National Technical University of Ukraine
"Igor Sikorsky Kyiv Polytechnic Institute"

Department of Biomedical Engineering

Web technologies and web design

Syllabus of the academic discipline (Syllabus)

Academic discipline requirements	
Level of higher education	***First (bachelor's)***
Branch of knowledge	*16 Chemical and Bioengineering*
Specialty	*163 Biomedical Engineering*
Educational program	*Medical Engineering*
Discipline status	*Selective*
Form of study	*Full-time (daytime) / blended / distance learning*
Year of training, semester	*4th year, spring semester*
Scope of the discipline	*4 ECTS credit modules (120 hours)*
Semester control/control measures	*Final Test, MTW, essay*
Class schedule	*Lectures (30 hours), practical classes (30 hours), ISW (60 hours)* *(According to the schedule on the website https://schedule.kpi.ua)*
Language of instruction	*Ukrainian / English*
Information about the course leader/teachers	*Lecturer: Candidate of Physical and Mathematical Sciences, Associate Professor, Solomin Andriy Vyacheslavovich, a.solomin@kpi.ua ; andr-sol@i.ua* *Practical: Candidate of Physical and Mathematical Sciences, Associate Professor, Solomin Andriy Vyacheslavovich, a.solomin@kpi.ua ; andr-sol@i.ua*
Teacher profile	*https://intellect.kpi.ua/profile/sav231* *http://bmi.fbmi.kpi.ua/department/staff-department/*
Course placement	*https://do.ipo.kpi.ua/course/view.php?id=2285*

Academic discipline program

1. Description of the academic discipline, its purpose, subject of study and learning outcomes

Purpose of discipline

The main goal of the academic discipline "Web Technologies and Web Design" is to develop in students the ability to design, create and maintain websites, choosing optimal solutions; operate databases on the server; design software components; and freely navigate modern trends in the industry.

According to statistics, the need for web specialists is growing the most in the IT industry.

This is due to the increasing transition to virtual communication in all areas: from ordinary websites of organizations and individuals to the Internet of Things. Web technologies are also widely used in biomedical engineering. The most striking example is telemedicine, which is now considered a priority area in government programs.

Subject of the discipline

The academic discipline "Web Technologies and Web Design" studies a complex of interrelated technologies used in the processes of creating, supporting, and maintaining websites as an important component of the digitalization of society.

According to the educational and professional programs (EPP) of the first "bachelor's" level of higher education, after studying the discipline, students can acquire (strengthen) the following competencies.

Integral competence (IC) *- The ability to solve complex specialized tasks and practical problems in biomedical engineering or in the process of learning, which involves the application of certain theories and methods of chemical, biological and medical engineering, and is characterized by the complexity and uncertainty of conditions (reinforcement).*
General competencies:
GC 1 *- Ability to apply knowledge in practical situations (reinforcement).*
GC 2 *- Knowledge and understanding of the subject area and understanding of professional activity (reinforcement).*
GC 4 *- Skills in using information and communication technologies (reinforcement).*
GC 6 *- Ability to search, process and analyze information from various sources (reinforcement).*
GC 7 *- Ability to generate new ideas (creativity) (reinforcement).*
GC 8 *- Ability to make informed decisions (reinforcement).*

Special (professional) competencies:
PC 1 *- Ability to use engineering software packages for conducting research, analyzing, processing and presenting results, as well as for automated design of medical devices and systems (amplification).*
PC 3 *- Ability to learn and apply new methods and tools for analysis, modeling, design, and optimization of medical devices and systems (enhancement).*
PC 10 *- Ability to apply the principles of building modern automated production control systems for medical devices, their technical, algorithmic, information and software support (enhancement).*

Ability *to design, create and maintain complex websites, choosing optimal solutions; operate databases on the server; design software components; implement software architecture prototypes; freely navigate modern industry development trends.*

According to the EPP, as a result of mastering the academic discipline, students must demonstrate the following program learning outcomes:
PLO 5 *- Be able to use databases, mathematical and software for data processing and computer modeling of biotechnical systems (amplification).*
PLO 13 *- Be able to analyze signals transmitted from organs to devices and process diagnostic information (signals and images) (amplification).*
PLO 14 *- Be able to analyze the level of compliance with modern world standards, as well as evaluate solutions and formulate tasks for the development of automated control systems, taking into account the capabilities of modern technical and software tools for the automation of medical equipment (amplification).*
PLO 20 - *Knowledge and use of methods for researching biomedical engineering objects, methods and means of systematizing and processing experimental information, methods of statistical processing for modeling and simulation of processes and systems of physical and biological nature, modern programming technologies and tools that support their use, methods for designing digital and microprocessor systems for medical purposes (amplification).*

Be able *to apply the acquired knowledge in professional activities during the development, debugging and operation of information systems; develop web applications based on the optimal use of modern technologies; configure software for different platforms, and support a software product throughout its life cycle.*

2. **Prerequisites and postrequisites of the discipline (place in the structural and logical scheme of study according to the relevant educational program)**

According to the structural and logical scheme of the specialist training program, the discipline "Web Technologies and Web Design" is included in the list of elective disciplines aimed at the formation of general and professional competencies.

Prerequisites - the academic discipline is taught in the 8th semester of the 4th year of study and does not directly depend on other academic disciplines in the structural and logical scheme of the educational program. The basis for studying the academic discipline is basic knowledge of the disciplines of the computer science block: "Basics of Informatics", "Object-oriented Programming".
Postrequisites - this course has no interdisciplinary connections. The practical skills and theoretical knowledge acquired while studying the academic discipline "Web Technologies and Web Design" can be used in the future when completing pre-diploma practice, for preparing diploma theses in the specialty and in further practical work in the specialty.

3. Content of the academic discipline

The main topics covered in the course:

Topic 1. Introduction. Internet services. Structure and principles of the web. Internet protocols. Internet addresses. Domain zones, IDN. Web servers and web clients.

Topic 1.1. History of the emergence and development of the Internet. Services on the Internet. The Web as one of the Internet services. The structure of the Web. Basic concepts and terms in the Web. Web pages and websites.

Topic 1.2. Protocols in network technologies. Protocols in the global Internet. Ports. HTTP protocol.

Topic 1.3. Clients and servers. Requests and responses. Sessions. URL. DNS, IDN. Hosting.

Topic 1.4. Purpose and principles of client-side and server-side scripting. Overview of client-side and server-side scripting languages, their advantages and limitations.

Topic 2. Implementation of the principle of separation of site structure, design and content in CMS technology.

Topic 2.1. Trends in modern programming - separation of structure, design and content of the site. Ideology of CMS/CMF.

Topic 2.2. The structure of modern CMS, their capabilities and advantages of use.

