



## Course program

# «Javascript Programming Language»

### For part-time groups. Version 3.0.0

Scope of the course: 10 double-classes.

### Course objective

To teach the student the development of client-side scripts using JavaScript. Learn to apply the right mechanisms and designs to solve a particular problem. To teach the student the features of using the jQuery library in the development of client-side scripts. Learn to apply the right mechanisms and designs of the jQuery library to solve a particular problem.

### By the end of the course the listener will be able to:

- use the basic JavaScript language constructs such as variables, conditions, loops, strings, arrays, functions, etc;
- understand the OOP and its basic concepts;
- handle the errors;
- understand the concepts of the event and event handler;
- create the handler functions of various events;
- understand the differences between BOM and DOM;
- interact with the BOM and DOM objects;
- understand the intricacies of the client-side scripts implementation for different browsers;
- understand the principles of creating forms and the the analysis of used data using regular expressions;
- save user data using the cookie mechanism;
- understand the features of using the HTML5 in relation to JavaScript;
- serialize and parse the data using JSON;
- understand the principles of creating asynchronous requests with Ajax;
- understand basic constructs of the jQuery library;
- understand the intricacies of using a particular selector;
- create event handlers and affect events behavior;
- interact and modify web page styles;
- master the methods of implementation of animation using jQuery;
- possess knowledge of how to influence the structure of the document;
- apply jQuery mechanisms for working with Ajax;
- connect and use jQuery plugins;
- learn the basics of interaction with AngularJS.

Upon completion of this course the student submits a practical task and takes a theoretical exam on course materials. For admission to the examination, all home and practical tasks must be submitted. Practical task should cover a maximum of material from different sections of the course.

## Lesson 1

### Introduction to JavaScript

1. Client-side scripts.
2. What is JavaScript?
3. History of creation of JavaScript.
4. The differences between JavaScript and Java, JScript, ECMAScript.
5. JavaScript versions.
6. The concept of Document Object Model.
7. The concept of Browser Object Model.
8. Insertion to HTML documents. JavaScript code editors.
9. The <noscript> tag.
10. Syntax basics:
  - case sensitivity;
  - comments;
  - key and preserved words.
11. Variables. Naming variables.
12. Data types.
13. Operators:
  - arithmetic operators;
  - relational operators;
  - logical operators;
  - assignment operator;
  - bit operators;
  - operator precedence;
  - the typeof operator.
14. Data input/output. Dialog boxes.
15. Conditions:
  - what is a condition?
  - if;
  - if else;
  - the ternary operator ?
  - switch.
16. Loops:
  - what is a loop?
  - while;
  - do while;
  - for;

- break;
  - continue;
  - the concept of tag.
17. What is a function?
- the syntax of function declaration;
  - function parameters;
  - returned value of the function. return keyword.
18. *arguments* object:
- aims and objectives of the object;
  - the length property.
19. The scope of variable. *this* keyword.
20. Recursion.

## Lesson 2

### **Object. Arrays. Array object. Strings. String object. Date object. Math object. Introduction to object-oriented programming**

1. Objects:
  - what is an object?
  - introduction to object data type;
  - object;
  - new keyword;
  - the concept of property;
  - adding properties. The syntax for adding properties;
  - the syntax for property accessing.
2. Arrays:
  - what is an array?
  - array object;
  - creating an array;
  - accessing array elements;
  - properties and methods of Array.
3. Strings:
  - string object;
  - properties and methods of String.
4. Delays and intervals. Periodical function call.
5. Date object. Date and time processing.
6. Math object. Properties and methods. Random numbers.
7. What is the OOP?

8. Three fundamental principles of the OOP:
  - encapsulation;
  - inheritance;
  - polymorphism.
9. The concepts of class and object in JavaScript terms.
10. Properties.
11. Methods.
12. Accessor properties:
  - getters;
  - setters.
13. Constructor.
14. The concept of prototype:
  - what is a prototype?
  - aims and objectives of prototype.
15. Inheritance.

## Lesson 3

### Event handling, Browser Object Model, Document Object Model

1. What is an event?
2. What is an event handler?
3. Event handling in scripts.
4. Managing styles of web page elements.
5. Event object and its properties.
6. The default event handlers, call restriction of the standard handler.
7. Image object. Managing images and rollovers.
8. What is a Browser Object Model?
9. Objects of Browser Object Model:
  - window object. Opening, moving and resizing the windows;
  - navigator object. Managing a browser;
  - screen object. Screen properties;
  - location and History objects. Moving through pages;
  - frames collection. Managing frames.
10. What is a Document Object Model?
11. The differences between DOM and BOM.
12. Representation of HTML document as a tree.
13. DOM objects. Nodes hierarchy.
14. Properties and methods of the DOM. DOM event model.
15. Modifying DOM tree.
16. Introduction to Document and Link objects.
17. Managing the selection and text range: Selection and TextRange objects.
18. DOM features in HTML5.

