

**Introduction to Web Components**

**Course Number:** SCRPT-198  
**Duration:** 2 days

**Overview**

This Introduction to Web Components training course teaches participants how to use web components to create robust, modern web solutions that seamlessly integrate with their existing web development workflow. This course also covers HTML, CSS, JavaScript, TypeScript, the Shadow DOM, custom elements, templates, and unit testing.

**Prerequisites**

Attendees must have experience with modern JavaScript or TypeScript and web browser programming.

**Materials**

All students receive comprehensive courseware covering all topics in the course.

**Software Needed on Each Student PC**

* A free, personal GitHub account to access the courseware
* Node.js and Visual Studio Code
* NPM Packages and Visual Studio Extensions
* If students cannot configure a local environment, a cloud-based environment can be provided

**Objectives**

* Understand the concept of Web Components and their role in solving web development challenges
* Work with fundamental web development languages, including HTML, CSS, JavaScript, and TypeScript
* Use Shadow DOM in web components, shadow host, shadow tree, and shadow root
* Work with custom elements
* Define and register custom element classes
* Implement lifecycle callbacks
* Use templates in web components, including the template element and slot element
* Understand unit testing in web components, set up Jest and TypeScript, and create effective unit test scaffolding

**Outline**

* Introduction
* What are Web Components?
  + What problems do Web Components solve?
  + W3C Standards
  + Custom Elements
  + Shadow DOM
  + HTML Template
* HTML
  + Elements & Custom Elements
  + Attributes & Custom Attributes
  + Semantic Meaning
  + Template and Slot Elements
* CSS
  + Selectors
    - Id, Class, Element
    - Attribute
    - Pseudo-Class
    - Combinators
    - Specificity
    - Scoping Strategy
  + Layout
    - Box Model
    - FlexBox
    - Grid
  + Display & Position
  + Styling Fonts & Colors
* JavaScript
  + Classes
  + Prototype Inheritance
  + Functions
  + Types and Variables
  + Promises
* TypeScript
  + Webpack & Babel
  + Browser API Review
  + DOM Manipulation
  + Selecting Elements
  + Append/Remove/Modify Elements
  + Cloning Elements
* Http Requests
  + XmlHttpRequest Object
  + Fetch API
* Events
  + Bubbling
  + Capturing
  + Event Data
  + Registering Event Handlers
  + Triggering Events
  + Prevent Default
  + Stop Propagation
* Web Components: Custom Elements
  + Define a new Custom Element Class
  + Register Custom Element
  + Lifecycle Callbacks
  + Connected Callback
  + Disconnected Callback
  + Adopted Callback
  + Attribute Changed Callback
  + Transpilers and Classes
* Web Components: Shadow DOM
  + Shadow Host
  + Shadow Tree
  + Shadow Boundary
  + Shadow Root
  + Attach a Shadow Root
  + Applying Styles
  + Browser Events
  + Open vs. Closed
* Web Components: Template
  + Template Element
  + Usage with Web Components
  + Slot Element
  + Project Content with Slots
* Web Components: Unit Testing
  + Setting up Jest and TypeScript
  + Unit Test Scaffolding
    - Test Suite
    - Test
    - Setup/Teardown
    - Assertions
    - Spies
    - Mocks
* Conclusion