



Skills **.NET 5** | POWER **BI**

TECHNOLOGY

PowerShell



DYNAMICS  
**365**

*Learning*

**u2u**

Blazor ⚡

**ANGULAR**

Microsoft  
**365**

*Training*

TEACH

**SQL Server**

*SharePoint*

Power  
PLATFORM

*Azure*

**Class**

*Online*

**COURSE AGENDA**  
**APR. 2021 - OCT. 2021**

On-schedule in Brussels  
On-demand in Europe & Middle East  
Online everywhere



# U2U - DEVELOPER AND IT TRAINING

U2U has more than 20 years of experience in providing top quality courses by trainers who are experts in their respective fields. U2U courses provide developers, IT professionals, data specialists and business users the skills to get the most out of web, mobile, cloud, infrastructure and data technologies.



## IN-CLASS TRAINING

Instructor-led courses organized in our spacious training center in Brussels. Learn in small groups with a highly qualified and experienced trainer.



## TUNE IN REMOTELY

Participate remotely in our classroom-based courses. Follow the presentation and trainers' activity in the classroom through our video conferencing system and Microsoft Teams.



## HIGH-QUALITY COURSES

We develop our own courses, keep them up to date with the latest features, and provide you with a printed copy. Enjoy a mix of theory, live demonstrations and exercises.



## LEARNING PORTAL

Benefit from our lab and learning environment during and after your training.



## OUR TRAINERS

All trainers are experienced fulltime presenters who will make the most challenging topics easy to understand!



## HEALTH & SAFETY

In order to provide a safe and relaxing atmosphere, we have drastically decreased the capacity of every classroom and are respecting a minimum distance of 2,5 meters between seats. More info at [www.u2u.be/safety](http://www.u2u.be/safety).

# CONTACT



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# ON-SCHEDULE COURSES

Our open enrollment courses are organized regularly **in our training center in Brussels**. These courses are conducted in **English** by our highly skilled and experienced instructors. To facilitate online training, all our classrooms are properly equipped with hardware for remote learning to accommodate for both in-person and online participants. This setup supports regular and substantive interaction between the trainer and the participants as if they were physically in the classroom.

## DELIVERY FORMATS



### Classroom

- Classroom-based instructor-led courses.
- Organized in our spacious training center in Brussels.
- Face-to-face interaction with highly qualified and experienced instructors.
- Course manual, preconfigured laptop, lunch, coffee and beverages are included.



### Remote Classroom

- Participate remotely in our classroom-based courses.
- Follow the presentation and trainer's activities through the camera system from anywhere in the world.
- Interact with our trainer, similar to a physical classroom.
- Participate in exercises with a ready-to-use lab and learning environment.

## AVAILABLE DISCOUNTS

**10% discount**, if you bring your own laptop to the classroom-based course.

**15% discount** for 14-Day Advance Prepayment. Your registration will be final and cannot be refunded or cancelled.

**15% discount** for the second participant. **25% discount** from the third participant onwards of the same company attending the same course session.

## HOW TO OBTAIN A 50% DISCOUNT?

Book multiple participants for the same course session and select the available discount. The first participant can receive up to 25% discount, the second up to  $25\% + 15\% = 40\%$  and from the third participant on up to  $25\% + 25\% = 50\%$ . Your group's price for a 5-day classroom-based course with a price of 1900€ will be:

First participant:	$1900\text{€} - 25\% =$	1425€
Second participant:	$1900\text{€} - 40\% =$	1140€
Third participant:	$1900\text{€} - 50\% =$	950€
Total for 3 participants:		3515€ (instead of 5700€)

## REBOOKING OPTIONS

If you registered for one of our courses, we offer the option to switch between the delivery format **Classroom** and **Remote Classroom** anytime you want.

You can also reschedule your training free of charge to a new session of the same course until December 31, 2021. With our rebooking options we want to offer you as much flexibility as possible so that you can participate in our courses with peace of mind.

# IN-COMPANY COURSES

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Private company courses can provide a more economic and convenient solution for companies that want to train a **group of people**. Our private formula offers exclusive courses in **Dutch, English or French customized to meet the needs of your company**.

## What you want

The content of the courses can be **fully tailored to meet your needs**. To optimize your time and to make the most of the course, you can choose the duration and which topics, based on our current catalog, you want to integrate in the course.

## Where you want

The courses can be organized **in our training center, online or at a location of your choice** throughout Europe and the Middle East. We will bring the course material and the ready-to-use lab environment.

## PRICES

**Our group price starts at 4000€ for 3-day in-company training up to 10 participants.**

## What is included in our price?

- The price includes the organization of the training online or on-site in your classrooms.
- The number of participants is not limited.
- All courseware up to 10 participants is included.
- The course content can be adapted to your needs without extra cost.
- Above 10 participants, additional fee per extra participant.

Please contact us for an exact price calculation and more information about our terms and conditions.

# SA VOUCHERS & KMO-PORTEFEUILLE

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## SA TRAINING VOUCHERS



**Microsoft Software Assurance Training Vouchers:** As part of the Microsoft Software

Assurance for Volume Licensing program, Microsoft offers their customers benefits such as Training Vouchers. Those vouchers can be used to pay for Microsoft Official Courses at U2U.

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## KMO-PORTEFEUILLE



Dankzij de subsidiemaatregel van de Vlaamse overheid, de Kmo-portefeuille, kan u voor uw opleiding tot 40% subsidies ontvangen. Het registratienummer van U2U voor de pijler opleiding is **DV.0213569**.

# SCHEDULE APRIL - OCTOBER 2021

## VISUAL STUDIO

### .NET PROGRAMMING

		Price	Days	Apr	May	Jun	Jul	Aug	Sep	Oct
<b>UCSPR</b>	Object-Oriented Programming in C#	1850 €	5		3	21		30		18
<b>UNOOP</b>	Advanced Object-Oriented Programming Techniques in .NET	1900 €	5		31			16		11

### WEB DEVELOPMENT

<b>UNASPA</b>	Programming in ASP.NET MVC and JavaScript	1900 €	5	12	31			9		4
<b>UNASPC</b>	Programming in ASP.NET Core and JavaScript	1900 €	5	12	31			9		4
<b>UWEBA</b>	Advanced .NET 5 Web Development with Visual Studio 2019	1900 €	5			14		16		11
<b>UCORE</b>	Upgrading to ASP.NET Core	1300 €	3			14		16		11
<b>UWAPI</b>	Building REST APIs with ASP.NET	1300 €	3	12	26			9		6
<b>UWSEC</b>	Web Security Development Techniques	1300 €	3	6	25			2		4
<b>UBLZ</b>	Building Single Page Applications with Blazor and C# <b>NEW</b>	1300 €	3		10		12		20	

### WINDOWS & MOBILE DEVELOPMENT

<b>UWPF</b>	Building Windows Applications with WPF	1900 €	5		17			23		
<b>UXAMAR</b>	Building apps for iOS, Android and Windows with Xamarin	1900 €	5							25

### ENTERPRISE & ARCHITECTURE

<b>UARCH</b>	.NET Best Practices: Architecture & Design Patterns	1900 €	5	26		28			6	
<b>UDEF</b>	Domain-Driven Design with Entity Framework Core	1300 €	3	6		7		16		11
<b>UTEST</b>	Effective Unit Testing	900 €	2	22		21		26		

### BIZTALK DEVELOPMENT

<b>UBTSD</b>	Developing Solutions Using Microsoft BizTalk Server 2020	1900 €	5			14				18
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### SEMINARS

<b>UMST</b>	Microsoft Windows & Web Development - Technology Overview	850 €	2		27				20	
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## MICROSOFT AZURE

### AZURE FOR DEVELOPERS

<b>UAWEB</b>	Developing & Deploying Web Apps on Microsoft Azure	1900 €	5	19		7		30		25
<b>UAMIC</b>	Developing Microservices with Containers, Kubernetes and Microsoft Azure	1300 €	3	19		14		23		18
<b>UACA</b>	Microsoft Azure Architecture Master Class <b>NEW</b>	1300 €	3		3	28			22	
<b>UADAI</b>	Developing Intelligent Solutions with the Microsoft AI Platform	1300 €	3	6		14			6	
<b>UIOT</b>	IoT with Windows 10 and Microsoft Azure	900 €	2	8		24			27	
<b>UTFS</b>	Team Development with Azure DevOps	1300 €	3		25		5		13	

### MICROSOFT AZURE FOR ADMINISTRATORS

<b>UAZUREA</b>	Microsoft Azure Infrastructure Services	1900 €	5			14		16		4
<b>UAAD</b>	Azure Active Directory Identity Management	900 €	2				1		2	
<b>UAON</b>	Managing Containers with Kubernetes and Microsoft Azure	1300 €	3			7			6	
<b>UAIC</b>	GitOps: Infrastructure as Code with Microsoft Azure <b>NEW</b>	1300 €	3	26		21		23		

### MICROSOFT AZURE DATA PLATFORM

<b>UADE</b>	Data Engineering on Microsoft Azure <b>NEW</b>	1900 €	5	19		14		30		18
<b>UASQL</b>	Implementing Azure SQL Databases	900 €	2	15		24		23		
<b>UACIT</b>	Machine Learning for the Citizen Data Scientist	900 €	2	6	25			2		4
<b>UADS</b>	Data Science with Python on the Microsoft Azure Platform	900 €	2	8	27			4		6

### MICROSOFT AZURE FOR ARCHITECTS

<b>UACA</b>	Microsoft Azure Architecture Master Class <b>NEW</b>	1300 €	3		3	28			22	
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## JAVASCRIPT

### WEB FUNDAMENTALS

<b>UJSDEV</b>	JavaScript Fundamentals	1300 €	3		19		7		15	
<b>UJSWEB</b>	Programming with JavaScript, HTML and CSS	1900 €	5		17		5		13	

### JAVASCRIPT LIBRARIES

<b>UANG</b>	Building web apps with Angular and TypeScript	1300 €	3		10		5		20	
<b>UANGA</b>	Mastering Angular	1300 €	3		19		12		27	
<b>UREACT</b>	Developing web apps with React	1300 €	3		10		12		20	
<b>UVUE</b>	Building Web Apps with Vue.js <b>NEW</b>	900 €	2	26		10		19		25

### MOBILE DEVELOPMENT

<b>UREACTN</b>	Mobile Development with React Native <b>NEW</b>	900 €	2	1		3		12		21
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All prices listed are in Euro and are 21% VAT exclusive. The prices listed on our calendar are for courses scheduled and organized at the U2U training centre in Brussels. The course price includes the high-quality lecture, hands-on exercises on an individual PC, a U2U course book or Microsoft Official Courseware, coffee, soft drinks and lunch. The prices are valid for all bookings registered at U2U after 1<sup>st</sup> April 2021 and before 31<sup>st</sup> October 2021. Cancellations up to 8 days before the course are at no charge. Cancellations after this date, as well as no-shows, will be liable for the full registration fee. Substitutions may be made at any time by providing U2U with written notice of the names of both the original and substitute registrant. Please send cancellation or substitution information by email to [info@u2u.be](mailto:info@u2u.be).