Topic 2.3. Local servers Denver, WAMP , MAMP , LAMP , XAMPP , their installation and configuration.

Topic 3. Common CMS types in the web environment. Basic principles of using CMS Joomla.

Topic 3.1. Common CMS types in the web environment.

Topic 3.2. Basic principles of using CMS Joomla.

Topic 3.3. Installation and configuration of CMS Joomla.

Topic 3.4. Templates, pages, categories, menus, multimedia elements.

Topic 4. Technology for creating websites based on CMS WordPress.

Topic 4.1. Basic principles of using CMS WordPress.

Topic 4.2. Installing and configuring WordPress CMS.

Topic 4.3. Topics, pages, posts, menus, multimedia elements, extensions.

Topic 5. GIT version management technology. GitHub repository and its use.

Topic 5.1. Advantages of using version management systems.

Topic 5.2. GIT Basics. Distributed GIT.

Topic 5.3 GIT tools.

Topic 5.4. GitHub Repository.

Topic 6. Creating an object structure of website pages using HTML. Features and advantages of using modern HTML5 technology.

Topic 6.1. Site planning. Logical site structure. Structural elements of pages. Rules for building HTML documents. Tags, their purpose and rules of use.

Topic 6.2. Physical and logical formatting of documents.

Topic 6.3. Main differences and advantages of using HTML5.

Topic 6.4. Semantic tags in the site structure.

Topic 6.5. Multimedia and graphics capabilities of HTML5.

Topic 7. Implementation of the principle of separation of object structure and site design in CSS technology. Features and advantages of using modern CSS3 technology.

Topic 7.1. CSS Basics. Rules. CSS Selectors.

Topic 7.2. Properties. CSS Cascading. CSS Support by Different Browsers.

Topic 7.3. Differences and advantages of using CSS3 over CSS2. Approaching CSS3 technology to the capabilities of the page object model.

Topic 7.4. Principles of building mobile interfaces, media queries.

Topic 8. Client-side scripts. JavaScript is the basis of typical client-side scripting technology.

Topic 8.1. Java Script Syntax.

Topic 8.2. Variables, operators..

Topic 8. 3. Functions, arrays.

Topic 8. 4. Interaction with HTML documents.

Topic 8. 5. New opportunities and prospects of JavaScore.

Topic 9. Advanced JavaScript capabilities. Programmatic interaction with HTML documents based on the DOM API

Topic 9.1. Object-oriented technologies in Java.

Topic 9.2. Objects. DOM and BOM.

Topic 9.3. jQuery is an example of the fruitful use of object-oriented programming technology in web applications.

Topic 10. Modern JavaScript specifications and trends in the universal use of their OOP technology.

Topic 10.1. Modern JavaScript specifications (ECMAScript), strict mode.

Topic 10.2. Add-ins (TypeScript) and features of their use.

Topic 11. Overview of server-side scripting languages and technologies for web applications.

Topic 11.1. PHP Overview.

Topic 11.2. Variables, operators.

Topic 11.3. Interacting with HTML documents.

Topic 11.4. Object-oriented programming tools in PHP.

Topic 11.5. Other server-side scripting technologies for web applications.

Topic 12. XML Schema Description Language and its application in web technologies. Formatting and transformation of XML documents using CSS and XML. XML-to-XML transformation of XML documents.

Topic 12.1. XML language.

Topic 12.2. Internal DTD Schemas.

Topic 12.3. Namespaces. Elements. Data types. DOM XML.

Topic 12.4. Converting XML documents. Formatting and converting an XML document using CSS and XML. XML to XML conversion.

Topic 12.5. Technologies for processing XML documents. Filtering and sorting XML data. Accessing XML attributes.

Topic 13. Modern universal technology for creating web applications based on the MEAN stack

Topic 13.1. New trends in the development of web application development technologies.

Topic 13.2. Mongo, Express, Angular, Node – components of the MEAN stack technologies.

Topic 13.3. Advantages and disadvantages.

Practical classes

The main tasks of the practical training cycle (PC):

- developing skills in the optimal and effective application of modern information technologies when designing software components, acquiring the ability to use theoretical knowledge in practical activities, and practical skills in working with computer technology.

Topics of practical work:

1. *Installation of the Apache web server based on WAMP "Denver".*
2. *Installing and configuring a local XAMPP web server.*
3. *Installation and basic principles of using CMS Joomla.*
4. *Using the advanced capabilities of CMS Joomla to create complex websites.*
5. *Installation and basic principles of using CMS WordPress.*
6. *Using the advanced features of the WordPress CMS to create complex websites.*
7. *Creating a structure of site page objects using HTML .*
8. *Using cascading style sheets in website design.*
9. *Using advanced CSS features in site design .*
10. *CSS technologies and JavaScript tools in web design .*
11. *JavaScript client-side scripting technology in Web design .*
12. *Using the advanced capabilities of JavaScript client-side scripting technology in WEB design .*
13. *Development and transformation of XML pages.*

4. Educational materials and resources

Basic literature

To prepare for lectures, practical classes, modular tests, individual assignments, independent work, etc., basic and additional literature (hereinafter referred to as literature) is used. The literature that must be used to master the discipline is studied by students independently using Internet resources, the Sikorsky platform. In distance learning conditions, you can prepare using the literature posted in e-form in the distance course on the academic discipline https://do.ipo.kpi.ua/course/view.php?id=2285 .

1. *Босько В.В., Константинова Л.В., Марченко К.М., Улічев О.С. Web-програмування. Частина 1 (frontend): навч. посіб. – Кропивницький: ЦНТУ, 2022. – 208 с. Режим доступу: https://dspace.kntu.kr.ua/server/api/core/bitstreams/2bfb5a3c-54d9-4283-89c1-5e190e8aa151/content*
2. *Соломін А.В. Веб-орієнтована розробка програмного забезпечення: практикум [Електронний ресурс]: навчальний посібник для студентів спеціальності 122 „Комп'ютерні науки та інформаційні технології" для всіх спеціалізацій / А.В.Соломін; КПІ ім.Ігоря Сікорського. – Електронні текстові данні (1 файл: 2,33 Мбайт). – Київ: КПІ ім.Ігоря Сікорського, 2018 – 131с. – Режим доступу: http://ela.kpi.ua/handle/123456789/23678.*
3. *Трофименко О. Г. Веб-технології та веб-дизайн: навч. посібник / О. Г. Трофименко, О. Б. Козін, О. В. Задерейко, О. Є. Плачінда. – Одеса: Фенікс, 2019. – 284 с.*
Режим доступу: https://dspace.onua.edu.ua/server/api/core/bitstreams/ae28ae9f-d248-4ec9-8ac2-deb56416f8c2/content
4. *Сучасні технології Web-програмування: навч. посіб. / Н. Ф. Хайрова, С. В. Петрасова. Харків: ФОП Панов А.М., 2020. – 112 с.*
Режим доступу: https://repository.kpi.kharkov.ua/server/api/core/bitstreams/9ccbf302-0771-4efa-9e78-06c413fcfb07/content
5. *WEB-технології: навч.-метод. комплекс / Сергій Онищенко. – Бердянськ: "БДПУ", 2016. – 500 с. Підручник надається студентам в електронному вигляді виклдачем на е-пошту студентів групи.*
6. *Цеслів О.В. Основи програмування та веб-дизайн: Навч. посіб. –К., КПІ ім. Ігоря Сікорського,*

