This five-day course provides a comprehensive and practical hands-on introduction to developing Web applications using ASP.NET 4.5.1 and Visual Studio 2013. It includes an introduction to ASP.NET MVC, a newer Web programming framework that incorporates use of the Model-View-Controller (MVC) pattern. It also includes coverage of using ASP.NET AJAX to build rich client applications and the use of Web API to create HTTP services. The fundamentals of Web applications are reviewed, and a testbed is established for ASP.NET and Internet Information Services. The architecture of ASP.NET is outlined, including the role of compilation, the Page class and code-behind. Web Forms are introduced, including server controls, view state, life cycle, and the event model. Request/response HTTP programming using ASP.NET is covered.

Visual Studio 2013 is used to greatly simplify the development of ASP.NET Web applications, including facilitating UI design. ASP.NET Web applications are covered, including issues of application and session state and the use of cookies. Server controls represent an important innovation in ASP.NET and are covered in detail, including validation, rich controls, and user controls. There is an introduction to caching in ASP.NET, which provides an effective mechanism for optimizing the performance of your ASP.NET application. The fundamentals of configuration and security are introduced. Diagnostics and debugging are covered, including the use of tracing.

Additional server controls are introduced, including menus and master pages. Data access is covered in some detail in two chapters, including an introduction to ADO.NET, Language Integrated Query (LINQ), the Entity Data Model (EDM) and the powerful data access controls provided by ASP.NET 4.5. The LocalDB version of SQL Server 2012 Express is used as the database. This section of the course is tied together by a progressive case study illustrating a Web site for a publishing company. The final section of the course introduces three important ASP.NET technologies: ASP.NET AJAX, ASP.NET MVC, and ASP.NET Web API.

**Audience:** Experienced application developers or architects responsible for Web applications in a Microsoft environment.

**Prerequisites:** A working knowledge of C# and .NET Framework. Knowledge of JavaScript is recommended for the AJAX chapter.

**Number of Days:** 5 days

1. **Introduction to ASP.NET**
   - Web Application Fundamentals
   - Benefits of ASP.NET
   - An Echo Program
   - ASP.NET Features
   - Compiled Code
   - Server Controls
   - Browser Independence
   - Separation of Code and Content

2. **Web Forms Architecture**
   - Web Forms Architecture
   - HelloCodebehind.aspx
   - HelloCodebehind.aspx.cs
   - Page Class
   - Code-Behind Inheritance Model
   - Web Forms Page Life Cycle
   - View State
Enabling View State for Controls
Web Forms Event Model
Page Processing
Page Events
Page Properties
Page Directive
Tracing

3. **ASP.NET and HTTP**
   Classical Web Programming
   Active Server Pages Object Model
   Request and Response Objects
   Request/Response in ASP.NET
   HttpRequest Class
   Properties of HttpRequest
   Using HttpRequest Class
   HTTP Collections
   HttpResponse Class
   Redirect
   HttpUtility
   Echo.aspx
   EchoBack.aspx
   GET and POST Compared
   QueryString and Forms Collections

4. **Web Applications Using Visual Studio**
   Using Visual Studio
   Starter Web Site
   ASP.NET Empty Web Site
   Adding a Web Form
   Default.aspx
   Adding Controls
   Using Components in ASP.NET
   Running Under IIS
   Shadow Copying
   Temporary Copy of the Component
   ASP.NET Applications
   Global.asax
   Web Application Life Cycle
   Code in Global.asax
   Log Class
   Adding Global.asax File
   ListBox
   Data Binding
   Items Collection
   XHTML
   XHTML in Visual Studio
   Flow Positioning

5. **State Management and Web Applications**
   Session and Application State
   Session Object
   Page_Load
   Session Variable Issues
   Session State and Cookies
   Session State Timeout
   Session State Store
   Application State
   Implementing Application State
   Global.asax
   Users.aspx.cs
   Multithreading Issues
   Bouncing the Web Server
   Cookies
   Cookies and ASP.NET
   HttpCookie Properties
   Acme Travel Agency Case Study
   State Management Techniques

6. **Server Controls**
   Server Controls in ASP.NET
   HTML Server Controls
   Using HTML Server Controls
   HTML vs. Web Forms Server Control
   Code for Login
   HTML Controls in Visual Studio
   Using HTML Controls
   Web Controls
   Validation Controls
   Required Field Validation
   Regular Expression Validation
   Rich Controls
   Copying a Web Site
   User Controls
   Using a User Control
   Copyright.ascx
   Copyright.ascx.cs

7. **Caching in ASP.NET**
   Introduction
   What Is Caching?
   Need for Caching (Why Cache?)
   Data to be Cached – Time Frame
   ASP vs. ASP.NET Response Model
   Caching in ASP.NET
   Three Types of Caching in ASP.NET
   Output Caching
@ OutputCache Directive
@ OutputCache – Attributes in Detail
VaryByParam in Detail
HttpCachePolicy Class
Page Fragment Caching
Common Mistakes in Using Fragment Caching
Data Caching or Application Caching
Add an Item to the Cache Object
Insert and Add Methods
Expiration
Problems in Caching

8. **ASP.NET Configuration and Security Fundamentals**
   One-minute Introduction to XML!
   ASP.NET Configuration - Overview
   Multi-level Configuration
   Configuration Hierarchy
   Web.Config File Structure
   Web.Config Sections
   Application Settings
   ASP.NET Security – Overview
   Role-Based Security and CAS
   Types and Steps
   Steps in Enabling Role-Based Security
   Three Ways to Authenticate
   Forms Authentication – Default.aspx
   Forms Authentication – Web.Config
   Features of Forms Authentication
   Authentication Cookie
   Forms Authentication Classes
   Customizing Forms Authentication
   Authentication Source
   Forms Authentication – Analysis
   Windows Authentication
   Windows Authentication – Analysis
   Authorization