## POWER BI

### POWER BI FUNDAMENTALS

		Price	Days	Apr	May	Jun	Jul	Aug	Sep	Oct
<b>UBIPBE</b>	Analyzing your data with Power BI for Business Users	1300 €	3		10	28		23		11
<b>UBIPB</b>	Analyzing your data with Power BI for BI Professionals	1900 €	5	19		21		16	27	
<b>ADVANCED POWER BI</b>										
<b>UDAX</b>	Mastering DAX	1300 €	3		10		5		1	18
<b>UPBIM</b>	Managing a Power BI Environment <b>NEW</b>	1300 €	3		3			2		4
<b>POWER BI FOR DEVELOPERS</b>										
<b>UBIPBD</b>	Developing for the Power BI Platform	1300 €	3	28		28			27	

## POWER PLATFORM & DYNAMICS 365

### FOR POWER USERS

<b>UPOWER</b>	Microsoft Power Apps and Power Automate	1600 €	4	19		14		2	20	
<b>UCRM365P</b>	Customizing Microsoft Dynamics 365	1900 €	5		17			16		4
<b>UCDS</b>	Building Model-Driven Apps on the Power Platform <b>NEW</b>	1900 €	5		17			16		4

### FOR DEVELOPERS

<b>UCRM365D</b>	Developing Microsoft Dynamics 365 Solutions	1900 €	5		3			9		11
<b>UCDS</b>	Developing for the Common Data Service Platform <b>NEW</b>	1900 €	5		3			9		11

## MICROSOFT 365 & SHAREPOINT

### MICROSOFT 365 FOR POWER USERS

<b>U0365P</b>	Office 365 Essentials	1300 €	3		10		5		6	
<b>USPOP</b>	Microsoft SharePoint Online for Power Users	1900 €	5	19		7		2	20	25

### MICROSOFT 365 FOR DEVELOPERS

<b>USPOAP</b>	Modern Development with Office 365 and SharePoint Online	1900 €	5		17			9		4
<b>USPFX</b>	Developing with the SharePoint Framework	1900 €	5	26		21		16		11
<b>UTEAMSD</b>	Developing for Microsoft Teams <b>NEW</b>	1300 €	3		31			9		4

### MICROSOFT 365 FOR IT PROFESSIONALS

<b>U0365A</b>	Configuring and Administering Office 365	1600 €	4	26	25		12		13	
<b>MS-700</b>	Managing Microsoft Teams <b>NEW</b>	900 €	2	29	25		1	26		21
<b>UINT</b>	Microsoft Endpoint Manager: Configuring Devices with Microsoft Intune <b>NEW</b>	1300 €	3		3	28		30		18
<b>UASEC</b>	Microsoft Cloud Security <b>NEW</b>	900 €	2	28		24		26		21

### SHAREPOINT FOR TECHNICAL MANAGEMENT

<b>USPOT</b>	Microsoft SharePoint Online Technology Overview	850 €	2	15	27			5	30	
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### SHAREPOINT SERVER 2019

<b>USP19P</b>	SharePoint Server 2016/2019 for Power Users	1600 €	4		31		5	30		25
<b>USP19AP</b>	Modern Development with SharePoint Server 2016/2019	1300 €	3		17	28		9		4
<b>USP19A</b>	Administering SharePoint Server 2016/2019	1300 €	3	19			12		27	
<b>USP19U</b>	What's new in SharePoint Server 2019	450 €	1		12				29	

## SQL SERVER

### SQL SERVER FOR DEVELOPERS

<b>UTSQL</b>	Querying SQL Server with Transact-SQL	1300 €	3		3	28			6	
<b>USQLD</b>	Developing and optimizing SQL Server databases	1900 €	5		17		12		13	
<b>USQLOP</b>	SQL Server Performance Tuning and Optimization	1900 €	5		17		5		20	

### SQL SERVER FOR ADMINISTRATORS

<b>USQLA</b>	Administering Microsoft SQL Server Databases	1900 €	5			7		23		25
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### BUSINESS INTELLIGENCE FOR BI PROFESSIONALS

<b>USQLIS</b>	Implementing Data Warehouses with Integration Services	1900 €	5		31				13	
<b>USQLAS</b>	Microsoft SQL Server Analysis Services	1900 €	5	12		7			6	
<b>USQLAT</b>	Microsoft SQL Server Analysis Services Tabular	900 €	2	6		21			6	
<b>USQLRS</b>	Microsoft SQL Server Reporting Services	1300 €	3		10			9		

## WINDOWS SERVER

### WINDOWS SERVER 2019

<b>WS-011</b>	Windows Server 2019 Administration <b>NEW</b>	1900 €	5				5		27	
<b>UPKI</b>	Public Key Infrastructure	900 €	2						9	
<b>UADFS</b>	Implementing Active Directory Federation Services	1600 €	4						20	

### POWERSHELL

<b>UPSHELLA</b>	Mastering PowerShell	1900 €	5	19			12		20	
<b>UPSHELL</b>	Scripting with PowerShell	1300 €	3	19			12		20	

All courses scheduled at U2U Brussels are taught in English. Course hours: First day of course 9:30-17:00, next days: 9:15-17:00.



# 05 DAYS | OBJECT-ORIENTED PROGRAMMING IN C#

## UCSPR

03 - 07 May 2021  
21 - 25 June 2021  
30 August - 03 September 2021  
18 - 22 October 2021  
13 - 17 December 2021

### LEARNING GOALS

This course teaches you how to start programming with Visual Studio, C# and .NET. You will get familiar with the C# language syntax and the .NET Object Oriented concepts, such as classes, objects, inheritance, polymorphism... In this course, you'll get a taste of the different types of applications and .NET libraries through examples in WPF, Entity Framework and ASP.NET.

### TARGET AUDIENCE

This training targets developers with no or limited C# experience. A basic understanding of programming - in whatever language - is advised. Once you've finished this training, you can start your journey to learn building things like web applications, desktop or mobile apps, backends, games, IoT, bots, etc. All with C#.

### OVERVIEW OF .NET 5

What is a .NET Application? .NET Framework versus .NET 5. .NET Applications: ASP.NET, Web API, WPF, Blazor, Xamarin,...

### THE .NET APPLICATION

The Visual Studio solution and project. What are Namespaces and Libraries?

### CLASSES AND OBJECTS

What is a class? Fields, Methods and Properties. Namespaces.

### INSTANCE CONSTRUCTORS

Instance Constructors. Constructor Initializers. Overloading Constructors.

### TYPES IN .NET

Type categories in .NET. Value types, Reference types and Immutable Reference types. Custom Value types: Structure and Enumeration. Boxing and Unboxing. Arguments of Functions. Pass by Value, by Reference; Passing Output.

### STATIC MEMBERS AND STATIC CLASSES

Static Members. Static Constructors. Static Classes.

### INHERITANCE

General Principle of Inheritance. Accessibility levels: public, private, protected and internal.

### POLYMORPHISM

Inheritance & polymorphism. Overriding methods & properties. Using the base class. Sealed classes, methods and properties. The Object class. Overriding the ToString, Equals and GetHashCode method.

### ABSTRACT CLASSES AND INTERFACES

Abstract classes. Defining interfaces. Implementing interfaces. Interface examples in .NET.

### COLLECTIONS

Arrays in .NET, Multidimensional Arrays. Indexer properties. The for, foreach and while loops.

### GENERICS

How to use Generics. Creating your own Generics. Generic constraints.

### EXCEPTION HANDLING

The exception-mechanism in .NET. The try-catch-finally keywords. Creating custom Exceptions.

### DELEGATES AND EVENTS

Creating Delegates. Using Delegates. Multicast Delegates. Creating Events. Using Events in a UI.

### LANGUAGE FEATURES

Type Inference. Extension Methods. Anonymous Methods. Anonymous Types. Lambda Expressions.

### ACCESSING A DATABASE WITH LINQ AND ENTITY FRAMEWORK

Enumerable Class. Func Delegates. Entity Framework. Query Operations from, where, order, group and select. Introducing Entity Framework. Entity Framework Basics.

# 05 DAYS | ADVANCED OBJECT-ORIENTED PROGRAMMING TECHNIQUES IN .NET

## UNOOP

31 May - 04 June 2021  
16 - 20 August 2021  
11 - 15 October 2021  
06 - 10 December 2021

### LEARNING GOALS

Today's applications have to be more responsive, scalable and high-performing. Therefore, modern .NET developers have to be familiar with the more advanced features of .NET and know how things work under the hood. This course examines advanced concepts of the framework like async programming, parallel computing and Reactive Extensions. You'll explore the latest C# language features like Nullable Reference Types and Asynchronous Streams. Join the training and improve your existing .NET programming skills.

### TARGET AUDIENCE

This in-depth course is meant for experienced developers who have an understanding of the .NET platform and have built .NET applications using either C# or VB.NET.

### GENERICS

Generic Class Declarations and Generic Struct Declarations. Generic interface declarations. Understanding Covariance and Contravariance.

### DELEGATES AND EVENTS

Creating Delegates. Using Delegates. Multicast Delegates. Creating Events. Using Events in a UI. Closures.

### LINQ SYNTAX FUNDAMENTALS

What is LINQ? LINQ to Objects, SQL, Entity Framework and XML. LINQ's Enumerable Class. Func Delegate. Query Syntax vs. Method Syntax. Deferred Query Evaluation. Querying Data using LINQ. Group and Join Operators. Don't Forget the Let Operator!

### USING TUPLES

Introducing Tuples. Writing Symmetric Functions. Understanding Destructuring. Discards. Pattern matching with tuples. ValueTuple.

### GARBAGE COLLECTION

The Lifecycle of a Class Instance. GC Class and Members. Forcing a Garbage Collection. Garbage Collection for Unmanaged Resources. The Dispose Pattern. Resurrection. Weak References.

### REFERENCE SEMANTICS WITH VALUE TYPES

Understanding Reference Semantics. How Value Types allow you to write faster code. Passing value types by reference with new access modifiers. Understanding Span<T> and related classes. Measuring using BenchmarkDotNet.

### CONCURRENCY

Understanding processes and threads. Different kinds of Concurrency. Scheduling Threads.

### MULTITHREADING IN .NET

The Thread. Exceptions and threads. Understanding thread pooling. Debugging Multi-Threaded Code.

### THREAD SYNCHRONIZATION

Race conditions and dead locks. Avoiding race conditions. Synchronizing threads: locks, monitors, signals, ... Thread safety in .NET.

### TASKS

What are Task? Waiting asynchronously. Dealing with Exceptions. Task cancellation.

### THE ASYNC AND AWAIT SYNTAX EXPLAINED

What is asynchronous programming? Invoking any method, synchronous and asynchronous. Async Exception Handling.

### ASYNCHRONOUS PROGRAMMING IN .NET

A History of Asynchronous Programming in .NET. Understanding SynchronizationContext. Cancellation, Progress and Exception Handling. ConfigureAwait. Async Guidelines.

### PARALLEL COMPUTING

What is parallel programming? Concurrent collections. Parallel LINQ.

### REACTIVE EXTENSIONS

Push vs. Pull. Understanding IObservable<T> and IOObserver<T>. Hot and Cold Observables. Using LINQ with Rx. Building your own Rx Extensions.

### ATTRIBUTES AND REFLECTION

What are Attributes? Applying Attributes. Common Predefined Attributes. Building Custom Attributes. What is Reflection? Retrieving Attribute Values.

### EXPRESSIONS AND STATIC REFLECTION

What are Expressions? How does LINQ to Database work? Using Static Reflection. Dynamically Generating Code with Static Reflection.

### USING THE DYNAMIC LANGUAGE RUNTIME

Understanding the Dynamic Keyword. Talking to JavaScript Objects using the Dynamic Keyword. Building your own Dynamic Types.



## UNASPA / UNASPC

12 - 16 April 2021  
31 May - 04 June 2021  
09 - 13 August 2021  
04 - 08 October 2021  
29 November - 03 December 2021

## LEARNING GOALS

This course will teach you how to build Web applications using the ASP.NET MVC (model-view-controller) framework and patterns in .NET 5 (also known as .NET Core). You will also learn how to create and consume RESTful services with ASP.NET Web API, JavaScript and Vue JS.

## TARGET AUDIENCE

Students should have a good knowledge of one of the .NET programming languages C# (or VB.NET). Furthermore, a basic knowledge of HTML is advised. This course is intended for .NET 5 with C#.