2020 –149с. Підручник надається студентам в електронному вигляді виклдачем на е-пошту студентів групи. Режим доступу:
https://ela.kpi.ua/server/api/core/bitstreams/a5fb4c77-59d3-463e-b2fd-caa1fae0d920/content

7. Web-програмування. Лабораторний практикум [Електронний ресурс]: навч. посіб. / А. Ю. Шелестов, Н. М. Куссуль; КПІ ім. Ігоря Сікорського. – Електронні текстові дані (1 файл: 1047 Кбайт). – Київ: КПІ ім. Ігоря Сікорського, 2021. – 61 с. Підручник надається студентам в електронному вигляді виклдачем на е-пошту студентів групи.

8. Web Development Essentials (030) (Version 1.0) / Linux Professional Institute: Learning Materials, 2022. – 357 p. Access mode: https://learning.lpi.org/en/learning-materials/030-100/

9. Fundamentals of Web Programming: Practical Tutorial [Electronic resource]: tutorial is aimed at students of the specialty 121 "Software Engineering" (educational program "Software Engineering of Multimedia and Information Retrieval Systems") / Igor Sikorsky Kyiv Polytechnic Institute; Liubov M. Oleshchenko. – Electronic text data (1 file: 4.78 Megabyte). – Kyiv: Igor Sikorsky Kyiv Polytechnic Institute, 2021. – 138. Access mode:. https://ela.kpi.ua/handle/123456789/42208

Additional literature

1. Цеслів О.В. WEB-програмування: навч. посіб. / О.В.Цеслів. – К.: НТУУ «КПІ», 2011. – 298 с. Режим доступу: https://pdf.lib.vntu.edu.ua/books/2020/Cesliv_2011_298.pdf

2. Scott Chacon, Ben Straub. Pro Git. – APress, 2019. – 549с. – Посібник надається студентам в електронному вигляді виклдачем на е-пошту студентів групи.

3. WEB-технології [Електронний ресурс]: навч. посіб. / Укладач: О. С. Бунке ; КПІ ім. Ігоря Сікорського. – Електронні текстові дані (1 файл: 1,0 Мбайт). – Київ: КПІ ім. Ігоря Сікорського, 2020. – 28 с. Підручник надається студентам в електронному вигляді виклдачем на е-пошту студентів групи.

4. Проценко О.Б. Web-програмування та web-дизайн. Технологія XML. Навчальний посібник. [Електронний ресурс]. – Суми: Видавництво СумДУ, 2009. – 127 с. – Режим доступу: http://www.essuir.sumdu.edu.ua/bitstream/123456789/1691/1/Procenko111.doc

Information resources

1. HTML textbook. – Access mode: http://on-line-teaching.com/html/ 2.
2. JavaScript textbook. – Access mode: http://javascript.ru/ .
3. jQuery library . – http://jquery.com/
4. Electronic campus. – login.kpi.ua
5. Sikorsky Platform – https://do.ipo.kpi.ua/course/view.php?id=2285

The list of information resources includes their sources.

Educational content

5. Methodology for mastering an academic discipline (educational component)

10 lecture sessions and 12 practical classes (PC) are planned, during which, among other things, a modular test work is planned.
Since the discipline "Web Technologies and Web Design" is considered difficult to master and is developing very rapidly, and also taking into account the requirements of the industry standard and the specifics of medical and biological applications and the significantly heterogeneous nature of the students' prior training, it is planned to be guided by the following recommendations when teaching it.
The following teaching methods are used when studying the educational material:

Lectures are held using the explanatory and illustrative method, the problem-based presentation method.
Practical classes are held using:
1) Reproductive method, thanks to which students consolidate the studied theoretical material and learn to use it in specific tasks.
2) Partial search, or heuristic, method, which teaches how to find the right ways and methods for solving problems.
The methodological model of teaching the discipline is based on the use of active learning methods. The organization of the educational process is based on the following principles:
- choosing teaching methods depending on various factors affecting the organization of the educational process, on the contingent of students;
- combining several methods into a single teaching module in order to increase the efficiency of the learning process;
- active participation of students in the learning process;
- conducting practical classes that contribute to the acquisition of skills and experience in solving problems;
- providing examples of using theoretical material in real practical situations;
- emphasizing the specifics of the subject in relation to medical and biological aspects of use, interest in new achievements and technologies;
- flexible and differentiated approach to each student, taking into account the degree of previous training;
- forecasting the development directions of web technologies in the future.
During training and for interaction with students, modern information, communication and network technologies are used, and an appropriate online course on the "Sikorsky" platform has been developed and is constantly being improved.

Topic names	**Lectures**		**Practical classes**		**ISW**	**Assessment of practical classes (PC)**
	Weekly teaching	Hours	Weekly teaching	Hours	Hours	
Topic 1. Introduction. Internet services. Structure and principles of the web. Internet protocols. Internet addresses. Domain zones, IDN. Web servers and web clients Topic 2. Implementation of the principles of separating the structure, design and content of the site in CMS technology	1	3	1-2	4	5	PC 1.2
Topic 3. Common CMS types in the web environment. Basic principles of using CMS Joomla	2	3	2-3	4	5	PC 3, 4
Topic 4. Technology for creating websites based on CMS WordPress	3	3	3-4	4	5	PC 5.6
Topic 5. GIT version management technology.	4	3	5	2	3	PC 7

GitHub repository and its use Topic 6. Creating an object structure for website pages using HTML. Features and advantages of using modern HTML5 technology						
Topic 7. Implementation of the principle of separation of object structure and site design in CSS technology. Features and advantages of using modern CSS3 technology	*5*	*3*	*5-6*	*4*	*5*	*PC 8, 9*
Topic 8. Client-side scripts. JavaScript is the basis of typical client-side scripting technology	*6*	*3*	*7*	*3*	*3*	*PC 10*
Topic 9. Advanced - JavaScript capabilities. Programmatic interaction with HTML documents based on the DOM API.	*7*	*3*	*8*	*3*	*3*	*PC 11*
Topic 10. Modern JavaScript specifications and trends in the universal use of their OOP technology. Topic 11. Overview of server-side scripting languages and technologies for web applications	*8*	*3*	*9*	*2*	*3*	*PC 12*
Topic 12. XML Schema Description Language and its Application in Web Technologies. Formatting and Transformation of XML Documents Using CSS and XML. XML to XML Transformation	*9*	*3*	*9-10*	*2*	*3*	*PC 13*
Topic 13. Modern universal technology for creating web applications based on the MEAN stack. Modular test work	*10*	*3*			*2*	
Modular test work			*10*	*2*	*2*	*MCW*
Essay			*9-10*		*15*	*essay*
Final test			*11*	*(2)*	*6*	***Final test***
Total hours		***30***		***30***	*60*	

Recommendations for mastering the training sessions (in the form of a detailed description of each session and planned work):

5.1. Lectures

List of didactic aids for lectures: Lecture notes, projection multimedia equipment; Power presentation Point, methodological materials on the Sikorsky platform (Moodle); for distance learning, the Zoom platform.

