

O. M. BEKETOV NATIONAL UNIVERSITY OF URBAN ECONOMY IN KHARKIV

Educational and Scientific Institute of Energy, Information and Transport Infrastructure



WORK PROGRAMME OF THE ACADEMIC DISCIPLINE
DEVELOPMENT OF CLIENT AND SERVER WEB APPLICATIONS
(FRONT-END / BACK-END)


type of discipline, code for EP	<i>Compulsory, RC26</i>
semester	<i>semester number 4</i>
number of ECTS credits	<i>4</i>
form of final control	<i>exam</i>
language of instruction, teaching and assessment	<i>English</i>
department	<i>Computer Science and Information Technology</i>

for higher education applicants:

level of higher education	<i>first (bachelor's degree)</i>
branch of knowledge	<i>12 Information Technology</i>
specialty	<i>122 Computer Science</i>
educational programme	<i>Computer Science</i>
form of study	<i>full-time</i>

2021 – 2022 ACADEMIC YEAR

Developers:

Surname and initials	Position, email	Scientific degree, academic title	Signature
Boris BOCHAROV	Associate Professor Boris.Bocharov@kname.edu.ua	PhD in Technical Science (Candidate of Technical Science), Associate Professor	

The work programme was approved **at the proceedings** of the Department of *Computer Science and Information Technology*

Minutes dated « 30 » 08 2021 No. 2

Head of the Department  (Maryna NOVOZHYLOVA)

The work programme of the discipline corresponds to the Educational Programme « Computer Science »

Guarantor of the Educational Programme  (Mykola PAN)

1. The purpose of the discipline

The purpose of studying the discipline is the formation of theoretical knowledge and practical skills in the technology of creation and maintenance of: hardware and software systems for creating web applications; software for maintenance of data warehouses, including cloud, mastering of modern programming technologies.

2. Interdisciplinary connections

The study of this discipline is directly based on the disciplines "Web Design", "Computer Graphics", "Programming".

3. Learning outcomes

Programme learning outcome	Teaching methods	Forms of evaluation	Learning outcomes of the discipline
LO10 Use tools for developing client-server applications, design conceptual, logical and physical models of databases, develop and optimize queries to them, create distributed databases, repositories and showcases of databases, knowledge bases, including cloud services, using web languages - programming.	Verbal, visual, practical	Oral survey, testing in Moodle, practical testing of skills Individual task defence. Exam (in writing with tickets)	Know the theoretical foundations and modern methods of using XML, JavaScript and DOM technologies. Be able to develop front-end and back-end applications using the latest computer technology; analyze the quality of their operation.
LO13 Know the languages of system programming and methods of program development that interact with the components of computer systems, know network technologies, computer network architectures, have practical skills in computer network administration technology and their software			Know modern methods and technologies of parallel computing in the development and operation of distributed information systems. Be able to use high-performance computing tools based on cloud services and technologies.

4. Programme of the discipline

Module 1. Development of client and server web applications (Front-end / Back-end)

Content module 1. Client application development technologies

Issues related to modern information technologies aimed at website development, creation of user interfaces and web applications are considered.

Content module 2. Server web application development technologies

Issues related to web page formatting, color assignments, fonts, styles, placement of individual blocks, and other aspects of appearance are considered.

Content module 3. Information technology business in the internet space

The issues of modern block layout technologies in the design and creation of Front-end and Back-end web applications are considered. Blocks are placed in the <div> tag.

5. Structure of the discipline and distribution of time

Content modules	Number of hours				
	total	lectures	practice	lab	independent work
MODULE (semester 4)	120	34	34		52
Content module 1	30	14	14		2
Content module 2	30	14	14		2
Content module 3	15	6	6		3
Individual task	30				30
Final control	15				15

6. Themes of the lectures

Theme	Contents (plan)	Number of aud. hours
Content module 1		
CSS basics	CSS basics. Tasks of colors, fonts, styles. Location of individual blocks. Other aspects of presenting the appearance of web pages. The main purpose of CSS development. Separate the description of the logical structure of a web page from the description of the appearance of this web page.	4
Interaction of JavaScript and CSS	CSS style management. Programming styles. Style attribute of document elements. The style property of the Element object. Use in JavaScript scripts. CSSStyleDeclaration object. Properties of this object.	4
Working with the DOM-model.	Object Window. Document property. Document object. Document Object Model (DOM), Application Programming Interface. Working with HTML and XML documents	6