## THE HTTP PROTOCOL

Http Methods. Headers. Status Codes. Redirection. Caching.

## ASP.NET MVC: INTRODUCTION

The Model-View-Controller (MVC) pattern. MVC in ASP.NET. Client-centric versus Server-centric.

## THE 3 MAIN ASP.NET MVC COMPONENTS

Handling the user interaction with Controller. Rendering the response with MVC views. Creating a MVC Model and ViewModel. understanding Routing.

## VIEWMODELS

Passing Data to a View. ViewModels. Mapping.

## JAVASCRIPT LANGUAGE FUNDAMENTALS

Variables. Primitives and Objects. Functions and the Self-Invoking Function Pattern. Scope. Strict Mode. Error Handling.

## RESPONSIVE WEB DESIGN WITH BOOTSTRAP

Normalizing and Resetting. The Grid System. Utility classes.

## ASP.NET CORE PIPELINE

Understanding the principle of the ASP.NET Core Pipeline. Selecting your middleware in the Startup class. Understanding the need for dependency injection and how to configure your dependencies. Adding your first middleware for serving static files. ASP.NET Core has its own routing middleware. Showing proper diagnostics while developing, and how to configure it in production. Review of built-in middleware.

## END-POINT ROUTING

Getting Started with Routing Concepts. Defining Routing Templates. Route Parameter Constraints. Route Parameter Transformers. Understanding Route Matching. Using Conventional vs. Attribute Routing. Routing Attributes. Handling Routing Errors.

## ASP.NET MVC CONTROLLERS

Model Binding. Different Action Results. Working with GET and POST. Action Filters. Redirections.

## RAZOR VIEWS

Views and View Engines. Layout and Sections. HTML and Tag Helpers.

## REUSABLE RAZOR BUILDING BLOCKS

Partial Views. View Components. Display and Editor Templates.

## DATA VALIDATION

Explicit versus Implicit Validation. Validating data using Data Annotations. Self-Validating Models. Validating using the Model Binder. Client-side validation with Unobtrusive JavaScript.

## ASP.NET MVC DEPENDENCY INJECTION &amp; TESTING

Methods of Dependency Injection. Dependency Inversion, Explicit Dependencies and Inversion of Control. Unit Testing your Components. Stubbing, Mocking & Faking.

## PUBLISHING YOUR APPLICATION

Deployment Options. Cross-platform Deployment. Self-Contained Deployment. Optimize your deployment with Assembly Trimming.

## BUILDING RESTFUL SERVICES WITH WEB API

What is REST? Building a REST Web-API with ASP.NET Web API. Supporting multiple representations: XML and JSON.

## CLIENT-SIDE SERVICE CONSUMPTION WITH VUE JS

The Evolution of Web Development. Components Everywhere. Vue Essentials. Using the Fetch API to consume a REST Service.

## AUTHENTICATION

Knock Knock... Who's There? Windows Integrated. Username and Password. Using External Authentication such as Google or Facebook. Extending Authentication with your own Data. Tokens. Impersonation and Delegation.



# 05 DAYS | ADVANCED .NET 5 WEB DEVELOPMENT WITH VISUAL STUDIO 2019

## UWEBA

29 March - 02 April 2021  
14 - 18 June 2021  
16 - 20 August 2021  
11 - 15 October 2021  
06 - 10 December 2021

### LEARNING GOALS

So you've been using ASP.NET MVC for a while, and you want to learn more? Join us in this training to upgrade your skills to master .NET 5 and ASP.NET Core. In this advanced ASP.NET development course you will build up the necessary knowledge and tools for dealing with the complexity of modern web applications using .NET 5, Entity Framework Core, apply Clean Architecture, and get more insights into SignalR, Blazor, Azure, OpenID Connect and Internationalization. With .NET 5 you can choose your development environment, such as Visual Studio, Visual Studio for Mac, Visual Studio Code, or any other. And then deploy to Windows, OSX or Linux (containers). This training uses Visual Studio, but if you like you can use your preferred development environment.

### TARGET AUDIENCE

This course is meant for developers that have experience with ASP.NET MVC and/or Web API and want to get on board with the latest development in ASP.NET Core.

### .NET 5 INTRODUCTION

What and Why. Understanding .NET 5: .NET Framework versus .NET 5. Supporting multiple runtimes. What is .NET Standard?

### VISUAL STUDIO FOR ASP.NET CORE

The new project structure. Browser auto-refresh while developing. NuGet. Targeting frameworks and handling differences. Executing commands and tools with the dotnet CLI. Pinning the SDK with global.json. Handling bundling and minification in .NET 5 projects.

### .NET 5 CROSS-PLATFORM CAPABILITIES

Developing ASP.NET Core on any platform. Generating a .NET 5 Project using the .NET CLI. Getting started with Visual Studio Code.

### ASP.NET CORE PIPELINE

Selecting your middleware in the Startup class. Dependency injection. Adding your first middleware for serving static files. Routing middleware. Showing proper diagnostics while developing and in production. Review of built-in middleware.

### ASP.NET CORE CONFIGURATION

No more web.config. Different ways of configuration. Storing sensitive configuration in Secrets. Environment variables and user secrets. Using the Options pattern. Adding your own configuration provider.

### LOGGING

Choosing from different logging providers. Understanding logging scopes. Using NLog. Logging guidelines and recommendations.

### BUILDING CUSTOM MIDDLEWARE FOR ASP.NET CORE

The OWIN specification. Project Katana. Applying the new EndPoint routing. Building your own custom middleware.

### END-POINT ROUTING

Routing Concepts. Defining Routing Templates. Route Parameter Constraints. Route Parameter Transformers. Route Matching. Conventional vs. Attribute Routing. Routing Attributes. Handling Routing Errors.

### ASP.NET CORE MODEL-VIEW-CONTROLLER

Web UI and Web API Unification. Razor tag helpers. Developing your own tag helpers. What are View Components? Service Injection with views.

### PUBLISHING YOUR APPLICATION

Deployment Options. Cross-platform Deployment. Self-Contained Deployment. Optimize your deployment with Assembly Trimming.

### ENTITY FRAMEWORK CORE

Differences with .NET 4.x Entity Framework. Scaffolding your project from an existing database. Understanding the generated code. Interacting with the database with LINQ.

### MODELING YOUR DATABASE WITH EF CORE

Methods of configuration. Creating and applying migrations. Table and column mapping. Mapping Value generated properties. Handling Concurrent updates. Modeling relationships. Mapping inheritance.

### SIGNALR

Server Concepts. Building SignalR Clients with C# and JavaScript.

### BUILDING SINGLE PAGE APPLICATIONS WITH C# AND BLAZOR

Introducing Blazor and Web Assembly. Client-Side vs. Server-Side Blazor. Creating a Blazor Component. Hosting Blazor. How does it work?

### ARCHITECTING MODERN WEB APPLICATIONS

"Clean" Architecture: put the business and application model at the center. Understanding the Core, Infrastructure and Presentation layers. Testing everything with Clean Architecture.

### AZURE APP SERVICES: WEB APPS

Using the Web Site Gallery. Deploying from Visual Studio. Free, shared, basic and standard plans. Scaling options. Configuring app settings, TLS, domain names and backup scheduling. Monitoring.

### LOGGING AND MONITORING YOUR APPLICATIONS WITH APPLICATION INSIGHTS

Enabling Application Insights. Diagnosing Failures. Diagnosing Dependencies. Custom events and using Metrics Explorer. Availability and Performance. Using Alerts to detect live problems early. Snapshot debugging.

### UNDERSTANDING CLAIMS-BASED SECURITY

Representing the user. Introducing claims based security. Understanding tokens and their representation on the net. Using Claims in .NET.

### MODERN WEB AUTHENTICATION AND AUTHORIZATION

Introducing OAuth and OpenID Connect. OAuth fundamentals: Authorization Code Grant, Implicit Grant and Client Credential Grant. Implementing OpenID Connect web sign-in with Azure AD.

### PROTECTING A WEB-API WITH OAUTH

Protecting resources. Adding permissions to the server side. Requesting permissions at the client side. Using the Microsoft Authentication Library (MSAL). User consent.

### INTERNATIONALIZATION

Display Content in Different Cultures. Using resource files. Different Views. Validation Messages. Autodetect Cultures. Override Cultures. Client-side Localization.

# 03 DAYS | UPGRADING TO ASP.NET CORE

## UCORE

29 - 31 March 2021  
14 - 16 June 2021  
16 - 18 August 2021  
11 - 13 October 2021  
06 - 08 December 2021

### LEARNING GOALS

ASP.NET Core in .NET 5 is a dramatic change to what .NET Framework used to be. Join us in this training to upgrade your skills to master .NET 5 and ASP.NET Core. If you want to tackle this content with even more advanced topics, check out our Advanced Web Development training.

### TARGET AUDIENCE

Developers that have experience with ASP.NET MVC and want to get on board with the latest development in .NET 5.

### .NET 5 INTRODUCTION

What and Why. Understanding .NET 5: .NET Framework versus .NET 5. Supporting multiple runtimes. What is .NET Standard?

### VISUAL STUDIO FOR ASP.NET CORE

The new project structure. Browser auto-refresh while developing. NuGet. Targeting frameworks and handling differences. Executing commands and tools with the dotnet CLI. Pinning the SDK with global.json. Handling bundling and minification in .NET 5 projects.

### .NET 5 CROSS-PLATFORM CAPABILITIES

Developing ASP.NET Core on any platform. Generating a .NET 5 Project using the .NET CLI. Getting started with Visual Studio Code.

### ASP.NET CORE PIPELINE

Selecting your middleware in the Startup class. Dependency injection. Adding your first middleware for serving static files. Routing middleware. Showing proper diagnostics while developing and in production. Review of built-in middleware.

### ASP.NET CORE CONFIGURATION

No more web.config. Different ways of configuration. Storing sensitive configuration in Secrets. Environment variables and user secrets. Using the Options pattern. Adding your own configuration provider.

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Choosing from different logging providers. Understanding logging scopes. Using NLog. Logging guidelines and recommendations.

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The OWIN specification. Project Katana. Applying the new EndPoint routing. Building your own custom middleware.

### END-POINT ROUTING

Routing Concepts. Defining Routing Templates. Route Parameter Constraints. Route Parameter Transformers. Route Matching. Conventional vs. Attribute Routing. Routing Attributes. Handling Routing Errors.

### ASP.NET CORE MODEL-VIEW-CONTROLLER

Web UI and Web API Unification. Razor tag helpers. Developing your own tag helpers. What are View Components? Service Injection with views.

### PUBLISHING YOUR APPLICATION

Deployment Options. Cross-platform Deployment. Self-Contained Deployment. Optimize your deployment with Assembly Trimming.

### ENTITY FRAMEWORK CORE

Differences with .NET 4.x Entity Framework. Scaffolding your project from an existing database. Understanding the generated code. Interacting with the database with LINQ.

### MODELING YOUR DATABASE WITH EF CORE

Methods of configuration. Creating and applying migrations. Table and column mapping. Mapping Value generated properties. Handling Concurrent updates. Modeling relationships. Mapping inheritance.

### SIGNALR

Server Concepts. Building SignalR Clients with C# and JavaScript.

### BUILDING SINGLE PAGE APPLICATIONS WITH C# AND BLAZOR

Introducing Blazor and Web Assembly. Client-Side vs. Server-Side Blazor. Creating a Blazor Component. Hosting Blazor. How does it work?

## UWAPI

26 - 28 May 2021  
09 - 11 August 2021  
06 - 08 October 2021  
08 - 10 December 2021

## LEARNING GOALS

ASP.NET Web API makes it easy to build REST APIs that reach a broad range of clients, including web and mobile applications. Along with best practices and modern design techniques, this extended 3-day training will guide you towards understanding API architecture, security considerations, and how to build an API with ASP.NET that is both extensible and flexible.

