and detection of academic plagiarism in final qualification papers of higher education applicants of the National Technical University "Kharkiv Polytechnic Institute" http://blogs.kpi.kharkov.ua/v2/nv/wp-content/uploads/sites/17 /2019/11/05_polozhennya-proekt-plagiat-1.pdf
4. Regulations on the Electronic Repository of Qualifying Graduation Theses of Graduates of Higher Education at the National Technical University "Kharkiv Polytechnic Institute" http://blogs.kpi.kharkov.ua/v2/nv/wp-content/uploads/sites/17/2019/11 /07_repozitarij_dipl_rabot_2018.pdf

Assessment and grading

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

100% final assessment in the form of credit

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