Syllabus
Course Program

Fundamentals of Web Development

Specialty
121 – Software Engineering

Institute
Institute of Computer Science and Information Technology

Educational program
Software Engineering

Department
Software Engineering and Management Intelligent Technologies (321)

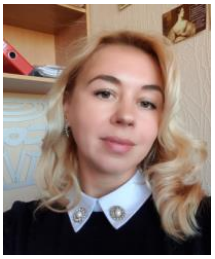
Level of education
Bachelor's level

Course type
Special (professional), Mandatory

Semester
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

Introduction of students to the principles of creating and layout of HTML documents; introduction of students to the basics of CSS and JavaScript; mastering the skills of effective programming in JavaScript; study of the principles of DHTML; introduction of students to the capabilities of the JQuery library for creating dynamic web applications.

Course objectives and goals

Formation of students' theoretical and practical knowledge of the basics of website design and design technologies; getting practical skills in the field of modern web programming.

Format of classes

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

Competencies

К02. Ability to apply knowledge in practical situations.
К05. Ability to learn and master modern knowledge.
К06. Ability to search, process and analyze information from various sources.
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.
К22. Ability to accumulate, process and systematize professional knowledge of software development and maintenance and recognize the importance of lifelong learning.
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.
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.

Student workload

The total volume of the course is 120 hours (6 ECTS credits): lectures - 32 hours, laboratory classes - 32 hours, self-study - 56 hours.

Course prerequisites

Fundamentals of Software Engineering
Models and data structures
Object-oriented programming
Computer networks.

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. Introduction to the fundamentals of web programming.
Subject and object of the course "Fundamentals of Web Development". Composition and purpose of software application of the WWW-system. Types of software as part of the WWW and its use. The concept and types of architectures of software systems. Software application of WWW-systems and web

development tools. Integrated software component development environments. Organisation of interfaces between components. Built-in editors and interfaces of software development tools. WWW architecture: client/server architecture of the Internet. Overview of Web technologies. Web standards.
Topic 2. Hypertext HTML language
The concept of hypertext. Evolution of HTML standards. Levels of HTML. The concept of the HTML language. The structure of an HTML document. The structure of HTML code. Language objects. Basic tags and its usage. Creating a website based on a template. Types of website templates. HTML templates. The concept of layout. The structure of websites.
Topic 3. Using CSS cascading style tables
The concept of cascading style sheets. The history of CSS versions. Relationships between multiple nested elements. Creating CSS styles. The relationship between HTML and CSS. Rules for writing CSS. Cascading CSS
Topic 4. JavaScript language for client scripts.
Introduction to JavaSript: basic concepts and definitions. Methods of connecting JavaSript to HTML documents. Collaboration of scripts and HTML. Features of interaction with browsers. Features of taking into account the type of browser
Topic 5. Dynamic HTML.
Development of dynamic HTML documents.
Topic 6. The object model of a web document.
The use of the Web Document Object Model (DOM) and the concept and use of Web forms.
Topic 7. The HTTP protocol.
Technologies for developing web-oriented information systems. Web servers in information systems and their configuration

Topics of the workshops

The workshops are not provided within the course.

Topics of the laboratory classes

Laboratory work 1. HTML. Creating web pages using the HTML language.
Laboratory work 2 Cascading style sheets. Practical use of CSS.
Lab 3 Working with web forms. Creating web forms using HTML.
Laboratory work 4 Dynamic HTML. JavaScript objects
Laboratory work 5 Development of dynamic web pages using JavaScript and DOM API.

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

Basic

1. Wagner G. Building Front-End Web Apps with Plain JavaScript.,2020.-333c.
2. Duckett Jon. HTML and CSS: Design and Build Websites, 2020. - 514 c.
3. Terry Ann Felke-Morris. Web development And Desin Foundations with HTML5 (8 edition), 2017.
4. Herron D. Node.js Web Development – 4 edition., 2018. – 492c.
5. Mike McGrath. CSS in Easy Steps, 2020.- 192c.
6. Eric Freeman, Elizabeth Robson Head First. JavaScript programming. – Fabula., 2022.-450 p.
7.Darnell R. JavaScript., 2020.
8. Haverbeke M. Eloquent JavaScript 3rd edition., 2018.-436c.

Recommended

1. Sheldon R. MySQL: a basic course . Dialectics, 2017.
2. Dakett J. HTML and CSS: Design and Build Websites, 2018.

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 (8%)
Laboratory work №2 (8%)
Laboratory work №3 (8%)
Laboratory work №4 (8%)
Laboratory work №5 (8%)

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