



Course Content

Course Description:

This two-day, instructor-led course provides students with the knowledge and skills to effectively use Visual Studio 2019 to design, write, and run high-quality .NET unit tests. The course focuses on the applicable features and capabilities of Visual Studio as it relates to unit testing and Test-Driven Development. This course also introduces other popular unit testing tools and techniques, and demonstrates how they integrate with Visual Studio and your team's development lifecycle.

At Course Completion:

After competing this course, student will be able to:

- Why unit tests are critical to software quality
- How unit tests and integration tests differ
- Popular .NET unit testing frameworks
- Popular JavaScript unit testing frameworks
- MSTest V2 improvements and capabilities
- The anatomy of a unit test
- The 3A pattern (Arrange, Act, Assert)
- Using Assert, StringAssert, and CollectionAssert
- Testing for expected exceptions
- Test class inheritance
- Why and how to test internal APIs
- MSTest, NUnit, and xUnit test projects
- Unit testing .NET Core projects
- Using Test Explorer to manage your tests
- Organizing tests using traits and playlists
- Running unit tests in parallel
- In-Assembly Parallel (IAP) execution
- Parallelism by assembly, class, and method
- Running tests and managing test results
- Viewing, grouping, and filter tests and results
- Creating and using a .runsettings file
- Continuous testing in Visual Studio
- Test-Driven Development (TDD) as a design practice
- Why write your tests first
- Practicing TDD within Visual Studio
- How to effectively refactor within TDD
- How to effectively refactor legacy code
- Practices for writing good unit tests
- Happy path vs. sad path testing
- Testing boundary conditions (Right-BICEP)
- Organizing tests and test assemblies
- Test naming conventions (e.g. BDD)
- Why and how to analyze code coverage
- Using code coverage as a metric
- Parameterized (data-driven) unit tests
- Concurrent testing using Live Unit Tests
- Concurrent testing using NCrunch (3rd party)
- Testing difficult code with the use of doubles
- Using dummies, fakes, stubs, and mocks
- Using Microsoft Fakes to test difficult code
- Using Rhino Mocks to test difficult code
- Using NSubstitute to test difficult code
- Generating MSTest unit tests with IntelliTest
- Generating NUnit unit tests with IntelliTest



Unit Testing in Visual Studio 2019

Course ID #: VS-114

Hours: 14

Prerequisites:

- The C# language
- Visual Studio 2015, 2017, or 2019
- Writing, debugging, and maintaining code
- Application Lifecycle Management basics
- Their organization's development lifecycle
- Building a high-quality software product

Target Student:

This course is intended for current software development professionals who are involved with building highquality .NET applications. Students will use Visual Studio while learning how to design, write, and run unit tests.They will also learn many relevant practices and techniques, such as TDD, refactoring, and how to test difficult code using doubles.

Topics:

Module 1: Unit Testing in .NET

- What is (and isn't) a unit test
- Why write unit tests
- .NET unit testing frameworks
- MSTest V2, NUnit, xUnit
- The anatomy of a unit test
- Writing and running your first unit test

Module 2: Unit Testing in Visual Studio

- Testing support in Visual Studio
- MSTest, NUnit, and xUnit test projects
- Test Explorer and other windows
- Writing and running unit tests in Visual Studio
- Managing a large number of tests and test results
- Organizing tests by grouping, filtering, and playlists
- Continuous testing in Visual Studio

Module 3: Test-Driven Development (TDD)

- TDD overview and benefits
- Practicing TDD within Visual Studio
- Effectively refactoring code
- Working with legacy code
- Using CodeLens to support TDD and refactoring

Module 4: Writing Good Unit Tests

- Asking questions about your code
- Path testing (e.g. happy, sad, evil, etc.)
- Right BICEP testing
- Testing for expected exceptions
- Maintaining high-quality test code
- Unit test naming conventions (e.g. BDD)
- Organizing unit tests



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Module 5: Leveraging Visual Studio

- Analyzing code coverage
- Using code coverage as a metric
- Parameterized (data-driven) unit tests
- DataRow, DynamicData, and DataSource attributes
- Concurrent testing using Live Unit Testing
- Concurrent testing using NCrunch

Module 6: Testing Difficult Code

- The need to isolate code under test
- Doubles (dummies, stubs, fakes, and mocks)
- Microsoft Fakes framework (stubs and shims)
- Comparing mocking frameworks
- Using Rhino Mocks and NSubstitute frameworks
- Profiling slow running unit tests
- Using IntelliTest with legacy code