## TARGET AUDIENCE

Participants of this course need to have a solid understanding of the .NET platform and have built .NET applications using either C# or VB.NET.

## REST

The HTTP Protocol in Depth. How REST works.

## INTRODUCING ASP.NET WEB API

Architecture. CRUD operations. Content Negotiation. Consuming with a .NET Client or fetch API.

## END-POINT ROUTING

Getting Started with Routing Concepts. Defining Routing Templates. Route Parameter Constraints. Route Parameter Transformers. Understanding Route Matching. Using Conventional vs. Attribute Routing. Routing Attributes. Handling Routing Errors.

## ASP.NET CORE API CONTROLLERS

The ApiController Attribute and ControllerBase Class. Action Methods. Understanding IActionResult. Using the ProblemDetails class for error reporting.

## CONTENT NEGOTIATION

Media types. Built-in Content Negotiation. Media Formatters. Custom Media Formatters.

## MODEL VALIDATION

Model Binding. The ModelState. Validation Attributes. Returning Validation Errors. Avoiding Overposting with ViewModels.

## SECURING YOUR WEB API SERVICE

Authentication & Authorization in Web API. Authorization Attributes and Policies. Authentication with OAuth and OpenID Connect. Working with Roles and Scopes.

## DOCUMENTING YOUR REST SERVICE WITH THE OPENAPI SPECIFICATION

Swagger and Swashbuckle. Enriching your metadata with attributes. Enriching your metadata with comments. Adding XML comments. Generating client-side code with Visual Studio and Swagger Codegen.

## BEST PRACTICES WHEN DESIGNING A WEB API

How to Organize Resources. Idempotency and Safeness. Dealing with Batches. Remote Procedure Calls. Limiting Data. Versioning. Handling Exceptions. Caching. Handling Large Resources.

## WEB API PATTERNS

Asynchronous Request-Reply Pattern. WebHooks. HATEOAS.



## UBLZ

10 - 12 May 2021  
12 - 14 July 2021  
20 - 22 September 2021  
08 - 10 November 2021

## LEARNING GOALS

Blazor is a new Microsoft Framework for building Single Page Applications. Unlike frameworks like Angular, VueJS, and React, Blazor allows you to do this using C# and use all the skills and tools you have been using with .NET 5! Attend this training if you want to get a head-start with Blazor!

## TARGET AUDIENCE

This training requires basic knowledge about building websites with HTML and CSS, and also some knowledge about C# and ASP.NET.

## INTRODUCTION TO WEBASSEMBLY AND BLAZOR

Building Rich Web Experiences, Past, Present and Future. Introducing Web Assembly. Web Assembly and .NET 5. Getting Started with Blazor - Easy! Understanding the difference between Blazor WASM vs. Blazor Server. Blazor Features Overview. Generating your project with Visual Studio, dotnet CLI or Visual Studio Code. Examining the generated solution and its projects.

## BLAZOR DATA BINDING

A Quick Look at Razor. One Way Data Binding. Event Handling and Data Binding. Two Way Data Binding. Reporting Changes with StateHasChanged.

## BLAZOR FORMS AND VALIDATION

Working with Forms in Blazor. Adding validation to your forms. Disabling the "Submit" button when validation detects errors. Implementing custom validation in Blazor.

## BLAZOR COMPONENTS

What is a Blazor Component? Building a Simple Blazor Component. Component Parameters. Conditional Rendering and ChildContent. Separating the View and View-Model. Component Data Binding. Attribute Splatting. Understanding EventCallback. Referring to Components. Styling Components.

## UNDERSTANDING BLAZOR COMPONENT LIFECYCLE HOOKS

Understanding Lifecycle Hooks. Limiting unnecessary Rerendering of components with ShouldRender. Using Virtualization to limit rendering. Help Blazor with change detection using @key.

## REUSING COMPONENTS WITH COMPONENT LIBRARIES

Building a Component Library. Consuming a Component Library.

## SERVICES AND DEPENDENCY INJECTION

Understanding Dependency Inversion & Injection. Some Inversion of Control Containers. Constructor & Property Injection. Configuring Dependency Injection. Blazor and Dependency Injection. Building Blazor Services.

## DATA STORAGE AND MICROSERVICES

What is REST? Invoking Server Functionality with REST. Building a Simple Microservice with ASP.NET Core. What is Entity Framework 5? Generating the Database with Code First. Testing your Microservice using Postman.

## COMMUNICATION WITH MICROSERVICES

Sending and receiving data. Using the HttpClient Class. The HttpClientExtensions Methods. Taking full control with HttpRequestMessage. Retrieving Data From the Server. Storing Changes.

## SINGLE PAGE APPLICATIONS AND ROUTING

What is a Single Page Application? Using Layout Components. Understanding Routing. Setting the Route Template. Redirecting to Other Pages. Sharing State between Components. Lazy Loading parts of your Blazor web site.

## JAVASCRIPT INTEROPERABILITY

Why do we still need JavaScript in Blazor? Calling JavaScript from C#. Calling .NET Methods from JavaScript. Displaying a map with a JavaScript library.

## BLAZOR AND GLOBALIZATION

What is internationalization, localization and globalization? Detecting the user's language. Internationalizing your Blazor application. Localizing your application.

## SECURITY

Adding authentication to a Blazor Server application. Adding authentication to a Blazor WASM application.



# 05 DAYS | .NET BEST PRACTICES: ARCHITECTURE & DESIGN PATTERNS

## UARCH

26 - 30 April 2021  
28 June - 02 July 2021  
06 - 10 September 2021  
15 - 19 November 2021

### LEARNING GOALS

In this training we identify software design problems and see how to address these using the best suited Design Pattern. This course teaches you the art of building maintainable and testable code through unit testing. We will also look at modern C# language features, S.O.L.I.D. principles, and apply what we've learned. Modern day developers should also know about Reactive Programming which makes certain complex problems a breeze to implement. Finally we finish building a reusable library always keeping things like backward compatibility and developer ease-of-use in mind!

### TARGET AUDIENCE

This course is intended for experienced programmers who are very familiar with VB.NET or C# and have a working experience with .NET.

### SOLID PRINCIPLES

Single Responsibility. Open/Closed. Liskov Substitution. Interface Segregation. Dependency Inversion.

### INTRODUCTION TO PATTERNS

What is a Pattern? The Gang of Four: Erich Gamma, Ralph Johnson, Richard Helm and John Vlissides. Different kinds of design patterns: creational, structural and behavioral patterns. The difference between implementation, design and architecture patterns... Some anti-patterns such as Loosy-Goosy.

### CREATIONAL PATTERNS

Singleton - a.k.a. The Pluto Pattern. Builders - separating the construction from the representation. Factory Method. Abstract Factory.

### BEHAVIORAL PATTERNS

Template Method. Strategy. Chain of Responsibility. State. Iterator. Observer. Mediator.

### MORE LOOSE COUPLING USING DEPENDENCY INJECTION

What is tight coupling and how to prevent it? Using Inversion of Control (IoC) containers. Constructor and Property injection. Microsoft.Extensions.DependencyInjection as an example.

### STRUCTURAL PATTERNS

Adapter. Decorator. Composite Facade. Flyweight. Proxy

### BUILDING YOUR OWN LITTLE PROGRAMMING LANGUAGE WITH SOME PATTERNS - FUN!

Interpreter: Build your own expressive language-grammar and execute it. How LINQ uses Interpreter - and how you can take advantage of it yourself. Builder: Hide how complex hierarchies of objects get built - and allow variations. XAML as the ultimate builder. Reflection: the ideal .NET way for implementing your own builder. Visitor: When you need a lot of different operations on the same object structure.

### MODEL-VIEW-WHATEVER

Model-View-Controller: An ancient pattern back in fashion. ASP.NET MVC - an introduction. MVVM in WPF - MVC taking advantage of powerful databinding capabilities. Command: Encapsulate behavior in objects. Implementing commands using closures.

### REACTIVE PROGRAMMING

What are Observables? Using Reactive Extensions. Applying the Redux pattern so simplify complex applications.

### UNIT TESTING IN .NET

What every developer wants: Quality code that works; and keeps on working. Finding bugs: not just in code. - Or how NASA lost a 125.000.000\$ Mars orbiter. What is unit testing? And what is a good unit test? Understanding the difference between a unit test and an integration test. Test Driven Development - Should you be doing it? Role-playing: Marge, Homer and Bart. The Triple-A of unit testing - and what has cooking to do with this?

### UNIT TESTING WITH VISUAL STUDIO

MSUnit - Built into Visual Studio. Building and running Unit Tests with MSUnit. Using the Test Explorer Window.

### DESIGN PATTERNS APPLIED: DEVELOPING YOUR OWN REUSABLE LIBRARY

Adding the GoF Command pattern to MVVM. Using interfaces for flexibility. Building Command Objects - extending WPF's ICommand interface. Adding Undo and Redo functionality to the command pattern. Using a CommandManager class. Challenge: retro-fitting our commands into MVVM without lots of changes. Implementing Undo-Redo using the Memento pattern. Choosing whether or not to add the Prototype pattern. Ideas on how to proceed with the command pattern.

# 03 DAYS | DOMAIN DRIVEN DESIGN WITH ENTITY FRAMEWORK CORE

## UDEF

06 - 08 April 2021  
07 - 09 June 2021  
16 - 18 August 2021  
11 - 13 October 2021  
20 - 22 December 2021

### LEARNING GOALS

This course will discuss the concepts of domain-driven design and how EF Core can help you at implementing these concepts. Participants learn about modern architecture and will get a hands-on approach to building a web site using DDD and EF Core.

### TARGET AUDIENCE

Attendees are required to have prior knowledge of C#/VB.NET and ASP.NET.

### INTRODUCTION TO DOMAIN DRIVEN DESIGN

What is DDD? Advantages of using DDD. When is DDD a bad option? Anti-Pattern: Big Ball of Mud. Anti-Pattern: Death by a Thousand Dots.

### ARCHITECTING MODERN WEB APPLICATIONS

"Clean" Architecture: put the business and application model at the center. Understanding the Core, Infrastructure and Presentation layer. Testing everything with Clean Architecture.

### UNIT TESTING IN .NET AND .NET 5

What every developer wants: Quality code that works; and keeps on working. Finding bugs: not just in code. - Or how NASA lost a 125.000.000\$ Mars orbiter. What is unit testing? And what is a good unit test? Understanding the difference between a unit test and an integration test. Test Driven Development - Should you be doing it? Role-playing: Marge, Homer and Bart. The Triple-A of unit testing - and what has cooking to do with this?

### UNIT TESTING WITH VISUAL STUDIO WITH MSTEST AND XUNIT

MSUnit - Built-in into Visual Studio. Building and running Unit Tests with MSUnit. Using the Test Explorer Window. Using Test Settings. Live unit testing with Visual Studio. Unit Testing best practices with XUnit. Facts and Theories. Unit testing parallelism. Measuring and improving Code Coverage.

### TACTICAL DESIGN

What is tactical design? Entities, Services, Aggregates, etc... Applying Tactical Design to a real world business case.

### TACTICAL DESIGN - ENTITIES AND VALUE OBJECTS

Differentiating between Entities and Value Objects. Designing entities identity. Designing immutable value objects. Implementing Value Objects Equality efficiently. C# 9 records.

### TACTICAL DESIGN - DOMAIN SERVICES AND MODULES

Providing domain specific operations with Services. Segregating concepts using Modules.