9. **Debugging, Diagnostics and Error Handling**
   ASP.NET Diagnostics
   Debugging Using Visual Studio
   Debugging Calculator
   Application-Level Tracing
   Tracing Calculator
   Using the Page Cache
   Preparing to Debug
   Trace Messages
   Tracing the Calculator Page
   Conditional Tracing
   Trace Category
   Trace Warning
   Exceptions in Trace
   Errors in ASP.NET
   Uncaught Exception
   Custom Error Pages

10. **More Server Controls**
    ASP.NET Configuration and Security Fundamentals
    ASP.NET Configuration - Overview
    Multi-level Configuration
    Configuration Hierarchy
    Web.Config File Structure
    Web.Config Sections
    Application Settings
    ASP.NET Security – Overview
    Role-Based Security and CAS
    Types and Steps
    Steps in Enabling Role-Based Security
    Three Ways to Authenticate
    Forms Authentication – Default.aspx
    Forms Authentication – Web.Config
    Features of Forms Authentication
    Authentication Cookie
    Forms Authentication Classes
    Customizing Forms Authentication
    Authentication Source
    Forms Authentication – Analysis
    Windows Authentication
    Windows Authentication – Analysis
    Authorization

11. **ADO.NET and LINQ**
    ADO.NET
    ADO.NET Architecture
    .NET Data Providers
    .ADO.NET Interfaces
    .NET Namespaces
    Connected Data Access
    SQL Express LocalDB
    SqlLocalDB Utility
    Visual Studio Server Explorer
    Queries
    ADO.NET with ASP.NET
    Web Client Isolation
    Web Client Database Code
    Using Commands
    Creating a Command Object
    Using a Data Reader
    Use of Session State
    Generic Collections
    Executing Commands
    Parameterized Queries
    DataSet
    DataSet Architecture
    Why DataSet?
    DataSet Components
    DataAdapter
    Data Access Class
    Retrieving the Data
    Filling a DataSet
    Accessing a DataSet
    Using a Standalone DataTable
Adding a New Row
Searching and Updating a Row
Deleting a Row
Row Versions
Row State
Iterating Through DataRows
Command Builders
Updating a Database
Language Integrated Query (LINQ)
ADO.NET Entity Framework
IntelliSense
Basic LINQ Query Operators
Obtaining a Data Source
Filtering
Ordering
Aggregation
Obtaining Lists and Arrays
Deferred Execution
Modifying a Data Source
Entity Framework in a Class Library
Data Access Class Library
Client Code

12. **Data Controls and Data Binding**

Data Access in ASP.NET
SQL Generation Options
Enable Edit and Delete
Editing Records
GridView Control
DetailsView Control
Storing the Connection String
Protecting the Configuration String
FormView Control
Master/Detail Web Pages
Data Binding
Template Editing
Using XML Data
Example Program
Multiple-Tier Data Access
Object Data Source

13. **ASP.NET AJAX**

Desktop Applications
Web Applications
Plug-Ins
Client-Side Scripting
Script Code
JavaScript in ASP.NET
Dynamic Pages

Efficient Page Redraws
AJAX
Google Maps
ASP.NET AJAX
Partial Page Rendering
UpdatePanel Control
AJAX Extensions Controls
AJAX Client Library
Using the Client Library
ScriptManager Control
Client Library Namespaces
Sys.Debug Tracing
Document Object Model
JavaScript for Simple Calculator
Using the Client Library
AJAX Control Toolkit
Installing AJAX Control Toolkit
ACT Controls in Visual Studio
AjaxControlToolkit.dll
ToolkitScriptManager
Extender Controls
NumericUpDownExtender Control

14. **ASP.NET MVC**

Model-View-Controller (MVC)
What is ASP.NET MVC?
Advantages of ASP.NET MVC
Advantages of Web Forms
Starter Application
Simple App with Controller Only
Action Methods and Routing
Action Method Return Type
Rendering a View
Creating a View in Visual Studio
The View Web Page
Dynamic Output
Razor View Engine
Embedded Scripts
Using a Model with ViewBag
Controller Using the Model and ViewBag
Using Model Directly
A View Using Model in Visual Studio
View Created by Visual Studio
Using Forms
HTML Helper Functions
Handling Form Submission
Model Binding
Greet View
Input Validation
Nullable Type
Checking Model Validity
Validation Summary

15. **ASP.NET Web API**
   - REST
   - Representation, State and Transfer
   - Collections and Elements
   - Specifying a Start Page
   - Implementing PUT Verb
   - Using Fiddler
   - Composing a Request
   - ASP.NET MVC and Web API
   - Route Registration
   - HTTP Response Codes
   - POST Response Code
   - HttpResponseException
   - Web API Clients
   - HttpClient
   - Initializing HttpClient
   - Issuing a GET Request
   - Issuing a POST Request

16. **Appendix A – Learning Resources**

17. **Appendix B – HTTP Pipeline**
   - Web Applications
   - Customizing the HTTP Pipeline
   - Customizing Applications
   - Customizing a Welcome Application
   - Logger Class
   - Custom Handlers
   - IHttpHandler Interface
   - .ashx Files
   - Custom Modules
   - Using DemoModule in IIS Express
   - Using IIS 7

18. **Appendix C: Hosting in IIS 7.5**
   - Internet Information Services
   - Installing IIS 7.5
   - ASP.NET with IIS 7.5
   - .NET Framework Version
   - Registering ASP.NET