Content module 2		
Principles of block layout	The basic element of the block structure. Tag div. Principles of division. Separation of content from design. Using HTML and CSS in different files). Using tables.	4
Back-end application programming	Server programming languages. Writing programs that run on the server side. Technologies for programming back-end applications.-Programming languages PHP, Java, Perl, Python, Ruby. PHP syntax. PHP operators, PHP variable languages. Control constructions of PHP language. Work with arrays. Working with forms	4
Hosting the site	Microsoft Azure cloud platform. Microsoft Azure student license from our university. Creating a Back-end application in Microsoft Azure. Corporate mailbox registration. Microsoft account registration. Join Azure and create the first application.	6
Content module 3		
Web structure and principles	Web basics. Web as a field of information technology, development and layout of websites. Content and formatting Create various user interfaces. The main stages of creating web applications: idea, technical task, layout, HTML + CSS layout, programming of functionality, hosting, promotion.	2
HTML basics	HTML (Hypertext Markup Language). Structuring and displaying a web page. Web page content. Browsers work. Web page formatting. Adding activity items.	2
Basics of web programming.	Basic web programming languages. Programming technologies. Client programming languages. Server programming languages. Client-server technology.	2

7 Themes of the practical classes

Theme	Contents (plan)	Number of aud. hours
Content module 1		
Lexical structure, data types, constants and JavaScript variables	Basic concepts of the basic language. External scripts, order of execution. Code structure. Modern standard, "use strict". Six data types, typeof. Identifiers and reserved words	4
JavaScript control constructs	The main operators. Comparison operators and logical values. Conditional operators: if, '?. Logical operators. Type conversion for primitives. Cycles. Switch construction	4

Object-oriented programming in functional and prototype style	OOP in a functional style. Internal and external interface. Functional inheritance. OOP in the prototype style. F.prototype property and creation of objects through new. Built-in "classes" in JavaScript. Their classes on prototypes. Inheritance of classes in JavaScript	6
Content module 2		
Web page formatting	Units: px, em, rem and others. Display property. Property float. Position property. Centering is horizontal and vertical. Font-size and line-height properties. White-space property. Outline property. Box-sizing property. The margin property. Overflow property. Features of the height property in%. CSS sprite. CSS formatting rules	4
Document and page objects	Environment: DOM, BOM and JS. DOM tree. Working with the DOM from the console. Navigation on DOM-elements. Modern DOM: polyphiles. Attributes and DOM properties. Methods contains and compareDocumentPosition. Adding and removing nodes	4
Basics of working with events	The order of event handling. The object of the event. Ascent and interception. Delegation of events. Reception of designing "behavior". Default browser actions. Generation of events on elements. Focusing: focus / blur. Change: change, input, cut, copy, paste. Forms: submission, event and submit method.	6
Content module 3		
Block layout of website pages	Creating a site layout layout in a graphics editor. Marking of each area of the page (header, bottom, sidebar, main content). Selection of pictures and backgrounds. The final HTML document is a set of <div> blocks with content inside. The layout is in a separate CSS file attached to the page with the <link> tag.	2
Back-end application programming	Using PHP. Syntax, operators, variables. Control structures. Working with arrays. Working with forms. Creating a database using MySQL. Creating a database. Database settings. Working with tables in MySQL. Filling the MySQL database. Queries to MySQL tables. MySQL privileges.	2
Hosting the site in Microsoft Azure	Register a corporate mailbox. Microsoft account registration. Join Azure and create the first application. Clean the Azure application. Creating a web application. Creating database tables. Create table view pages. Hosting your site in Microsoft Azure. Add dynamic pages.	2

8. Individual task (IT)

Kind: calculation and graphic work.

Name: development of the project (on an individual variant) providing complex use of client and server technologies.

Aim: improvement of theoretical knowledge and practical skills in the technology of creating and maintaining: hardware and software systems for creating web applications; software for maintenance of data warehouses, including cloud, mastering of modern programming technologies..

9. Methods of control and the procedure for assessing learning outcomes

The current control system is based on the use of the following forms of control:

- oral examination based on lecture materials;
- oral examination based on the results of the practical lesson;
- checking the results of practical tasks;
- protection of the report on settlement and graphic work;

Final control in the form of an exam is carried out in writing on tickets.

Structure of the discipline and distribution of points

Content modules	Maximum number of points			
	total	practice	lab	independent work
MODULE (semester)	100			
Content module 1	20	15		5
Content module 2	20	15		5
Content module 3	15	10		5
Individual task	15			15
Final control	30			

Types of the tasks, means of control and maximum number of points

Types of the tasks and means of control (<i>testing, control works, individual tasks, reports on laboratory classes, etc.</i>)	Distribution of points
Content module 1	20
Practical task “Lexical structure, data types, constants and JavaScript variables” (report, oral interview)	5
Practical task “JavaScript control constructs” (report, oral interview)	5
Practical task “Object-oriented programming in functional and prototype style” (report, oral interview)	5
Tasks for independent work "Conceptions of front-end development" (report, oral interview)	5
Content module 2	20
Practical task “Web page formatting” (report, oral interview)	5
Practical task “Document and page objects” (report, oral interview)	5
Practical task “Basics of working with events” (report, oral interview)	5
Tasks for independent work "Conceptions of back-end development" (report, oral interview)	5