### STRATEGIC DESIGN

The linguistic delimitation that are Bounded Contexts. Identifying the terms and concepts with the Ubiquitous Language. Relating Bounded Contexts with Context Maps.

### TACTICAL DESIGN - LIFE CYCLE, AGGREGATES, FACTORIES AND REPOSITORIES

Clustering Entities and Value Objects with Aggregates. Abstracting the creation of Entities, Value Objects and Aggregates with Factories. Data storage by using Repositories. Abstracting queries using Specifications.

### INTRODUCTION TO ENTITY FRAMEWORK CORE

What is Entity Framework Core? The need for Object Relational Mapping, especially with inheritance. Decoupling conceptual data structure from logical data structure. Querying data: APIs and LINQ.

### ENTITY FRAMEWORK CORE

Differences with .NET (Framework) 4.x Entity Framework. Scaffolding your project from an existing database. Understanding the generated code. Interacting with the database with LINQ.

### MODELING YOUR DATABASE WITH EF CORE

Methods of configuration. Creating and applying migrations. Table and column mapping. Modeling properties. Mapping Value generated properties. Handling Concurrent updates. Modeling relationships. Mapping inheritance.

### ADVANCED EF: MAPPING DDD TO EF CORE.

DDD and Persistence Ignorance. Implementing Value Objects with Owned Properties. Using Shadow Properties to Avoid 'Leaky Abstractions'. Building Repository and Specification classes. Testing your Specifications. Entity Validation.

### TACTICAL DESIGN - DOMAIN EVENTS

What are domain events? Publishing significant domain changes with Domain Events.

### UNIT TESTING ASP.NET CORE WEB APPLICATIONS

Challenges when unit testing MVC applications. Writing unit test for your MVC controllers. Unit testing your views. Unit testing ApiController. Using the ASP.NET Core testing framework. End-to-end testing.

# 02 | EFFECTIVE UNIT TESTING

## UATEST

22 - 23 April 2021  
21 - 22 June 2021  
26 - 27 August 2021  
02 - 03 November 2021  
16 - 17 December 2021

### LEARNING GOALS

This course guides you into the art of unit testing, where you learn to build testable code and various techniques to give your code a good spin. With unit testing, comes unit testing frameworks, we'll discuss how unit testing frameworks work and how they help you.

### TARGET AUDIENCE

This course is intended for experienced programmers who are very familiar with VB.NET or C#.

### UNIT TESTING IN .NET AND .NET 5

What every developer wants: Quality code that works; and keeps on working. Finding bugs: not just in code. - Or how NASA lost a 125.000.000\$ Mars orbiter. What is unit testing? And what is a good unit test? Understanding the difference between a unit test and an integration test. Test Driven Development - Should you be doing it? Role-playing: Marge, Homer and Bart. The Triple-A of unit testing - and what has cooking to do with this?

### UNIT TESTING WITH VISUAL STUDIO WITH MSTEST AND XUNIT

MSUnit - Built-in into Visual Studio. Building and running Unit Tests with MSUnit. Using the Test Explorer Window. Using Test Settings. Live unit testing with Visual Studio. Unit Testing best practices with XUnit. Facts and Theories. Unit testing parallelism. Measuring and improving Code Coverage.

### SOLID PRINCIPLES

Single Responsibility. Open/Closed. Liskov Substitution. Interface Segregation. Dependency Inversion.

### MORE LOOSE COUPLING USING DEPENDENCY INJECTION

What is tight coupling and how to prevent it? Using Inversion of Control (IoC) containers. Constructor and Property injection. Microsoft.Extensions.DependencyInjection as an example.

### WRITING TESTABLE CODE

Testing dependencies - and the art of writing testable code. The difference between a Stub and a Mock. How to replace dependencies with stub and mock objects. The Extract and Override pattern. How the MVVM pattern facilitates UI testing. Replacing configuration in tests.

### ISOLATION FRAMEWORKS: MOQ AND MICROSOFT FAKES.

Understanding Isolation Frameworks. Building Stubs and Mocks with MOQ. Checking arguments and return values. Using Linq to Mocks. What makes Microsoft Fakes so special. Testing legacy/untestable code. Building Stubs and Mocks with Fakes.

### UNIT TESTING ASP.NET CORE WEB APPLICATIONS

Challenges when unit testing MVC applications. Writing unit test for your MVC controllers. Unit testing your views. Unit testing ApiController. Using the ASP.NET Core testing framework. End-to-end testing.

### AUTOMATIC REGRESSION TESTING

What is a regression? Using an automated build system. Continuous integration. Running integration tests. Automatic regression tests.

# 03 | WEB SECURITY DEVELOPMENT TECHNIQUES

## UWSEC

25 - 27 May 2021  
02 - 04 August 2021  
04 - 06 October 2021  
20 - 22 December 2021

### LEARNING GOALS

Many web developers lack the required skills to write secure code. This course takes you through the different security threats and learns you hands-on how to apply them to ASP.NET Core and ASP.NET Web API.

### TARGET AUDIENCE

This course is meant for developers that have experience with ASP.NET MVC and want to make the world a safer place through applied security best practices.

### SECURITY: A MANY PRONGED WORD

Non-disclosure. Authentication. Authorization. Data-tampering. Security testing. Applying STRIDE. The Ten Immutable Laws of Security.

### PRIVACY

Encryption. Understanding symmetric keys. Asymmetric keys. Hybrid encryption. Hashing. Properly store passwords with hashing and salt. What are digital signatures? Certificates, SSL, TLS and HTTPS.

### OWASP WEB SECURITY HEADERS

Understanding HTTP headers. Setting headers in IIS and ASP.NET Core. HTTP Strict Transport Security header. HSTS options. HTTP Public Key Pinning. Understanding TOFU and how to mitigate.

### UNDERSTANDING CLAIMS-BASED SECURITY

Representing the user. Introducing claims based security. Understanding tokens and their representation on the net. Using Claims in .NET.

### MODERN WEB AUTHENTICATION AND AUTHORIZATION

The Internet and a way of sharing. Introducing OAuth and OpenID Connect. OAuth fundamentals: Authorization Code Grant, Implicit Grant and Client Credential Grant. Implementing OpenID Connect web sign-in with AzureAD and Identity Server.

### PROTECTING A WEB-API WITH OAUTH2

Protecting a Web API's resources. Adding permissions to the server side. Requesting permissions at the client side. Using the Microsoft Authentication Library (MSAL). User consent.

### WEB SITE SECURITY THREATS AND DEFENCES

OWASP - Top 10 security issues. Injection - Never trust user input! Broken authentication. Sensitive data exposure. XML External Entities (XEE). Broken Access Control. Security Misconfiguration. Cross-site scripting (XSS). Insecure Deserialization. Using components with known vulnerabilities. Insufficient Logging & Monitoring. Extra: Cross Site request forgery (CSRF).

### SECURITY BEST PRACTICES

Never trust input. Always properly encode output. Apply good access control. Run with least privilege. Securely store (or better yet - not) secrets. Don't tell the hacker anything. Allow long password/passphrases. Default to secure configuration. Generate good random numbers.

# 05 | BUILDING APPS FOR IOS, ANDROID AND WINDOWS WITH XAMARIN

## UXAMAR

Building a mobile app is never building one app. It's building one app for Android, one for Windows and one for iOS. Learning three platforms is time consuming, but the real problem is having to write the same code three times. Xamarin allows us to do this in a much more efficient way. One language to rule them all: C#, while staying true to the platform. Xamarin is based upon Mono, the open source implementation of the .NET runtime. By combining reusable C# code and platform-specific views, Xamarin is able to create cross-platform native apps with all features and the power the native platform has to offer.. Details see [www.u2u.be/cc/uxamar](http://www.u2u.be/cc/uxamar).

# 05 | BUILDING WINDOWS APPLICATIONS WITH WPF

## UWPF

This course will teach you how to build business applications with Windows Presentation Foundation. You will learn to create functional and attractive user interfaces using XAML. Since most business applications are data-driven, you will learn how to handle data using the Entity Framework and how to consume data from web services. Furthermore, you'll get acquainted with the MVVM pattern, making your code maintainable and testable. Details see [www.u2u.be/cc/uwpf](http://www.u2u.be/cc/uwpf).

05  
DAYS

# DEVELOPING & DEPLOYING WEB APPS ON MICROSOFT AZURE

## UAWEB

19 - 23 April 2021  
07 - 11 June 2021  
30 August - 03 September 2021  
25 - 29 October 2021  
13 - 17 December 2021

### LEARNING GOALS

This training is designed to get developers up to speed with designing, developing, hosting and managing web applications using Microsoft Azure. Azure Web Apps and Azure Functions will contain your code; Azure SQL, Cosmos DB and Blob Storage will hold your data; and Message Brokers and Logic Apps will wire it all together. You will also learn about security, monitoring and automated deployment.

### TARGET AUDIENCE

This course is intended for web developers who would like to get familiar with the web development services and tools of Microsoft Azure.

### MICROSOFT AZURE OVERVIEW FOR DEVELOPERS

Overview of Microsoft Azure. Usage Scenarios. Software as a Service (SaaS). Platform as a Service (PaaS). Infrastructure as a Service (IaaS). Pricing. The Azure Management Portals. The Azure Management Portals. Azure Components.

### APP SERVICE PLANS

What is an App Service. Purpose of service plans. Creating a service plan. Scaling a service plan. Moving and cloning apps to other service plans.

### APP SERVICES: WEB APPS

Deploying from Visual Studio. Configuring app settings, SSL, domain names and backup scheduling. Monitoring your Web App. Running/testing locally. Spinning up more website instances. How to implement traffic routing for A/B testing.

### STORING YOUR DATA IN THE CLOUD

Advantages of storing data in the cloud. Microsoft Azure storage concepts. Storage APIs: Blob, File, Table and Queue. Securing your storage with Shared Access Signatures. Using the Azure CDN in your websites to serve your assets.

### BROKERED MESSAGING IN THE CLOUD

Using Service Bus Queues for decoupling applications. Dispatching messages with Topics and Subscriptions. Adding filters to Subscriptions.

### SERVERLESS COMPUTING WITH AZURE FUNCTIONS

Serverless Azure Functions. Function triggering options. Integrating with other Azure services. Sending triggers from your website via Azure Storage Queues.

### SERVERLESS COMPUTING WITH LOGIC APPS

Workflow-like logic. Triggering a logic app. Connectors and Actions. Controlling the flow: conditions, variables and iterations. Adding your own API's as custom connectors.

### AZURE SQL DATABASE

Features and Service Tiers. Azure SQL Server and Azure SQL Database. Comparison with on-prem SQL. Backups and Replication. Authentication and Firewall.

### SECURING YOUR APPLICATIONS AND APIS WITH AZURE ACTIVE DIRECTORY

Azure Active Directory. Basic Principles: Users, Groups, App Registrations, Roles and Scopes. Tokens and Claims. Authentication Scenarios. Microsoft Authentication Library.

### ELIMINATE CREDENTIALS USING MANAGED IDENTITY

System-Assigned and User-Assigned Managed Identities. Storing secrets using Azure Key Vault. Accessing Blob Storage, Azure SQL and Service Bus.

### LOGGING AND MONITORING YOUR APPLICATIONS

Implementing and configuring Application Insights. Server-side monitoring. Client-side monitoring. Snapshot Debugging: debugging from errors that happened on live web applications. Power BI dashboards.

### REDIS CACHE

What is Redis Cache. Data types you can use in your cache. Accessing the cache. Redis Messaging. Implementing Redis Cache into your website.

### STORING YOUR DATA IN COSMOSDB

What is Cosmos DB. Using document databases using the SQL API. Using document databases using the MongoDB API. Using Graph databases using the Gremlin API. Using key-value databases using the Table API. The Apache Cassandra API. Enterprise Readiness.