No.	Title of the lecture topic and list of main questions (list of didactic aids, tasks for the SRS with references to literature)	Number of hours
1	***Topic 1. Introduction. Internet services. Structure and principles of the web. Internet protocols. Internet addresses. Domain zones, IDN. Web servers and web clients.*** *Topic 1.1. History of the emergence and development of the Internet. Services on the Internet. The Web as one of the Internet services. Web structure. Basic concepts and terms in the web. Web pages and websites. Topic 1.2. Protocols in network technologies. Protocols in the global Internet. Ports. HTTP protocol. Topic 1.3. Clients and servers. Requests and responses. Sessions. URL. DNS, IDN. Hosting. Topic 1.4. Purpose and principles of client and server scripting. Overview of client and server scripting languages, their advantages and limitations.* ***List of teaching aids:*** *Lecture notes; projection multimedia equipment; Power presentation Point, methodological materials on the Sikorsky platform (Moodle); for distance learning - the Zoom platform.* ***Tasks for the ISW:*** *1. Review the lecture material, prepare for practical classes on these sections, study of literary sources [1, Sections 1,1-1.2]*	**1.5**
2	***Topic 2. Implementation of the principles of separating the structure, design and content of the site in CMS technology.*** *Topic 2.1. Trends in modern programming - separating the structure, design and content of the site. Ideology of CMS/CMF. Topic 2.2. Structure of modern CMS, their capabilities and advantages of use. Topic 2.3. Local servers Denver, WAMP, MAMP, LAMP, XAMPP, their installation and configuration.* ***List of teaching aids:*** *Lecture notes; projection multimedia equipment; Power presentation Point, methodological materials on the Sikorsky platform (Moodle); for distance learning - the Zoom platform.* ***Tasks for the ISW:*** *1. Review the lecture material, prepare for practical classes on these sections, study of literary sources [2, Sections 1-3]*	**1.5**
3	***Topic 3. Common CMS types in the web environment. Basic principles of using CMS Joomla.*** *Topic 3.1. Common CMS types in the web environment. Topic 3.2. Basic principles of using CMS Joomla. Topic 3.3. Installation and configuration of CMS Joomla. Topic 3.4. Templates, pages, categories, menus, multimedia elements.* ***List of teaching aids:*** *Lecture notes; projection multimedia equipment; Power presentation Point, methodological materials on the Sikorsky platform (Moodle); for distance learning - the Zoom platform.* ***Tasks for the ISW:*** *1. Review the lecture material, prepare for practical classes on these sections, study of literary sources [2, Section 2,3]*	**3**
4	***Topic 4. Technology for creating websites based on CMS WordPress.*** *Topic 4.1. Basic principles of using CMS WordPress. Topic 4.2. Installing and configuring CMS WordPress. Topic 4.3. Themes, pages, posts, menus, multimedia elements, extensions..* ***List of teaching aids:*** *Lecture notes; projection multimedia equipment; Power presentation Point, methodological materials on the Sikorsky platform (Moodle); for distance learning - the Zoom platform.* ***Tasks for the ISW:*** *1. Review the lecture material, prepare for practical classes on these sections, study literary sources [Moodle: https://do.ipo.kpi.ua/pluginfile.php/478890/mod_assign/introattachment/0/%D0%9F%D1%80%D0%B0%D0%BA%D1%82%D0%B8%D1%87%D0%BD%D1%96%20%D0%B7%D0%B0%D0%BD%D1%8F%D1%82%D1%82%D1%8F%204-6.pdf?forcedownload=1]*	**3**

5	***Topic 5. GIT version management technology. GitHub repository and its use.*** *Topic 5.1. Advantages of using version management systems.* *Topic 5.2. GIT Basics. Distributed GIT. Topic 5.3 GIT Tools. Topic 5.4. GitHub Repository..* ***List of teaching aids:*** *Lecture notes; projection multimedia equipment; Power presentation Point, methodological materials on the Sikorsky platform (Moodle); for distance learning - the Zoom platform.* ***Tasks for the ISW:*** *1. Review the lecture material, prepare for practical classes on these sections, study literary sources [Moodle: https://do.ipo.kpi.ua/pluginfile.php/583882/mod_resource/content/1/Git%20-%20%D0%A1%D0%B8%D1%81%D1%82%D0%B5%D0%BC%D0%B8%20%D0%BA%D0%BE%D0%BD%D1%82%D1%80%D0%BE%D0%BB%D1%8E%20%D0%B2%D0%B5%D1%80%D1%81%D1%96%D0%B9.pdf]*	***1.5***
6	***Topic 6. Creating an object structure of site pages using HTML. Features and advantages of using modern HTML5 technology.*** *Topic 6.1. Site planning. Logical site structure. Structural elements of pages. Rules for building HTML documents. Tags, their purpose and rules for use. Topic 6.2. Physical and logical formatting of documents. Topic 6.3. Main differences, advantages of using HTML5. Topic 6.4. Semantic tags in the site structure. Topic 6.5. Multimedia and graphic capabilities of HTML5.* ***List of teaching aids:*** *Lecture notes; projection multimedia equipment; Power presentation Point, methodological materials on the Sikorsky platform (Moodle); for distance learning - the Zoom platform.* ***Tasks for the ISW:*** *1. Review the lecture material, prepare for practical classes on these sections, study of literary sources [1, 1.5-1.7; 2, Section 4]*	***1.5***
7	***Topic 7. Implementation of the principle of separation of object structure and site design in CSS technology. Features and advantages of using modern CSS3 technology.*** *Topic 7.1. CSS basics. Rules. CSS selectors. Topic 7.2. Properties. CSS cascading. CSS support by different browsers. Topic 7.3. Differences and advantages of using CSS3 compared to CSS2. Approaching CSS3 technology to the capabilities of the object model of the page. Topic 7.4. Principles of building mobile interfaces, media queries.* ***List of teaching aids:*** *Lecture notes; projection multimedia equipment; Power presentation Point, methodological materials on the Sikorsky platform (Moodle); for distance learning - the Zoom platform.* ***Tasks for the ISW:*** *1. Review the lecture material, prepare for practical classes on these sections, study of literary sources [1, 1.8, 1.9; 2, Section 5]*	***3***
8	***Topic 8. Client-side scripts. JavaScript language is the basis of typical client-side scripting technology.*** *Topic 8.1. JavaScript syntax. Topic 8.2. Variables, operators..* *Topic 8.3. Functions, arrays. Topic 8.4. Interaction with HTML documents. Topic 8.5. New possibilities and prospects of JavaScgirt.* ***List of teaching aids:*** *Lecture notes; projection multimedia equipment; Power presentation Point, methodological materials on the Sikorsky platform (Moodle); for distance learning - the Zoom platform.* ***Tasks for the ISW:*** *1. Review the lecture material, prepare for practical classes on these sections, study of literary sources [1, Section 3; 2, Sections 8, 9]*	***3***
9	***Topic 9. Advanced JavaScript capabilities. Programmatic interaction with HTML documents based on the DOM API.*** *Topic 9.1. Object-oriented technologies in JavaScript. Topic 9.2. Objects. DOM and BOM. Topic 9.3. jQuery is an example of the fruitful use of object-oriented programming technology in web applications.* ***List of teaching aids:*** *Lecture notes; projection multimedia equipment; Power presentation Point, methodological materials on the Sikorsky platform (Moodle); for distance learning - the Zoom platform.* ***Tasks for the ISW:***	***3***

