



## Syllabus

### Course Program



# Fundamentals of Web Development

## Specialty

122 – Computer Science

## Educational program

Computer Science and Intelligent Systems

## Level of education

Bachelor's level

## Semester

4

## Institute

Institute of Computer Science and Information Technology

## Department

Software Engineering and Management Intelligent Technologies (321)

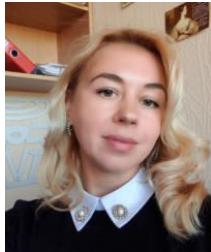
## Course type

Special (professional), Mandatory

## Language of instruction

English, Ukrainian

## Lecturers and course developers



### Uliya Litvinova

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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

- 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

- 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 120 hours (6 ECTS credits): lectures - 32 hours, laboratory classes - 32 hours, self-study - 56 hours.

## Course prerequisites

Databases  
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 JavaScript: basic concepts and definitions. Methods of connecting JavaScript 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**

Practical classes 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

Andrii KOPP