### ARM TEMPLATES

The Azure Resource Manager. The purpose of Resource groups. Declarative syntax for ARM templates. Getting ARM-templates for your deployed resources. Creating templates in Visual Studio. Deploying with templates.

### CI/CD WITH AZURE DEVOPS

DevOps Lifecycle. Planning. Build. Release Management. Auto-setup.

### AZURE STATIC WEB APPS

Static Web Apps. API support with Azure Functions. Integrate with a GitHub Repository. Automated and Distributed Deployment.

03  
DAYS

# MICROSOFT AZURE ARCHITECTURE MASTER CLASS

## UACA

03 - 05 May 2021  
28 - 30 June 2021  
22 - 24 September 2021  
01 - 03 December 2021

### LEARNING GOALS

In this training we start from potential problems a cloud developer/architect may face. Then, we figure out what to do by using proven patterns. And finally, we look at various technologies available in Azure to implement these patterns.

### TARGET AUDIENCE

People who want to become cloud developers/architects in Azure. Participants of this course need to have a solid developer background and must know the basics of Azure.

### ARCHITECTURAL BUILDING BLOCKS

Applications: Web Sites, APIs, Jobs, Triggers. Data: Structured and Unstructured Data. Communication: REST, gRPC, Message Brokers.

### DESIGN CONSIDERATIONS

Considerations: Availability, Resiliency, Performance, Cost,... Decision Making and Impact on Architecture.

### MICROSERVICES

Dealing with Evolution in an Application. Benefits and Drawbacks. Communication: client-service, service-service. Data Isolation.

### SCALING AN APPLICATION

Using an App Service Plan. Using an Orchestrator. Serverless. Multi-Region. Load Balancing. Azure Resources: Traffic Manager, Front Door, Load Balancer, Application Gateway.

### SQL VERSUS NOSQL

Schemas and Relations. Data Consistency. Read and Write Performance. Partitioning and Scaling. Azure Resources: Azure SQL, Cosmos DB.

### SCALING A DATABASE

Vertical versus Horizontal Scaling. Partitioning and Sharding. Multi-Region. Azure Resources: Azure SQL, Cosmos DB.

### CACHING STRATEGIES

Azure Redis Cache. Cache-Aside Pattern. Read-Through and Write-Through. Materialized View Pattern. Valet Key Pattern. Azure CDN.

### SYNCHRONOUS COMMUNICATION

Retry and Circuit Breaker. Bulkhead Pattern. Ambassador Pattern.

### ASYNCHRONOUS COMMUNICATION

Queue-Based Load Leveling. Event-Based Communication. Messages, Events and Commands. Azure Resources: Service Bus, Event Grid, Storage Queue.

### SCALING A MESSAGE BROKER

Partitioning. Claim-Check Pattern. Azure Resources: Event Grid, Event Hub.

### DATA CONSISTENCY

Strong Consistency. CAP Theorem. Eventual Consistency. Outbox Pattern. Compensating Transaction Pattern.

### CQRS AND EVENT SOURCING

The Problem with CRUD. Read and Write Models. Commands. Event Store.

### EXTERNAL COMMUNICATION

API Gateway. Backend for Frontends. Webhooks. Asynchronous Request-Reply. Azure Resources: Front Door, Application Gateway, API Management.

### SECURITY CONCERNS

Options for Storing Sensitive Data. Azure Key Vault and Managed Identity. Service Authentication. Security on Infrastructural Level: Virtual Networks, Firewalls,... GateKeeper Pattern.



03  
DAYS

## DEVELOPING MICROSERVICES WITH CONTAINERS, KUBERNETES AND MICROSOFT AZURE

### UAMIC

19 - 21 April 2021  
14 - 16 June 2021  
23 - 25 August 2021  
18 - 20 October 2021  
20 - 22 December 2021

#### LEARNING GOALS

A Container is a virtualization technology used to implement scale-out applications that require greater efficiency and scalability.

#### TARGET AUDIENCE

This course is intended for experienced .NET Developers who would like to get acquainted with Docker containers and Microservices on Azure.

#### CONTAINERS

Why Containers? Containers vs Virtual Machines. Linux, Windows and Hyper-V Containers. Container Orchestration.

#### DOCKER

Running Docker. Containers, Images and Registries. Building an Image. Port Mapping and Volumes. Container Orchestration.

#### ADD ASP.NET APPLICATIONS TO CONTAINERS

.NET or .NET Core? Official .NET Docker Images. Working with Databases. Tools.

#### AZURE FOR CONTAINER OVERVIEW

Azure Container Registry. Hosting Containers: Container Instances, AKS. Service Fabric. Deploy with Containers: Web Apps, Batch and Functions.

#### MICROSERVICE ARCHITECTURE

Dealing with Evolution in an Application. Benefits and Drawbacks. Scaling. Versioning. Communication: client-microservice, service-service, event-based. Data Isolation per microservice. Migration from a monolith. Securing Microservices.

#### KUBERNETES

Kubernetes Cluster. Kubectl and YAML. WorkLoads: Pods and Deployments. Communication: Services and Ingresses. Scaling and Updates. Health Monitoring.

#### AZURE CONTAINER SERVICE (AKS)

Putting a Kubernetes Cluster in Azure. AKS Features. Using Helm Charts.

#### BRIDGE TO KUBERNETES

Debugging in AKS. Bridge to Kubernetes Concept. Using Bridge to Kubernetes. Client-side Tooling. Working in Isolation in a Shared Development Environment. Routing.

#### API GATEWAYS

Benefits/Drawbacks. Implementation Options. Azure API Management.

#### ASYNCHRONOUS COMMUNICATION

Communication Patterns. Event-Based Communication. Event Bus. Integration Events. Eventual Consistency. Azure Service Bus.

#### SYNCHRONOUS COMMUNICATION

Problems with Direct Communication. Retry. Circuit Breaker. Sidecar Pattern. Service Mesh.

03  
DAYS

## TEAM DEVELOPMENT WITH AZURE DEVOPS

### UTFS

25 - 27 May 2021  
05 - 07 July 2021  
13 - 15 September 2021  
08 - 10 November 2021

#### LEARNING GOALS

In this course you will learn about using Azure DevOps, formerly known as Visual Studio Team Services (VSTS), to manage the application development lifecycle. This training will show you the role of the project manager, developer and tester in this process and how DevOps can improve the efficiency and code quality of your team.

#### TARGET AUDIENCE

.NET developers, project managers, testers and anyone who is involved in application development.

#### AZURE DEVOPS SERVICES

Azure DevOps: The big picture. Features. Architecture. The Extensions Marketplace.

#### AZURE DEVOPS TEAM PROJECTS

Development Processes. Team Projects and Process Templates.

#### PROJECT MANAGEMENT WITH AZURE BOARDS

Iterative Development. Creating the project backlog. Work Items and Queries. Velocity and Forecasting.

#### PLANNING A SPRINT

Sprint Planning. Identifying user stories for the next sprint. Capacity planning. Defining tasks to complete a user story. Adjust work to fit team capacity. Sharing a sprint with stakeholders.

#### RUNNING THE SPRINT

Running a sprint. The daily standup meeting. Burndown chart. Team dashboard.

#### STORING DEVELOPER ASSETS IN AZURE REPOS

Version Control concepts. Distributed Source Control with Git. Creating a local repository. Cloning a remote repository. Staging files. Committing files. Adding branches to your workflow. Branching Strategies. Merge vs. Rebase. Synchronizing with a remote repository. Pull Requests.

#### CONTINUOUS INTEGRATION AND DEPLOYMENT WITH AZURE PIPELINES

What is Team Build? Doing Continuous integration. Creating Build processes with the new componentized build. What are jobs, tasks? Integrating with other systems (such as GitHub) using Service Connections. Integrating with other systems (such as GitHub) using Service Connections.

#### AZURE RESOURCE MANAGER TEMPLATES

Infrastructure as Code. Authoring ARM Templates. Parameters, Variables, Resources, Output. Nested Templates.

#### CONTINUOUS DEPLOYMENT WITH AZURE PIPELINES

Release management and continuous deployment. Release definitions. Approving releases with release gates. Choosing between deployment patterns. Notifications with Service Hooks. What are Agents? Setting up a build agent in your enterprise network. Understanding ChatOps.

#### AZURE TEST PLANS

Types of tests. Test planning. Test Plan, test suite, test case. Running manual tests using the Test Runner. Parameters and Shared Steps. Creating bug work items.

03  
DAYS

## DEVELOPING INTELLIGENT SOLUTIONS WITH THE MICROSOFT AI PLATFORM

### UADAI

06 - 08 April 2021  
14 - 16 June 2021  
06 - 08 September 2021  
08 - 10 November 2021

#### LEARNING GOALS

AI is not just for the greats, it's at the fingertips of any developer without having to be a data-scientist. In this course you are taken through all relevant topics to build intelligent applications.

#### TARGET AUDIENCE

Participants of this course need to have a decent understanding of .NET and preferably some experience with Microsoft Azure.

#### WHAT IS ARTIFICIAL INTELLIGENCE?

Definitions of Artificial Intelligence. Domains of Artificial Intelligence. History, Current State and Future.

#### BOTS

The Microsoft Bot Framework. Debugging your bot with the bot Emulator. Turns, Messages and Activities. Conversations and Channels. Designing a Dialog Flow. Prompts, Waterfalls and Components.

#### MACHINE LEARNING

Supervised vs Unsupervised. Machine Learning Process. Deep Learning. Data Preparation. Tools.

#### AZURE COGNITIVE SERVICES

What is Cognitive services? Image Classification, Recognition and moderation. Person Identification. Speech-to-text, text-to-speech. Speaker recognition and real-time translation. Visual Search. QnA.

#### ML.NET

Loading and Transforming Data. Prediction and Evaluation. Importing and Exporting Models. Experiments. Automated Machine Learning.

#### NATURAL LANGUAGE PROCESSING WITH LUIS

The Language Understanding Intelligent Services (LUIS). Intents, Entities and Utterances. Using prebuilt models. Entity types. Training and testing LUIS. Calling LUIS from a bot. Integrating LUIS with Speech. Comparison with Watson.

#### AZURE MACHINE LEARNING DESIGNER

Working with Datasets. Data Preparation. Exploring modelling techniques. Training and evaluating models. Automated ML. DevOps for ML.

#### EXPOSING YOUR CONTENT TO AI WITH SEARCH

Setting up Search Indexing. Filtering, Sorting, Facets, ... Query Syntax. Cognitive Search and Content Augmentation. Consuming your Search Service.

05  
DAYS

## MICROSOFT AZURE INFRASTRUCTURE SERVICES & AZURE AD

### UAZUREA

29 March - 02 April 2021  
14 - 18 June 2021  
16 - 20 August 2021  
04 - 08 October 2021  
22 - 26 November 2021

#### LEARNING GOALS

Microsoft Azure helps IT Professionals to build a scalable infrastructure to their needs. It reduces costs for the overall IT platform and allows you to extend your environment very quickly whenever necessary. The cost of the IT infrastructure is reduced because you only pay for what you really use.

#### TARGET AUDIENCE

This course is intended for IT professional technical specialists responsible for implementing and maintaining the IT environment.

#### AZURE OVERVIEW

Cloud Computing. Azure Benefits. Software as a Service (SaaS). Platform as a Service (PaaS). Infrastructure as a Service (IaaS). Global Azure Infrastructure. Azure Products Overview. SLA and Pricing. Azure Resource Manager.

#### AZURE MANAGEMENT

Azure Portal. Managing Azure with PowerShell. Managing Azure with the CLI. Azure Cloud Shell. Azure Resource Manager Templates.

#### MANAGING SUBSCRIPTIONS

Management Groups. Naming and Tagging. Resource Locks. Role Based Access Control (RBAC).