	1. Review the lecture material, prepare for practical classes on these sections, study of literary sources [1, Section 4; 2 Section 10]	
10	***JavaScript specifications and trends in the universal use of their OOP technology.*** *Topic 10.1. Modern specifications JavaScript (ECMAScript), strict mode. Topic 10.2. Extensions (TypeScript) and features of their use.* ***List of teaching aids:*** *Lecture notes; projection multimedia equipment; Power presentation Point, methodological materials on the Sikorsky platform (Moodle); for distance learning - the Zoom platform.* ***Tasks for the ISW:*** *1. Review the lecture material, prepare for practical classes on these sections, study of literary sources [1, Section 4; 2, Sections 11,12; Moodle: https://do.ipo.kpi.ua/pluginfile.php/490470/mod_resource/content/1/%21_JavaScript_ECMA.pdf]*	***1.5***
11	***Topic 11. Overview of server-side scripting languages and technologies for web applications.*** *Topic 11.1. Overview of PHP. Topic 11.2. Variables, operators. Topic 11.3. Interaction with HTML documents. Topic 11.4. Object-oriented programming tools in PHP. Topic 11.5. Other server-side scripting technologies for web applications.* ***List of teaching aids:*** *Lecture notes; projection multimedia equipment; Power presentation Point, methodological materials on the Sikorsky platform (Moodle); for distance learning - the Zoom platform.* ***Tasks for the ISW:*** *1. Review the lecture material, prepare for practical classes on these sections, study of literary sources [2, Sections 14,15; 4]*	***1.5***
12	***Topic 12. XML Schema Description Language and its Application in Web Technologies. Formatting and Transformation of XML Documents Using CSS and HTML. HTML Transformation of XML Documents.*** *Topic 12.1. XML Language. Topic 12.2. Internal DTD Schemas. Topic 12.3. Namespaces. Elements. Data Types. DOM XML. Topic 12.4. Transformation of XML Documents. Formatting and Transformation of an XML Document Using CSS and HTML. HTML Transformation of an XML Document. Topic 12.5. Technologies for Processing XML Documents. Filtering and Sorting XML Data. Accessing XML Attributes.* ***List of teaching aids:*** *Lecture notes; projection multimedia equipment; Power presentation Point, methodological materials on the Sikorsky platform (Moodle); for distance learning - the Zoom platform.* ***Tasks for the ISW:*** *1. Review the lecture material, prepare for practical classes on these sections, study of literary sources [2, Section 7; 8]*	***3***
13	***Topic 13. Modern universal technology for creating web applications based on the MEAN stack.*** *Topic 13.1. New trends in the development of web application creation technologies. Topic 13.2. Mongo, Express, Angular, Node – components of the MEAN stack technology. Topic 13.3. Advantages and disadvantages.* ***List of teaching aids:*** *Lecture notes; projection multimedia equipment; Power presentation Point, methodological materials on the Sikorsky platform (Moodle); for distance learning - the Zoom platform.* ***Tasks for the ISW:*** *1. Review the lecture material, prepare for practical classes on these sections, study literary sources [Moodle: https://do.ipo.kpi.ua/pluginfile.php/478907/mod_resource/content/1/%D0%9B%D0%B5%D0%BA%D1%86%D1%96%D1%8F%20%D1%81%D1%82%D0%B5%D0%BA%20MEAN.pdf]*	***3***
Total		***30***

5.2. Practical work

1. *Installation of the Apache web server based on WAMP "Denver".*
2. *Installing and configuring a local XAMPP web server.*
3. *Installation and basic principles of using CMS Joomla.*

4. *Using the advanced capabilities of CMS Joomla to create complex websites.*
5. *Installation and basic principles of using CMS WordPress.*
6. *Using the advanced features of the WordPress CMS to create complex websites.*
7. *Creating a structure of site page objects using HTML .*
8. *Using cascading style sheets in website design.*
9. *Using advanced CSS features in site design .*
10. *CSS technologies and JavaScript tools in web design .*
11. *JavaScript client-side scripting technology in Web design .*
12. *Using the advanced capabilities of JavaScript client-side scripting technology in WEB design .*
13. *Development and transformation of XML pages.*

Distance learning platform:

For more effective communication in order to understand the structure of the academic discipline "Web Technologies and Web Design" and master the material, e-mail, Telegram channel, the distance learning platform "Sikorsky" based on the Moodle system of KPI-Telecom and the service for conducting online meetings Zoom are used, with the help of which:

- the efficiency of communication with students increases, convenient feedback is provided;

- the placement, access and exchange of educational material is simplified;

- students' learning tasks are assessed;

- student activity is analyzed.

6. Student's independent work (Self-study, ISW)

The following types of independent work are planned: preparation for lectures and practical classes; performance, processing of practical work results, preparation of a report; preparation for a modular test work; writing an essay. A total of 60 hours are planned for independent work.

6.1. Topics for independent study – not planned

6.2. Preparation for lectures and practical classes. To prepare for lectures and practical classes, the student must study the planned basic and auxiliary literature, recommended sources, and prepare material for discussion in class. The student is allocated 37 hours of SIW for this.