Content module 3	15
Practical task “Block layout of website pages” (report, oral interview)	3
Practical task “Back-end application programming” (report, oral interview)	4
Practical task “Hosting the site in Microsoft Azure” (report, oral interview)	3
Tasks for independent work "Basic of hosting front-end/back-end applications" (report, oral interview)	5
Individual task	15
Preparation of the calculation part	10
Presentation and defence	5
Final control - exam	30
Theoretical question 1	10
Theoretical question 2	10
A task	10
TOTAL FOR THE MODULE	100

Grading scale

The sum of points for all types of educational activities	Score on a national scale	
	for the exam, diff. test	for test
90-100	excellent	passed
82-89	good	
74-81		
64-73	satisfactory	
60-63		
35-59	unsatisfactory with the possibility of retaking	failed with the possibility of retaking
0-34	unsatisfactory with mandatory re-study of the discipline	failed with mandatory re-study of the discipline

10. Material and technical and information support

Methodical support

1. Bocharov, Boris. Scripting Programming Languages : Tutorial / Boris Bocharov, Maria Voevodina, Yuriy Levicov – Kharkiv: O. M. Beketov NUUE. – 2021. – 131 p.
[<https://eprints.kname.edu.ua/57267/>]
2. Bocharov, Boris. Front-end / back-end development : Lecture notes – [Electronic resource]. - Access mode: [https://teams.microsoft.com/l/file/C8107079-2AAE-4D29-AFE4-DEA07C7321E4?tenantId=b4e18cf3-2cc0-446f-afb7-f3c65cf9d6d8&fileType=pdf&objectUrl=https%3A%2F%2Fknameedu.sharepoint.com%2Fsites%2FBocharovmanuals%2FShared%20Documents%2FGeneral%2FFRONT_END_BACK_END%2Fpr_sam_front_back.pdf&baseUrl=https%3A%2F%2Fknameedu.sharepoint.com%2Fsites%2FBocharovmanuals&serviceName=teams&threadId=19: ae45c087fe8f44cb98b7a773edfdf236@thread.tacv2&groupId=711b5ad1-41c8- 4273-a4a3-4bb5eab1476c](https://teams.microsoft.com/l/file/C8107079-2AAE-4D29-AFE4-DEA07C7321E4?tenantId=b4e18cf3-2cc0-446f-afb7-f3c65cf9d6d8&fileType=pdf&objectUrl=https%3A%2F%2Fknameedu.sharepoint.com%2Fsites%2FBocharovmanuals%2FShared%20Documents%2FGeneral%2FFRONT_END_BACK_END%2Fpr_sam_front_back.pdf&baseUrl=https%3A%2F%2Fknameedu.sharepoint.com%2Fsites%2FBocharovmanuals&serviceName=teams&threadId=19%3Aae45c087fe8f44cb98b7a773edfdf236@thread.tacv2&groupId=711b5ad1-41c8-4273-a4a3-4bb5eab1476c)
3. Bocharov, Boris. Front-end / back-end development: Methodical instructions for practical work – [Electronic resource]. - Access mode: https://teams.microsoft.com/l/file/9B7B6BC7-E99C-4F97-B830-2B4AC9C6C5C5?tenantId=b4e18cf3-2cc0-446f-afb7-f3c65cf9d6d8&fileType=pdf&objectUrl=https%3A%2F%2Fknameedu.sharepoint.com%2Fsites%2FBocharovmanuals%2FShared%20Documents%2FGeneral%2FFRONT_END_BACK_END%2Fkonsp_web_front_back.pdf&baseUrl=https%3A%2F%2Fknameedu.sharepoint.com%2Fsites%2FBocharovm

anuals&serviceName=teams&threadId=19:ae45c087fe8f44cb98b7a773edfdf236@thread.tacv2&group
 Id=711b5ad1-41c8-4273-a4a3-4bb5eab1476c

4. Distance course " Front-end / back-end development "-
<https://dl.kname.edu.ua/course/view.php?id=2237>

Recommended literature and information resources

1. PHP documentation - <https://www.php.net/docs.php>
2. Django –<https://docs.djangoproject.com/en/3.2/>
3. Java Script documentation– <https://developer.mozilla.org/en-US/docs/Web/JavaScript>
4. W3Schools Online Web Tutorials – <https://www.w3schools.com/>

Hardware, equipment, software products

Name of computer lab	Model and brand of personal computers, their number	Name of application packages (including licensed)	Internet access, availability of access channels (yes / no)
Laboratory of Informatics and Computer Engineering	Impression computer P + - 18 units multimedia projector	- ESET Antivirus Software - Office Pro 2013 Rus OLP NL Academy - Electronics Workbench electronic circuit modeling systems	yes