#### AZURE STORAGE

Azure Storage Types: Blob, Tables, Queues, Files and Disks. Storage Accounts. Secure Access to Storage. Working with Storage. Azure File Sync.

#### AZURE NETWORKING

Virtual Network Overview. Virtual Network Design. VNet Peering. Site-to-Site Connection. Point-to-Site Connection. ExpressRoute.

#### AZURE VIRTUAL MACHINES

Virtual Machines Overview, Pricing and Storage. VM Networking. Network Security Groups. Creating VMs. Connect to a VM: RDP, SSH, Bastion.

#### AZURE ADVANCED NETWORKING

Azure DNS. User Defined Networking. Service Endpoints. Private Endpoints. Azure Firewall.

#### MANAGE AZURE VMs

Disk Management. VM Extensions. VM Backup. Disaster Recovery. Update Management.

#### TROUBLESHOOTING AZURE VMs

Boot Diagnostics. Serial Console. RDP Connection Issues. Run Command. Azure Mobile App.

#### AZURE LOAD BALANCING

Azure Load Balancer. Application Gateway. Web Application Firewall. Traffic Manager. Azure Front Door. Comparing Load Balancing Solutions. VM Scale Sets.

#### AZURE WEB APPS

App Services and App Service Plans. Web Apps. Deployment. Deployment Slots. Web App Scaling. Backup and Restore. Adding a Custom Domain to your Web App. Enabling HTTPS.

#### AZURE SQL DATABASE

Azure SQL Database Service. Managed Instances. Pricing Models. Creating and Managing Databases. Connecting to SQL Azure Database. Business Continuity. Security.

#### AZURE DEFENDER

Azure Security Center. Configure Security Policies. Protect Your Resources. Respond to Incidents. Just in Time VM Access. Adaptive Application Controls. File Integrity Monitor. Adaptive Network Hardening. Azure Secure Score.

#### AZURE GOVERNANCE

Management Groups. Azure Policy. BluePrints. Cost Management. Resource Graph.

02  
DAYS

## MICROSOFT AZURE ACTIVE DIRECTORY IDENTITY MANAGEMENT

### UAAD

01 - 02 July 2021  
02 - 03 September 2021  
02 - 03 December 2021

#### LEARNING GOALS

Azure Active Directory is a cloud identity solution that provides a set of capabilities to manage users and groups. Azure AD helps secure access to applications such as Microsoft online services (Office 365, Azure, Microsoft Intune, Power BI, ...) and a world of non-Microsoft SaaS applications. Azure AD can be integrated with your on-prem Active Directory to simplify user management and provide a Single Sign-On experience. Multi-factor authentication adds an extra layer of security to the authentication process. Conditional access policies allow you to control under what circumstances users are allowed to access your resources..

#### TARGET AUDIENCE

IT Administrators responsible for user management in cloud services like Office 365, Azure, Intune and Dynamics 365.

#### AZURE ACTIVE DIRECTORY

Azure AD Overview. Azure AD Editions. Add a custom domain to Azure AD. User and Group Management. Password Management. Azure AD Business to Business. Company Branding.

#### AZURE AD CONNECT

Azure AD Connect Overview. Directory Synchronization. Password Synchronization. Troubleshooting Directory Synchronization.

#### PASS-THROUGH AUTHENTICATION

Pass-Through Authentication. High Availability. Seamless Single Sign-On.

#### ACTIVE DIRECTORY FEDERATION SERVICES

Federation Overview. Configure Active Directory Federation Services. High Availability. Azure AD Connect Health.

#### SECURING YOUR IDENTITIES

Multi-Factor Authentication. Identity Protection. Conditional Access.

#### AZURE AD PRIVILEGED IDENTITY MANAGEMENT

PIM Features. Managing Azure AD Roles and Azure Resources. Add Eligible Users. Activate Roles. Configure Access Reviews.

#### AZURE AD APPLICATION MANAGEMENT

Application Management Overview. Gallery Applications. Azure AD Application Proxy. Custom Developed Applications. Managed Identities.



## UACON

07 - 09 June 2021

06 - 08 September 2021

29 November - 01 December 2021

## LEARNING GOALS

In this course students will learn to build Docker containers on both Windows and Linux. Students will deploy a Kubernetes cluster and learn how Kubernetes handles the deployment of applications across various nodes. Finally, students will take a look at the Azure services related to container management and maintenance.

## TARGET AUDIENCE

This course is intended for experienced IT professionals. The technologies learned in the course can be useful for both on-prem and Azure deployments.

## CONTAINERS

Containers Overview. Containers versus Virtual Machines. Container Fundamentals. Docker Editions.

## WINDOWS AND LINUX CONTAINERS

Windows Containers. Deploy a Windows Container Host. Linux Containers on Windows. Linux Containers. Deploy a Linux Container Host.

## DOCKER

Docker Overview. Docker Commands. Container Networking. Dockerfile. Docker Hub. Docker Compose. Docker Swarm.

## KUBERNETES

Kubernetes Overview. Kubernetes Cluster. Cluster Hosting Options. Azure Kubernetes Service. Kubernetes Building Blocks: Pods, Volumes.

## CONTAINER DEPLOYMENT WITH KUBERNETES

Deployments. Update a Deployment. Scaling. Networking in Kubernetes. AKS Networking Options. Services.

## CONTAINER MANAGEMENT WITH KUBERNETES

Ingress. Secrets and ConfigMaps. Namespaces. Network Policies. Health Monitoring. Kubernetes Dashboard.

## CONTAINER TECHNOLOGY IN AZURE

Azure Container Registry. Azure Container Instances. Web App for Containers.



## UAIC

26 - 28 April 2021

21 - 23 June 2021

23 - 25 August 2021

08 - 10 November 2021

20 - 22 December 2021

## LEARNING GOALS

The core idea of GitOps is having a Git repository that always contains declarative descriptions of the infrastructure currently desired in the production environment and an automated process to make the production environment match the described state in the repository. In this course, you will learn about the tools that help you to setup this kind of deployment for your infrastructure.

## TARGET AUDIENCE

IT Pros who are interested in learning how to deploy their cloud infrastructure in an easy, fully automated way.

## INTRODUCTION TO GITOPS

What is GitOps? Why should you use GitOps? How does GitOps work? GitOps Services and Tooling: Git(Hub), Azure DevOps, Kubernetes, Terraform, Flux,...

## AZURE RESOURCE MANAGER TEMPLATES

Infrastructure as Code. Authoring ARM Templates. Parameters, Variables, Resources, Output. Nested Templates. Validating ARM Templates: Test Toolkit, Pester.

## TERRAFORM

Terraform Features. Configuration and Providers. Variables, Resources, Secrets. Terraform State.

## DESIRED STATE CONFIGURATION (DSC)

Benefits of Desired State Configuration. DSC Components: Configuration, Resources, Compilation. Enact Your Configuration: Push or Pull mode. DSC Tools: PowerShell, Chef, Puppet.

## SOURCE CONTROL WITH AZURE DEVOPS AND GITHUB

Version Control concepts. Distributed Source Control with Git. Creating a local repository. Cloning a remote repository. Staging files. Committing files. Adding branches to your workflow. Branching Strategies. Merge vs. Rebase. Synchronizing with a remote repository. Pull Requests.

## CONTINUOUS INTEGRATION WITH AZURE PIPELINES

What is Team Build? Doing Continuous integration. What are jobs, tasks? Creating Build processes with the new componentized build. Validating Infrastructure as Code scripts with a build. Integrating with other systems (such as GitHub) using Service Connections.

## CONTINUOUS DEPLOYMENT WITH AZURE PIPELINES

Release management and continuous deployment. Release definitions. Approving releases with release gates. Choosing between deployment patterns. Notifications with Service Hooks. What are Agents? Setting up a build agent in your enterprise network. Understanding ChatOps.



05  
DAYS

## DATA ENGINEERING ON MICROSOFT AZURE

### UADE

19 - 23 April 2021  
14 - 18 June 2021  
30 August - 03 September 2021  
18 - 22 October 2021  
13 - 17 December 2021

#### LEARNING GOALS

Microsoft Azure offers a broad range of services like Azure Data Factory, Azure Data Lake, Azure Databricks and Azure Synapse Analytics helping you build your data warehouse in the cloud. This training will cover all aspects of designing and implementing a data warehouse on Microsoft Azure. Participants will leave the training with hands-on experience with all Microsoft Azure services to explore, prepare, manage and serve data for immediate BI or machine-learning needs.

#### TARGET AUDIENCE

This course focusses on developers and administrators who are considering migrating existing data solutions to the Microsoft Azure cloud. Some familiarity with relational database systems such as SQL Server is handy. Prior knowledge of Azure is not required.

#### THE MODERN DATA WAREHOUSE

From traditional to modern data warehouse. Lambda architecture. Overview of Big Data related Azure services. Getting started with the Azure Portal.

#### STORING DATA IN AZURE

Azure Blob Storage. Azure Data Lake Storage Gen 2. Tools for uploading data. Storage Explorer, AZCopy and PolyBase.

#### INTRODUCING AZURE DATA FACTORY

Data Factory V2 terminology. Setup a Data Factory with GIT support. Exploring the Data Factory portal. Creating Linked Services and Datasets. Copying data with the Data Factory wizard.

#### AUTHORING PIPELINES IN AZURE DATA FACTORY

Adding activities to the pipeline. Working with Expressions. Variables and Parameters. Debugging a pipeline.

#### CREATING DATA FLOWS IN DATA FACTORY

From ELT to ETL. Creating Data Factory (Mapping) Data flows. Exploring Wrangling Data Flows.

#### DATA FACTORY INTEGRATION RUNTIMES

Integration runtime overview. Controlling the Azure Integration Runtime. Setup self-hosted Integration Runtimes. Lift and shift SSIS packages in Data Factory.

#### DEPLOYING AND MONITORING DATA FACTORY PIPELINES

Adding triggers to pipelines. Deploying pipelines. Monitoring pipeline executions. Restart failed pipelines.

#### AZURE SQL DATABASE

Provisioning an Azure SQL Database. Migrating an on-premises Data Warehouse to Azure SQL Database. Ingesting Azure Blob Storage data. Working with Columnstore Indexes.

#### AZURE SYNAPSE ANALYTICS

Overview of Azure Synapse Analytics. Provisioning an Azure Synapse Analytics Workspace. Getting started with Azure Synapse Studio. Ingesting data. Working with on-demand SQL Pools. Using notebooks on Spark Pools.

#### AZURE SYNAPSE ANALYTICS PROVISIONED SQL POOLS (AZURE DATA WAREHOUSE)

Architecture of Provisioned SQL Pools. Loading data via PolyBase. CTAS and CETAS. Setting up table distributions. Indexing. Partitioning. Performance monitoring and tuning.

#### GETTING STARTED WITH AZURE DATABRICKS

Introduction Azure Databricks. Cluster setup. Databricks Notebooks. Collaborative features in Databricks.

#### ACCESSING DATA IN AZURE DATABRICKS

Uploading data. Connecting to Azure Storage and Data Warehouse. Mounting Azure Blob storage. Accessing data in an Azure Data Lake Gen 2. Dealing with malformed data. Processing Spark Dataframes in Python. Using Spark SQL. Working with Delta Lake.

#### DEPLOYING AN AZURE DATABRICKS SOLUTION

Azure Databricks jobs. Working with Databricks Widgets. Calling Databricks Notebooks from within Azure Data Factory pipelines.