## Lesson 4

### Forms and form validation Using the Cookies

1. Using the forms. Placing the form elements in HTML.
2. Forms collection. Creating and programming the form elements:
  - button, Submit and Reset elements;
  - text boxes; Text, Password, File Upload, Textarea elements;
  - hidden field of the form; basic concept of the Hidden element;
  - checkbox element;
  - radio element;
  - list. Select and Option elements.
3. RegExp object Rules for writing regular expressions.
4. Methods of String and RegExp objects for working with regular expressions.
5. Checking the reliability of the form data.
6. What is cookie?
7. Advantages and disadvantages of cookie.
8. Creating, using, and deleting cookie.

## Lesson 5

### Drawing with canvas, HTML5 and JavaScript

1. What is a canvas?
2. Basic features:
  - fill;
  - operation with graphical primitives. Drawing points, lines, rectangles, circles, Bezier curves, etc;
  - displaying text;
  - displaying images;
  - working with shadows and gradient.
3. Cross-document messaging or XDM:
  - aims and objectives of XDM;
  - sending messages. postMessage method;
  - receiving messages.
4. Drag and drop:
  - drag and drop support in different browsers;
  - events that occur when dragging and dropping;
  - dataTransfer object:
    - methods of dataTransfer object;
    - dropEffect and effectAllowed properties;
  - draggable property.
5. Media support:
  - using the <video> tag;
  - using the <audio> tag.

## Lesson 6

### JSON, Ajax

1. What is a JSON?
2. Aims and objectives of JSON.
3. Syntax of JSON:
  - variables;
  - objects;
  - arrays.
4. JSON object:
  - what is a serialization?
  - what is a parsing?
  - stringify and parse methods.
5. Configuring custom serialization in JSON. toJSON method.
6. Synchronous and asynchronous requests.
7. What is the Ajax?
8. XMLHttpRequest object:
  - creating through an ActiveX object;
  - creating through an XMLHttpRequest object.
9. Methods and properties of XMLHttpRequest.
10. The concept of HTTP header.
11. Using the GET method URL encoding.
12. Using the POST method.

## Lesson 7

### Introduction to jQuery, Events and jQuery

1. What is the jQuery?
2. Aims and objectives of jQuery.
3. History of creation of jQuery.
4. JQuery versions.
5. Linking jQuery.
6. Access to page elements by using the \$.
7. The concept of selector.
8. Types of selectors:
  - CSS selectors;
  - jQuery selectors.
9. Traversing. Bypassing the DOM. Methods: filter, next, nextAll, prev, prevAll, siblings, etc.
10. Creating event handlers using jQuery.
11. Removing event handlers.

12. Event object and jQuery.
13. Impact on the event handling.
14. Triggering event handling.

## Lesson 8

### Styles and animation, interaction with the DOM, AJAX and jQuery, the use of jQuery plugins

1. Css method.
2. Showing and hiding elements. *show* and *hide* methods.
3. Creating effects.
4. Animation.
5. Creating new DOM elements.
6. Inserting DOM elements.
7. Moving DOM elements.
8. Copying DOM elements.
9. Interaction with attributes.
10. JSON.
11. Ajax mechanisms inside the jQuery library.
12. Using the GET method.
13. Using the POST method.
14. Events and Ajax in jQuery.
15. Error handling.
16. The concept of jQuery plugin.
17. Installing a plugin.
18. Examples of plugins:
  - cycle;
  - jQuery UI.

## Lesson 9

### AngularJS

1. What is AngularJS?
2. Aims and objectives of AngularJS.
3. The history of AngularJS.
4. How to add AngularJS to a web page.
5. The concept of MVC (Model-View-Controller).
6. Controller.
7. What is a controller?
8. What is a module?

9. What is a directive?
10. What is a scope?
11. What is a filter?
12. Basics of working with the controller.
13. Using the modules.
14. The use of:
  - ng-model;
  - ng-click;
  - ng-repeat;
  - ng-show;
  - ng-hide;
  - ng-include.
15. What is a service?
16. What are the services used for?
17. Example use of services.
18. Routing:
  - what is a routing?
  - configuring a routing;
  - examples of use.

## Lesson 10

### Exam