Syllabus
Course Program

Advanced web development course

Specialty
121 – Software Engineering
122 – Computer Science

Institute
Institute of Computer Science and Information Technology

Educational program
Software Engineering
Computer Science and Intelligent Systems

Department
Software Engineering and Management Intelligent Technologies (321)

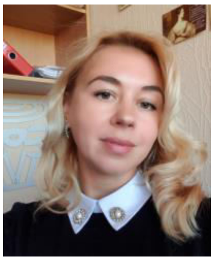
Level of education
Bachelor's level

Course type
Special (professional), Elective

Semester
4

Language of instruction
English, Ukrainian

Lecturers and course developers



Uliya Litvinova
Uliya.Litvinova@khpi.edu.ua
Ph.D. (01.05.02 Mathematical Simulation and Methods of Calculation). Associate Professor at the Department of Software Engineering and Management Intelligent Technology. Work experience – since 2006. Author (co-author) of more than 40 research papers and textbooks. (h-index = 3 in Google Scholar - https://scholar.google.com.ua/citations?user=8cVqocUAAAAJ&hl=uk; ORCID ID is https://orcid.org/0000-0001-6680-662X)General information, number of publications, main courses, etc.
Basic courses: "Fundamentals of Web Development (lectures and laboratory classes), Innovative Entrepreneurship (lectures and laboratory classes), Research and Practical Workshop "Software Engineering" (practical classes). Information systems software (practical classes)
More about the lecturer on the department's website

General information

Summary

The subject of learning the discipline is the theory and methodology of applying the PHP programming language in professional activities by future specialists.

Course objectives and goals

The purpose of studying the discipline is to form the readiness of future specialists to use the PHP programming language in professional activities.

Format of classes

Lectures, laboratory classes, consultations, self-study. Final control in the form of an exam.

Competencies

121 - Software Engineering

K02. Ability to apply knowledge in practical situations.
K05. Ability to learn and master modern knowledge.
K06. Ability to search, process and analyze information from various sources.
K13. Ability to identify, classify and formulate software requirements.
K14. Ability to participate in software design, including modeling (formal description) of its structure, behavior and processes of functioning.
K22. Ability to accumulate, process and systematize professional knowledge of software development and maintenance and recognize the importance of lifelong learning.
K25. Ability to reasonably choose and master the tools for software development and maintenance.
K26. Ability to think algorithmically and logically.

122 - Computer Science and Intelligent Systems

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.
GC6. Ability to learn and master modern knowledge.
GC9. Ability to work in a team.
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.

Learning outcomes

121 - Software Engineering

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.
PLO03. Know the basic processes, phases and iterations of the software life cycle.
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.
PLO12. Apply effective approaches to software design in practice.
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.
PLO23. Be able to document and present the results of software development.

122 - Computer Science and Intelligent Systems

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.

Student workload

The total volume of the course is 150 hours (6 ECTS credits): lectures - 32 hours, laboratory classes - 32 hours, self-study - 86 hours.

Course prerequisites

Fundamentals of web development.

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

Teaching and learning methods

Interactive lectures with presentations, discussions, laboratory classes, teamwork, case method, student feedback method, problem-based learning.

Forms of assessment (continuous assessment CAS, final assessment FAS)

Written individual assignments for laboratory works (CAS), assessment of knowledge in laboratory classes (CAS), express surveys (CAS), online tests (CAS), final/semester control in the form of a semester exam, according to the schedule of the educational process (FAS).

Program of the course

Topics of the lectures

Topic 1: HTTP protocol. Features of creating dynamic websites.

The HTTP protocol. Formation of HTTP requests. Structure and types of HTTP requests. The structure of the HTTP response. The life cycle of an HTTP request. Features of creating dynamic sites.

Topic 2. Features of developing web applications in PHP.

PHP syntax. Variables in PHP. Data types in PHP. PHP operators.

Topic 3. Development of web applications in PHP.

PHP cycles. Functions in PHP. PHP Arrays. PHP global variables.

Topic 4. Session and cookie technologies in PHP.

Features of the session in PHP. Session.use_cookies

Topic 5. Using PHP to work with databases.

Working with the MySQL database.

Topic 6: The basics of using OOP in PHP.

Inheritance in PHP object-oriented programming. Own methods and properties of a child class. Overriding parent properties and methods. Class constants in OOP. Abstract classes in PHP. Polymorphism in OOP in PHP.

Topic 7. Interfaces in PHP

Features of creating interfaces in PHP. Implementation of multiple interfaces.

Topic 8. Features of professional development in PHP.

PHP is an Open Source language. The advantages of PHP. Features of PHP frameworks.

Topic 9: Code documentation, test development, methods of deploying web applications.

Documentation of the code. PHP test development. Methods of deploying web applications. Server configuration options for your web application.

Topics of the workshops

Practical classes are not provided within the course.

Topics of the laboratory classes

Laboratory work 1. Development of web applications in PHP.

Laboratory work 2. Working with web forms and studying the features of using databases in a web application (developing an online diary - blog).

Laboratory work 3. Creating a website (user authorisation, menu system programming, working with data in XML and JSON format, working with date and time).

Laboratory work 4. Fundamentals of web application development using PHP frameworks.

Self-study

Individual tasks are not provided for in the programme.
Students are recommended additional materials (videos, articles) for self-study

Course materials and recommended reading

Compulsory

1. Mark Safronov, Jeffrey Winesett.Web Application Development with Yii 2 and PHP 2nd., 2020,-460p.
2. Julie C. Meloni PHP, MySQL & JavaScript All in One, Sams Teach Yourself. 6th Edition. 2018. 1625 p
3. McLaughlin B. PHP and MySQL. An exhaustive guide.2021,- 512p.
4. . McLaughlin B. PHP & MySQL: The Missing Manual. 2022, -560p.
5. Robin Nixon. Learning PHP, MySQL, JavaScript, CSS & HTML5. A Step-by-Step Guide to Creating Dynamic Websites., 2022, - 716p.

Recommended

1. Tom Butler. PHP & MySQL: Novice to Ninja 7th Edition.,2022. -686p.
2. Matt Zandstra. PHP Objects, Patterns, and Practice (4th Edition).,2016.- 576p

Internet resources

1. PHP Manual. PHP: website. https://www.php.net/manual/en/langref.php#langref.
2. PHP. The free way. PHP. The Free Way: website. //http://iflista.github.io/php-the-right-way/

Assessment and grading

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

100% Final assessment as a result of Final exam (30%) and Continuous assessment (70%).
30% Final exam
70% Continuous assessment:
Module №1 (15%)
Module№2 (15%)
Laboratory works (40%)
Laboratory work №1 (10%)
Laboratory work №2 (10%)
Laboratory work №3 (10%)
Laboratory work №4 (10%)

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
Andrii KOPP