6.3. Modular test work. 2 hours of SIW are allocated for preparation for the MCW.

6.4. Completion of an individual assignment - an essay. 15 hours of SIW are allocated for the preparation and design of the essay. The student must choose and approve the topic of the essay from the teacher no later than 4 weeks from the beginning of the academic semester. The deadline for submitting the essay to the teacher is no later than 8 weeks. The defense of the essay is planned at an unscheduled session from 9 to 10 weeks. Methodological recommendations for completing the essay are given in Appendix 1.

6.5. Credit. Credit is given at the credit session, after students complete the module test and defend the individual assignment - an essay and reports on the PC. Based on the results of the rating points scored for the semester, the applicant receives credit without additional tests, if the sum of the points scored is not less than 60. Applicants who have fulfilled all the conditions for admission to the credit and have rating points from 31 to 59, or wish to improve their result - take a credit test or undergo an interview on credit questions. 6 hours of SIW are allocated for preparation for the test. During the distance learning period, the test can be conducted according to the class schedule using the Sikorsky platform and the Zoom online meeting platform.

No. salary	Types of independent work	Number hours
1	Preparation for lectures and practical classes	10
2	Completion of tasks on the topic of practical classes	27
3	Preparation for the modular test	2
4	Writing an essay	15

5	Test	6
Together		**60**

Policy and control

7. Academic discipline policy (educational component)

7.1.Incentive points

Incentive points	
Criterion	Weighted score
Using new technologies not provided for in the curriculum when completing an essay and practical work	+1
Taking additional distance learning courses on topics agreed upon with teachers	+5
Preparation of a scientific paper for participation in a student scientific paper competition	+10
Writing theses, articles, participation in international, all-Ukrainian and/or other events or competitions on the topic of the academic discipline	+5

However, according to the provisions of https://osvita.kpi.ua/node/37, clause 2.7, the amount of incentive points cannot exceed 10% of the rating scale.

7.2.Rules for attending classes

Attending lectures and practical classes is not mandatory, but desirable, since it is through mastering the lecture material that systemic competencies are formed, which are then consolidated in practical classes.

The assessment system is focused on receiving points for student activity, as well as completing tasks that can develop practical skills and abilities.

Missed practical classes can be completed and defended within a week (remote option possible).

7.3.Rules for completing an individual task

The main goal of completing an individual assignment (essay) is to solve a practical problem using theoretical material learned in lectures and independently, and practical skills obtained on the PC. The student can write an essay only on a topic agreed with the teacher.

Methodological recommendations for writing an abstract are given in Appendix 1.

The abstract is evaluated according to the following criteria: the overall design of the created site, the quality of the site content, the quality of the page code, client and server scripts (or the use of plugins in the case of CMS), the quality of the content and the design of the explanatory note.

Deadline for submitting an abstract for review: 8th week of study. The abstract defense is held in weeks 9-10.

The abstract is not checked for plagiarism, but must meet the requirements of academic integrity. If academic dishonesty is detected, the work is canceled and not checked.

7.4.Deadline and rescheduling policy

Missed control measures (defense of practical work) must be completed in subsequent classes, provided that the task scheduled for the current class or consultations is completed.

A missed control measure (MCM) can be completed at an additional (consultation) session, but only in case of a missed test for good reasons.

An essay submitted for review after the deadline is evaluated with a reduced number of weighted points.

7.5. Procedure for appealing the results of control measures

Students have the opportunity to raise any issue related to the examination procedure and expect it to be addressed according to predetermined procedures.

The student has the right to appeal the results of the control measure in accordance with the approved regulations on appeals at Igor Sikorsky Kyiv Polytechnic Institute (approved by order No. HOH/128/2021 dated 05/20/2021) - https://osvita.kpi.ua/index.php/node/182

7.6.Distance learning

Distance learning takes place through the Sikorsky Distance Learning Platform.

Distance learning through additional online courses on a specific topic is permitted subject to agreement with students. If a small number of students wish to take an online course on a specific topic, studying the material through such courses is permitted, but students must complete all tasks provided for in the academic discipline.

The list of courses is offered by the teacher after students express their desire (since the bank of available courses is updated almost every month).

The student provides a document confirming completion of the distance learning course (in the case of completing the full course) or provides completed practical tasks from the distance learning course and, subject to passing an oral interview with the teacher on the topics covered, may receive grades for the control measures provided for the subjects studied.

Practical classes, as well as individual assignments, are carried out during independent work of students in remote mode (with the possibility of consulting with the teacher via email and social networks).

7.7.Learning in a foreign language

Teaching in English is provided only for foreign students.

At the request of students, it is allowed to study the material using English-language online courses on topics that correspond to the topics of specific classes.

7.8.University policy

Academic integrity

The policy and principles of academic integrity are defined in Section 3 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". More details: https://kpi.ua/code .

Norms of ethical behavior

The norms of ethical behavior of students and employees are defined in Section 2 of the Code of Honor of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". More information: https://kpi.ua/code.

7.9.Inclusive learning

The academic discipline " Web Technologies and Web Design " can be taught to most students with special educational needs, except for students with severe visual impairments that prevent them from completing tasks using personal computers, laptops, and/or other technical means.

8. Types of control and rating system for assessing learning outcomes (ALO)

***Current control**: carried out during classes and aims to check the level of students' preparation for classes and the current implementation of the curriculum. During practical classes, reports on PC are completed and defended. It is also provided for the implementation of modular test work and individual assignments.*

***Calendar control**: not carried out for 4th year students.*

Evaluation and control measures

Control measures evaluation system:

No.	Control measure	%	Weighted score	Number	Total
1.	Practical classes (PC)	65	5	13	65
2.	Essay	15	15	1	15
3.	Modular test work	20	20	1	20
	Total				100

The results are announced to each student individually in person or remotely (on the Sikorsky platform or by e-mail).

8.1.Execution and defense of reports from practical classes

13 PC reports are planned.

*The weight of the report is 5 points. The maximum number of points for reports is 5 points * 13 reports - 65 points.*

Report evaluation criteria:

" **Excellent** ": the work was completed without errors, in full, during the defense, complete and solid knowledge of the relevant material was demonstrated **The report** was submitted on time and all requirements for its preparation were met.	5 points
" **Good** ": minor inaccuracies were made in the work, knowledge of the relevant material with minor inaccuracies was demonstrated during the defense **Report –** submitted on time and all requirements for its preparation were met	4 points
" **Sufficient** ": The work contains some errors that are made due to negligence and lack of consistent skills, when defending the relevant material, the student's answer is incomplete or contains an inaccurate answer to theoretical questions **Report –** not submitted on time and not all requirements for its preparation were met	3 points
" **Unsatisfactory** ": the work contains fundamental errors, incomplete (incorrect) calculations, incomplete or inaccurate (incorrect) answers to theoretical questions. work **report was not submitted and was not protected without a valid reason.**	0 points

8.2. Essay

Weighted score – 15 points.

