JavaScript

JavaScript is the key language behind Rich Internet Applications. The course covers core language constructs, the document object model (DOM) and custom objects, and introduces the principles of Ajax. Topics: function, date, array, strings, RegExp, math, document, node, objects; HTML form manipulation; cookies; event binding/handling; prototype-based inheritance; DHTML; multiple script debugging techniques; Ajax request and response handling; Ajax toolkits.

Who should take this course?

This course is targeted for students already proficient in programming and web concepts who wish to master the standard programming language of the web browser.

Course Objectives

• Identify where and how JavaScript is used to enhance web pages.
• Use branching and looping constructs.
• Describe and use objects from all four object categories.
• Author and call functions.
• Use methods of the String, Date, Math, RegExp, and Array objects.
• Create custom objects by authoring constructor functions.
• Debug scripts using a variety of techniques and tools.
• Use Ajax techniques to update only portions of a web page

Course Details

• Length: 30 hours
• Format: Classroom
• Prerequisites: HTML: Level 1 and C# Programming: 1 or equivalent programming experience
• Recommended: Cascading Style Sheets: Level 1 and C# Programming: 2

The above prerequisites are considered to be the basic skills and knowledge needed prior to taking this class. Instructors will assume your readiness for the class materials and will NOT use class time to discuss prerequisite materials.
Course Contents

Introduction

- Who created and introduced the JavaScript language
- The purpose for which JavaScript was originally designed
- How JavaScript, JScript, and ECMAScript relate to one another
- Characteristics of JavaScript
- Differences between JavaScript and Java
- Sources of JavaScript reference documentation
- Author a simple web page that uses JavaScript to display messages to the user

Nuts and Bolts

- The rules for creating identifiers
- JavaScript’s data types
- JavaScript’s operator set
- Use JavaScript’s branching constructs
- Use three looping constructs

Overview of Objects

- Implementing JavaScript’s features using objects
- The four types of objects in JavaScript
- JavaScript object (typically consists of properties and methods)
- Syntaxes for referencing an object’s properties
- Iterate over the properties of an object using the for/in loop
- Use the with keyword when working with objects
- Creating objects in JavaScript: the interpreter automatically allocates memory, and automatically deallocates memory for the objects when they are no longer referenced
- The operation of the delete keyword
Course Contents, continued

Functions

• The difference between a function and a procedure
• Using the function keyword to define both functions and procedures
• Author functions that declare parameters and are called with arguments
• JavaScript functions: objects having both properties and methods
• Use a function’s arguments array to resolve the quantity and values of arguments passed to the function when it is called
• Returning differing data types from the same function
• Parameters: passed to functions by value
• Pass functions as arguments to other functions

Core Objects

• Use the Date object’s constructors
• The usage of several methods of the Date object
• The methods of the Math object
• Ways to create Array objects
• Use methods of the Array object to sort an array in ascending or descending order
• Use an Array object to perform the operation of a Stack and a Queue
• Use numerous methods of the String object
• The JavaScript string is immutable
• The RegExp object and its uses
• Several methods of the Global object
• The operation of the eval method
Course Contents, continued

**Browser and DOM objects**
- Key methods of the window object, especially window.open
- Using the location object to control the page displayed in window
- Using the document object to obtain references to HTML objects in a web page, including objects in the images array
- Opening, writing, and closing streams of text using document object methods of the same name
- Manipulate, automate, and validate HTML form data
- The form's onsubmit event handler to abort the submission of a form to the web server
- Multiple techniques for debugging scripts, including use of the Venkman JavaScript debugger

**Event Handling**
- Ways to associate event handler code with HTML elements, known as event binding
- The JavaScript event object
- Why event handling implementations vary among browsers
- Writing event handling code that works in (nearly) all browsers
- How utility functions can simplify cross-browser event handling

**DOM**
- The Document Object Model (DOM) is based on the concept of nodes
- The terminology of a tree structure, including parent, child, and sibling
- Using DOM Node methods to insert and remove nodes
- Using document methods to access, modify, create and remove elements
- The operation and use of the getElementsByTagName method
- Getting and setting attribute nodes of an element
- Combining event handling and DOM methods to modify the contents of elements
Course Contents, continued

Persistence

- JavaScript’s two forms of persistence
- Referencing JavaScript code stored in one frame from another frame
- The limitations of frame-based persistence
- Define cookie
- Using the document.cookie property to create JavaScript cookies
- Using cookie utility functions to get, set, and delete cookies

Custom Objects

- Define the term constructor function
- Creating custom objects by defining a constructor function and calling it with the new operator
- Several techniques for defining methods for your custom objects
- Using a Function object’s prototype property to add properties and methods to your custom objects
- To what does the constructor property of an object refer?
- The call method to call constructor functions from other constructor functions
- Replacing a constructor’s prototype object with an instance of another object to facilitate inheritance
- Using a namespaces object to minimize object naming conflicts

DHTML

- Assigning new values to a DOM element’s className attribute to achieve visual effects
- Using an element’s style object to change specific style attributes
- Combining event-handling along with the style and className properties to dynamically change the visual aspects of a page
- Using Cross browser libraries - jQuery, Prototype, and X
Course Contents, continued

**Introduction to AJAX**
- Describing the technologies that comprise Ajax
- Principles of Ajax-enabled Web pages
- Working with the XMLHttpRequest object
- Sending requests and simple response processing

**Ajax Response Processing**
- Authoring callback function closures
- Processing JSON responses
- Working with XML

**Ajax Toolkits**
- Working with prototype.js Ajax methods
- Using jQuery to send requests and process responses
- Combining Ajax with DHTML effects