# Contents

## I Developing Web Applications with JavaScript, HTML5, and CSS

Course Goals I-2

Audience I-3

Course Outline I-4

Course Practices I-5

#### 1 Introduction to Web Applications

Objectives 1-2

Introduction to Web Application 1-3

HTTP Requests Methods 1-5

HTTP GET and HEAD Methods 1-7

HTTP POST Method 1-8

HTTP PUT and PATCH Methods 1-9

HTTP DELETE Method 1-10

HTTP Responses and Status Codes 1-11

HTML Document Object Model (DOM) 1-12

HTML Document Page Layout 1-14

HTML Tables 1-15

HTML Lists 1-16

Add Style to HTML Elements 1-17

Add JavaScript to HTML Document 1-19

Associating Style Sheet with HTML Document 1-20

Associating JavaScript with HTML Document Page 1-21

HTML Forms 1-22

Implementing Navigation in an HTML Document 1-23

Summary 1-24

Practice Overview 1-25

#### 2 Introduction to JavaScript

Objectives 2-2

Agenda 2-3

Introduction to JavaScript 2-4

JavaScript Origins 2-6

JavaScript Clones and Standards 2-7

JavaScript Standards Split 2-8

JavaScript Variants Proliferation 2-9

JavaScript New Engine and Server-Side Expansion 2-10

JavaScript Modern Evolution 2-11

Agenda 2-12

JavaScript Syntax 2-13

JavaScript Variables 2-14

JavaScript Data Types 2-15

JavaScript Types Coercion 2-18

Explicit Value Conversions 2-19

JavaScript Objects and Functions 2-20

Agenda 2-21

JavaScript Operators 2-22

Manipulate Numeric Values Using Arithmetic Operators 2-23

Extract Portions of Text from a String 2-24

Concatenate Strings 2-25

Manipulate Text Values 2-26

Compare Values 2-27

Manipulate Date Values 2-28

Agenda 2-29

Manipulate Arrays 2-30

Complex Arrays and Collections 2-31

Array Object 2-32

Agenda 2-34

Implement Flow Control with if /else 2-35

Ternary Operations 2-37

Implement Flow Control with Switch 2-38

Implement Iterations with Loops 2-39

For Loop Variants 2-40

Advanced Loops 2-41

Summary 2-42

Practice Overview 2-43

#### 3 Functions, Classes, and Objects

Objectives 3-2

Classification of Functions, Classes, and Objects 3-3

Define and Invoke a Function 3-4

Arrow Functions 3-5

Global Object 3-6

this keyword 3-7

Define and Access an Object 3-8

Converting Objects to String 3-9

Define and Use Accessors 3-10

Define and Instantiate a Class 3-11

Constructor Functions 3-12

Define "Private" Properties 3-13

Define and Access Static Context 3-14

Dynamically Alter an Object 3-15

Interrogate Object and Its Properties 3-16

Retrieve and Populate Object Properties 3-17

Summary 3-18

Practice Overview 3-19

# 4 Extending Classes and Objects

Objectives 4-2

JavaScript Extensibility Mechanisms 4-3

What Is a Prototype? 4-4

Create Objects Based on a Specific Prototype 4-5

Function Object 4-6

Extending an Object vs Extending a Prototype 4-7

Implement Inheritance with Prototypes 4-8

Implement Inheritance with Classes 4-9

Spreading Arrays and Objects 4-10

Summary 4-11

Practice Overview 4-12

#### 5 JavaScript in a Web Browser Environment

Objectives 5-2

Retrieve DOM Elements 5-3

Traverse Document Nodes 5-5

Interact with Elements and their Attributes 5-6

Interact with Selected Lists 5-7

Interact with Check Boxes 5-8

Interact with Radio Buttons 5-9

Event Handling Overview 5-10

Events and Listeners 5-11

Dispatching Events 5-12

Subscribing to Events 5-13

Prevent Default Action 5-15

React to User Input 5-16

Validate User Input 5-17

Assist User Input with Value Selectors 5-18

Display and Input a Value within a Range 5-19

Produce Image Map 5-20

Other Input Types 5-21

Button, Image, and Form Actions 5-22

Write to HTML Document 5-23

Add, Remove, and Modify HTML Document Content 5-24

Summary 5-25

Practice Overview 5-26

## 6 Cascading Style Sheets

Objectives 6-2

Defining Styles 6-3

Element Selectors 6-4

Attribute Selectors 6-5

Use Pseudo-Class and Pseudo-Element Selectors 6-6

Selecting Elements Based on Their State 6-7

Selecting Elements Based on Their Properties 6-8

Selecting Child Elements within a Parent 6-9

Other Selectors 6-10

Visual Properties 6-11

Setting Sizes 6-12

Setting Colors 6-13

Selecting Fonts 6-14

Positioning, Sizing and Orientation using Box Model 6-15

Box Model Example 6-16

Component Orientation 6-17

Handling Overflow 6-18

Control Display Layout 6-19

Grid Display 6-20

Flex Flow and Alignments 6-21

Flex Display 6-22

Altering Styles Based on Required Media 6-23

Media Queries 6-24

Dynamic Style Changes 6-25

Summary 6-26

Practice Overview 6-27

#### 7 Advanced JavaScript

Objectives 7-2

Exception Handling 7-3

Producing Exceptions 7-4

Handling Exceptions 7-5

Timeouts and Intervals 7-6

Promises 7-7

Execute an Array of Promises 7-8

Async/Await 7-9

Pass Functions as Arguments and Return Functions 7-10

Modules 7-11

Export Components 7-12

Import Components 7-13

Access Modules from HTML Document 7-14

JavaScript Memory Organization and Code Execution 7-15

JavaScript Concurrency Limitations 7-16

Execute Concurrent Code with Workers 7-17

Worker Life Cycle 7-18

Worker Message Exchanges 7-19

Summary 7-21

Practice Overview 7-22

# 8 Exchanging Data with Servers

Objectives 8-2

What is JSON? 8-3

REST Service Conventions and Resources 8-4

Cross-Origin Resource Sharing (CORS) 8-5

Dispatch Service Request Using AJAX 8-6

Handle Service Response Using AJAX 8-7

Dispatch Service Requests Using Modern JavaScript 8-8

Handle Service Response Using Modern JavaScript 8-9

Introduction to WebSockets 8-10

WebSocket Life Cycle 8-11

Send and Receive Messages Via the WebSocket 8-12

Stateless Versus Stateful 8-13

Manage Application State 8-14

Retain State Using Parameters or Headers 8-15

HTTP Cookies 8-16

Set and Get HTTP Cookies in JavaScript 8-17

Local and Session Web Storage 8-18

Summary 8-19

Practice 8 8-20

#### 9 JavaScript Variants, APIs, Frameworks, and the Cloud Environment

Objectives 9-2

Agenda 9-3

JavaScript Variants and Alternatives 9-4

TypeScript Type Enforcement 9-5

TypeScript Extra Types 9-6

TypeScript Enumerations 9-7

... And Many More TypeScript Features 9-8

Agenda 9-9

JavaScript Libraries and Frameworks 9-10

Manage Library References 9-12

Use jQuery Selectors and Functions 9-13

Use jQueryUI Widgets 9-14

Agenda 9-15

Implement Server-Side JavaScript with Node.js 9-16

Manage Node.js Projects 9-17

Agenda 9-18

JavaScript and Oracle Cloud Application Development 9-19

Single-Page Application Design 9-20

Visual Builder Studio Project Management 9-21

Visual Builder Application Runtime 9-22

Summary 9-23