The essay is evaluated according to the following criteria: overall design of the created site, quality of site content, quality of page code, client and server scripts (or use of plugins in the case of CMS), quality of content and design of the explanatory note. Each criterion is evaluated on a 5-point scale.

Criteria for evaluating the components of an essay

No.	Essay	%	Weighted score	Num.	Total
1.	Overall design of the created site	20	5	1	3
2.	Site content quality	20	5	1	3
3.	Quality of page code, client and server scripts (or use of plugins in the case of CMS)	33	5	1	5
4.	Quality of content and design of the explanatory note	27	5	1	4
	Total				15

8.3.Modular test work

The weighted score of the MTW is 20 points (5 tasks of 4 points each).

There are 5 tasks in the MTW in total. The weighted score of each task is 4 points. The maximum number of points for the MTW is 4 points x 5 tasks = 20 points.

The evaluation criterion for each MTW task according to the table:

No.	Modular test work	%	Weighted score
1.	Complete and exhaustive answer (at least 90% of the required information)	100	4
2.	Minor errors in the answer (at least 75% of the required information)	75	3
3.	There are shortcomings in the answer and certain errors (at least 60% of the required information)	60	2.5
4.	The answer is missing or incorrect.	0	0

If academic misconduct is detected during distance learning, the control measure is not taken into account, and the student is not allowed to defend his/her thesis.

***Calendar control** (CC) - Not conducted for 4th year students.*

In order to receive the highest rating, the student must: timely and qualitatively complete, prepare and defend PC reports and an abstract, and accordingly complete the MTW.
A student may appeal a teacher's grade by submitting a complaint to the teacher no later than the day after the student is informed of the grade. The complaint will be considered according to the procedures established by the university.

***Conditions for admission to semester control**: having at least 40 points and completing the MTW, as well as completing and defending all reports on the PC and the essay with a score of no less than "sufficient".*

A student receives a credit without additional tests if the sum of the points scored is not less than 60. A student who received more than 60 points in the semester, but wishes to improve his/her result, can take part in a credit test or a survey on questions before the credit. In this case, the final result consists of the points received in the credit test or during the survey.
Applicants who have met all the admission requirements and have a rating score of less than 60 points take a credit test (CT). The final result consists of the points obtained in the credit test and the defense of the essay.

The final test is conducted at the final session.
The credit test is evaluated out of 100 points and is determined as the sum of the points for the credit test and the points for the individual semester assignment (essay). In this case, the size of the credit test evaluation scale is reduced by the maximum value of the points provided for the essay (15 points). https://osvita.kpi.ua/node/37 (p.3.12)

The test task on the credit test consists of two parts: theoretical questions (4 questions); practical task (1 task): Based on the size of the scale RD = R test + R essay = 100 points
R test = RD - R essay = 100 - 15 = 85 points
Practical task assignment – weighted score 17
Theoretical credit question – weighted score 17.
Maximum number of points: 17 points x 1 practical task + 17 points x 4 theoretical questions = 85 points

The criterion for evaluating a theoretical credit question is -	
" **Excellent** ", the answer is correct (at least 90% of the required information)	17-15 points
" **Good** ", there are minor errors in the answer (at least 75% of the required information)	14-13 points
" **Enough** ", there are shortcomings in the answer and certain errors (at least 60% of the required information).	12-10 points
"**Unsatisfactory**", the answer is missing or does not meet the requirements for "Satisfactory"	0 points

The criterion for evaluating the practical assignment is -	
" **Excellent** ", all task requirements are met (at least 90% of the required information)	17-15 points
" **Good** ", all requirements for the task are met, or there are minor errors (at least 75% of the required information)	14-13 points
" **Sufficient",** there are shortcomings in fulfilling the requirements of the task and there are certain errors. (at least 60% of the required information).	12-10 points
"**Unsatisfactory**", the answer is missing or does not meet the requirements for "Satisfactory"	0 points

Table of correspondence of rating points to grades on the university scale:

Number of points	*Rating*
100-95	Excellent
94-85	Very good
84-75	Good
74-65	Satisfactorily
64-60	Enough
Less than 60	Unsatisfactorily
Admission conditions not met	Not allowed

9. Additional information on the discipline (educational component)

A list of questions for preparing for the module test, as well as for preparing for the exam, is provided in Appendix 2.

Scientific and pedagogical workers can make clarifications to the content modules, RSA and tasks for the practical classes, MCW and essay, taking into account their own methodological developments and the surrounding situation.

Distance learning *through additional online courses on a specific topic is allowed subject to agreement with students. If a small number of students wish to take an online course on a specific topic, studying the material using such courses is allowed, but students must complete all the tasks provided for in the academic discipline. The list of courses is offered by the teacher after students express their desire (since the bank of available courses is updated almost monthly). The student provides a document confirming completion of the distance course (in the case of completing the full course) or provides completed practical tasks from the distance course and, subject to an oral interview with the teacher on the topics covered, can receive grades for the control measures provided for the topics studied.*

The working program of the academic discipline (syllabus):

Compiled by: Associate Professor, Candidate of Physical and Mathematical Sciences, Solomin Andriy Vyacheslavovich

Approved by the Department of Biomedical Engineering (Minutes No. 16 dated 06/21/2024);

Approved by the Methodological Commission of the Faculty (Minutes No. 9 dated 06/26/2024)

Appendix 1 to the syllabus of the discipline " Web Technologies and Web Design "

Methodological recommendations for completing an individual task (Essay)

An individual semester assignment is planned for the semester – an essay, which is completed during independent student work (ISW) and involves the student independently performing certain practical work based on the learned theoretical material.

The purpose of the individual task is to provide students with in-depth study of individual sections of the curriculum, to acquire skills and experience in the practical application of the acquired knowledge, and to provide additional control and self-control of the quality of the educational process. Each student must independently complete an essay, demonstrating the ability to develop a structure and design, design and create a website, choose the optimal technologies for the task, configure and maintain a software product, using the acquired theoretical knowledge and acquired abilities for practical activity.

The content of the task is for each student to create and place on a local server or free host a website, for example, their own resume-portfolio website (but not necessarily - the topic is free; for example, it can be some online textbook, a travel agency catalog, about a faculty or specialty, about a singer or football player, etc.). If a resume-portfolio website is chosen based on the topic, then its goal is to facilitate further employment. In this case, the website should contain pages of autobiography, scientific interests and achievements during studies and the topic of the thesis, hobbies and plans for the future, as well as wishes for future work after graduation.

The site should include client and server scripts, the ability to send messages to the administrator, comments, image galleries, videos, RSS, several widgets, etc. In addition to the site itself, each student should be provided with an explanatory note with an analysis and justification of the technologies and design solutions used, containing the site structure with comments, screenshots, as well as testing results for different browsers.

The created site is displayed in one of the following ways:

- *displayed on the student's laptop (once quarantine and martial law end);*
- *hosted on free hosting;*
- *Due to quarantine and martial law, a demonstration in the form of detailed sequential screenshots in an explanatory note is possible.*

The explanatory note, which is a mandatory component of the work performed, must contain:

- *title page (sample attached);*
- *introduction according to general requirements for scientific and technical documents, i.e. highlighting the goal, tasks, methods and tools for solving them;*
- *the main part with an explanation of the site structure, structural elements, applied technologies, design elements, site navigation, why such technologies and elements were chosen, with screenshots and testing results;*
- *conclusions with an analysis of the degree and optimality of methods for achieving the goal and fulfilling the tasks set.*

(The recommended volume is approximately 1 author's sheet, i.e. approximately 20 pages of A4 format. If the distance learning mode does not end, then you do not need to print it, but only send it electronically in a Word document).

Essay evaluation criteria

1) Overall site design, aesthetics of appearance, ease of navigation, and accessibility of all site pages.
2) Content quality, distribution of information between site pages, drawing users' attention to priority topics.
3) Using classification of materials by categories, managing access rights of authors and users, convenient and effective menus, keywords and facilitating indexing by search engines, editing (own design) templates and styles, using several different modules.
4) Quality of the content of the explanatory note – explanation of the site structure, structural elements, applied technologies, design elements, site navigation, why such technologies and elements were chosen. Design of the introduction and conclusions of the explanatory note in accordance with the general requirements for scientific and technical documents.

Special attention is paid to the introduction and conclusions during evaluation, as this concerns the quality of any scientific and technical publications, including theses, and the design of the abstract can be considered training in this sense.

The general scheme for constructing the introduction and conclusions of any scientific and technical publication is as follows.

The introduction should include:
- *The relevance of the problem that led to the choice of the topic of the work, a brief background of the issue according to the chronological or conceptual principle.*
- *The purpose of the work.*
- *In accordance with the goal, the following tasks are set (objectives are formulated):*

1)…
2)…
3)…

- *Methods and technologies for performing work.*

The structure of the introduction looks schematically as follows:

- in the "relevance" section, based on the background, the relevance of the topic of the work is substantiated, that is, its potential usefulness is revealed;

- in the "goal" section, the goal of the work is formulated, that is, what is planned to be achieved as a result of the work to realize the formulated potential utility;

- the "tasks" section sets several tasks, the step-by-step solution of which will ensure the achievement of the formulated goal.

It should be noted that the conclusions to the work are built in a similar order, that is, it is noted that the goal (from the introductory part) was achieved (fully or to some extent with a brief analysis) by solving the tasks set by such and such methods or means (each task should be highlighted separately). Next, the practical significance is analyzed, recommendations for further work in this direction are made.

(See sample abstract cover page on the next page.)

Teacher */Solomin A.V./*

SAMPLE COVER LETTER

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
National Technical University of Ukraine
“Igor Sikorsky Kyiv Polytechnic Institute”
Faculty of Biomedical Engineering

ESSAY

from discipline

"Web technologies and web design"

on the topic**:**

« (for example) **Student resume website »**

(the topic could be more interesting)

Done by

3rd year student

Groups ____

_____

(Full name)

Kyiv 2024

Appendix 2 to the syllabus of the discipline "Web Technologies and Web Design"

List of questions to prepare for the module test work, and also for preparation for the test

Topic 1. Basics of the web

What Internet services do you know?
What are data exchange protocols and what protocols do you know on the Internet?
What is a URL? The structure of a full URL and the purpose of all its fields.
What are the principles of building IDN (Internationalized Domain Names)? What is Punycode?.
What are HTTP, FTP, SMTP, POP3? Describe.
What is the <!DOCTYPE> tag? Describe its full syntax (structure) and the purpose of its fields.
Explain the purpose of server-side web scripts? Describe the server-side scripting languages you know.
Explain the purpose of client-side web scripting? Describe the client-side scripting languages and tools you know.
Describe the structure of domain names. What is DNS? Describe the operation of a DNS server. What are root servers?
Describe the purpose and basic principles of the "three whales of the web": TCP/IP, HTTP, HTML.
What is MIME? Examples.
Explain the main differences between HTML5 and earlier versions.

Topic 2. Web design

Methods for adding styles (CSS) to a web page.
How do you understand cascading in cascading style sheets (CSS)? CSS priorities when applying different styles to the same element at the same time.
CSS syntax.
What are selectors in CSS and what are the types of selectors?
What are contextual selectors in CSS (for nested tags) and how are they designated?
What are child and adjacent selectors in CSS and how do they differ from contextual selectors? Examples.
What are Class selectors in CSS and how are they designated?
What are pseudo-classes in CSS? Give examples.
How and why are the float and clear attributes used for block elements on a web page?
Explain the main differences between CSS3 and earlier versions.

Topic 3. Basics of XML.

What is the root element in XML and where in an XML document is this information recorded? Where does a parser start parsing an XML document?
How does XML allow for the use of designer-created tag names? Where do XML parsers get information about these names and the rules for their use?
What are CDATA sections in XML?
XML language syntax.
Principles of using XSL stylesheets and XSLT.
DOM XML. Transforming XML documents.
Internal DTD schemas.
What is the Namespaces mechanism in the XML standard and what is it used for?
What does each field in these XML records mean: <?xml version="1.0"?>
<!DOCTYPE hello SYSTEM "hello.dtd">
What does the following XML entry mean: <!ELEMENT hello (title, body)>
<!ELEMENT title (#PCDATA)>
<!ELEMENT body (#PCDATA)>

Topic 4. Web programming (client-side scripts)

Describe all the methods for linking (embedding) JavaScript code into an HTML document and the ways in which JavaScript code can be executed.

What is a collection in JavaScript and how is it different from an array? What collections of the Document object do you know?

The concept of the Document Object Model (DOM) in JavaScript – explain the idea and structure of the DOM.

Properties, methods, and events for objects in JavaScript - how they are used in web scripts.

What is the Math object used for in JavaScript?

What is the Date object used for in JavaScript?

How can you pass a variable number of arguments to functions in JavaScript? What is the arguments object?

Describe the ideas for creating animation in JavaScript.

Describe the basic principles of using CMS (Content management system) on the web. Give examples of CMS.

Topic 5. Task.