#### MODELING DATA WITH AZURE ANALYSIS SERVICES

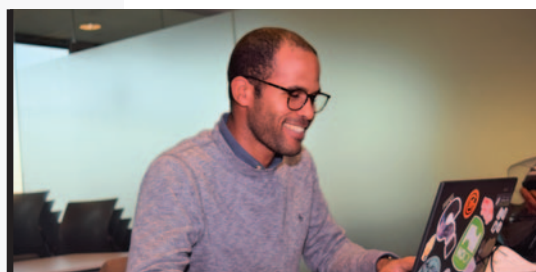
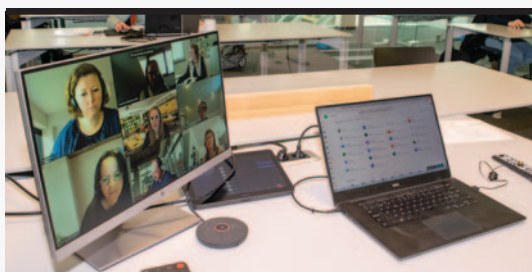
Online Analytical Processing. Analysis Services Tabular. Creating a model on top of Azure Storage or Azure Data Warehouse. Model deployment. Processing. Model management.

#### AZURE DATA EXPLORER

Data Explorer architecture. Ingesting data in Data Explorer. Querying and visualizing data with Kusto. Accessing Data Explorer from Data Factory and Power BI.

#### REAL-TIME EVENT PROCESSING WITH AZURE STREAM ANALYTICS

Lambda architecture. Create Azure Stream Analytic jobs. Azure Event Hubs. Connecting inputs and outputs. Writing Stream Analytic queries.



02  
DAYS

## IMPLEMENTING AZURE SQL DATABASES

### UASQL

15 - 16 April 2021  
24 - 25 June 2021  
23 - 24 August 2021  
04 - 05 November 2021

#### LEARNING GOALS

Participants of this course will learn from both a DBA and database developer's perspective how to setup and implement Azure SQL databases. The complete database lifecycle from creating and configuring your servers and databases, developing new database objects or migrating existing databases and client applications will be covered.

#### TARGET AUDIENCE

This 2-day course is intended for existing DBA's and database developers who want to move their databases to Azure SQL. Participants of this course need to have a basic understanding of the Microsoft SQL Server platform.

#### INTRODUCTION TO AZURE SQL

What is Azure SQL? Azure SQL Architecture. Azure SQL Pricing. Azure SQL Service Tiers and DTU's. Working with the Azure Management Portal.

#### AZURE SQL MANAGEMENT

Creating and configuring a Server in Azure SQL. Creating and configuring an Azure SQL Database. Implementing Firewall Rules. Overview of the Azure SQL Management Tools.

#### DEVELOPING AND MIGRATING AZURE SQL DATABASES

Creating tables, views, stored procedures, ... Migrate an existing SQL Server database. Exporting and Importing BACPAC files of a SQL Database. Copy an Azure SQL Database.

#### AZURE SQL DATABASE CLIENT CONNECTIVITY

Connectivity Overview. Available Connectivity Libraries. Azure SQL Database Connection Strings.

#### SCALING AZURE SQL DATABASES

Introducing Elastic Database Pools. Implementing Elastic Database Pools and working with eDTU's. Creating Elastic Database Pools. Configuring Elastic Databases. Monitoring Elastic Database Pools. Creating Elastic Jobs.

#### SECURING USER ACCESS TO AZURE SQL DATABASES

Authentication overview. Configuring Authentication. Configuring Authorization. Creating Logins and Users. Working with contained databases.

#### MONITOR AN AZURE SQL DATABASE

Configuring Database Auditing. Azure SQL Database threat detection. Query Performance Insight in Azure SQL Databases. Working with Extended Events.

#### BACKUP, RESTORE AND HIGH AVAILABILITY

Business Continuity overview. Backup of an Azure SQL database. Restoring an Azure SQL database. Geo-Restore of an Azure SQL database. Geo-Replication of Azure SQL databases.

## UACIT

06 - 07 April 2021  
25 - 26 May 2021  
02 - 03 August 2021  
04 - 05 October 2021  
29 - 30 November 2021

## LEARNING GOALS

In this two-day course the basic concepts of Machine Learning for citizen data science are covered. A number of tools are introduced that can be used to create and deploy ML models without a lot of Machine Learning or coding knowledge in Microsoft Azure.

## TARGET AUDIENCE

This course is intended for people who plan on using machine learning without writing code. This can be BI developers, data analysts as well project managers.

## INTRODUCTION TO MACHINE LEARNING

What is machine learning? Why would we use Machine Learning? Machine Learning methodology. Data preprocessing. Modeling. Model evaluation: measuring quality.

## TOOLS FOR CITIZEN DATA SCIENTISTS IN AZURE

Overview Machine Learning in Azure. Pretrained models. Transfer learning. Graphical approaches. Coding approaches.

## COGNITIVE SERVICES

Overview of cognitive services. Pretrained services. Customizable services. LUIS.

## AZURE MACHINE LEARNING SERVICE: AUTOMATED ML

Introduction to Azure Machine Learning Service. Important concepts Azure ML. Building Automated ML Models. Deploying and consuming an Automated ML model.

## AZURE MACHINE LEARNING SERVICE: DESIGNER

What is the Designer? Loading data. Preprocessing data. Creating Machine Learning Models. Deploying models.

## AI FEATURES IN POWER BI

Introduction to Power BI. Using ML models in Power BI Data Flows. More machine learning options in Power BI.



## UADS

08 - 09 April 2021  
27 - 28 May 2021  
04 - 05 August 2021  
06 - 07 October 2021  
01 - 02 December 2021

## LEARNING GOALS

Data science converts data into insights by applying techniques from the field of artificial intelligence and machine learning. This training starts from data that has already been prepared and uploaded to Azure.

## TARGET AUDIENCE

This course focusses on developers and data scientists who are considering the Azure stack for applying machine learning on their data.

## MACHINE LEARNING INTRODUCTION

Supervised versus unsupervised learning. Machine learning methodology. Data preparation. Classification, regression and clustering. Model evaluation. Cognitive services. Automated ML in Azure ML Services. Working with the Azure ML Designer.

## GETTING STARTED WITH PYTHON

Introducing the Python programming language. Python environments. Interactive development with Azure notebooks. Variables and objects. Common data structures: Lists, tuples, sets and dictionaries. Functions. Creating and using classes.

## DATA PROCESSING WITH SCIPY

Numerical Python: Numpy. Numpy data structures. Pandas DataFrames. Loading data with pandas. Data manipulations with Pandas.

## DATA INSPECTION

Plotting with pandas. Introducing the matplotlib package. Using the seaborn package. Creating interactive plots with Plotly.

## MACHINE LEARNING WITH SCIKIT-LEARN

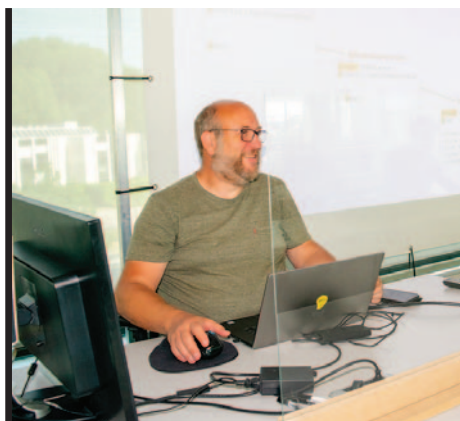
Machine learning specific data preprocessing: normalization, standardization, one-hot encoding. Classification using decision trees, logistic regression and support vector machines. Model tuning: working with hyper-parameters. Building regression models with linear regression, SVM's and Neural networks. Unsupervised learning: Clustering.

## AZURE MACHINE LEARNING SERVICES

Azure ML service overview. Create a ML service workspace. Setting up computes and datastores. Creating and querying experiments. Deploying and using models. Creating and registering images. Deploy images as web services.

## GETTING STARTED WITH DEEP LEARNING

From Neural networks to Deep learning. Overview of deep learning frameworks. Getting started with the Keras framework.



# 03 DAYS | JAVASCRIPT FUNDAMENTALS

## UJSDEV

19 - 21 May 2021  
07 - 09 July 2021  
15 - 17 September 2021  
01 - 03 December 2021

### LEARNING GOALS

This course is the primer you need for any of your JavaScript endeavors, whether you want to build web sites, web servers with node, mobile apps, office extensions, tools, machine learning,... The list goes on.

### TARGET AUDIENCE

This course is independent of the server-side technology you are using, so feel free to attend whether you use PHP, ASP.NET, Python, Ruby on Rails... A basic understanding of programming - in whatever language - is advised.

### JAVASCRIPT INTRODUCTION

Why is JavaScript important? What is ECMAScript? Performance. Picking the right Libraries. Developer Tools.

### JAVASCRIPT LANGUAGE FUNDAMENTALS

Using Variables. Primitives and Objects. Functions: more powerful than you'd expect. Understanding Scope. Strict Mode. Error Handling.

### JAVASCRIPT COLLECTIONS

Storing multiple values in Arrays. Useful Functions and Operators. Using Objects as Maps. Sets, Maps and Others.

### JAVASCRIPT CONSTRUCTORS AND CLASSES

Creating your own Objects using Constructors. Prototypes. Class syntax. Using Properties to encapsulate your fields. The 'this' keyword explained.

### DEALING WITH ASYNC CODE IN JAVASCRIPT

Threading in JavaScript. Using Callbacks. Event Handling. Working with Promises. Async and Await.

### STRUCTURING JAVASCRIPT APPLICATIONS AND TOOLING

Using Libraries. Content Delivery Networks. Getting Libraries with npm. Modules versus the Global Object. Using Task Runners like Gulp. Bundling and Minification Tools like WebPack. PolyFills and Transpilers like Babel and TypeScript. Tools for Code Quality.

### REST SERVICES

REST. Verbs and URLs. XML and JSON format. Example with node.js and Express.

### CLIENT-SIDE SERVICE CONSUMPTION

Getting data using AJAX. Fetch API. External Libraries. Vue.js Essentials. Loading Data in a Vue Application.

# 05 DAYS | PROGRAMMING WITH HTML, CSS AND JAVASCRIPT

## UJSWEB

17 - 21 May 2021  
05 - 09 July 2021  
13 - 17 September 2021  
29 November - 03 December 2021

### LEARNING GOALS

This course is about front-end (client-side) web development. It's what the user sees, touches and experiences in the browser. You'll learn how to build modern, interactive websites by learning the fundamentals of HTML, CSS, and JavaScript. This course is about the browser not the server.

### TARGET AUDIENCE

This course is independent of the server-side technology you are using, so feel free to attend whether you use PHP, ASP.NET, Python, Ruby on Rails... A basic understanding of programming - in whatever language - is advised.

### THE HTTP PROTOCOL

Http Verbs. Headers. Status Codes. Cookies. Redirection. Caching.

### HTML FUNDAMENTALS

Anatomy of a page. How a page is parsed. Some important HTML elements. Styling and Behavior.

### FORMS

Form Elements. How Forms Work. Useful Attributes and Functions. Validation.

### HTML SEMANTICS

The need for meaningful elements. Headers, content and footers. Articles and sections. Navigation elements. Meaningful figures. Dates and time.

### CSS FUNDAMENTALS

Styling websites using CSS. CSS Selectors. Understanding Inheritance & Cascading behavior. Choosing the right unit.

### PRINCIPLES OF WEB DESIGN

Layout and Composition. Color. Graphics. Typography. User Experience.

### CSS POSITIONING

Understanding the Box Model. Flow. Display. Position.

### CSS POSITIONING ADVANCED

Float. Flex Box. Grid. Page layout strategies.

### RESPONSIVE WEB DESIGN WITH BOOTSTRAP

Normalizing and Resetting. The Grid System. Utility classes. Customizing look and feel. Components: navigation, popovers ...

### JAVASCRIPT INTRODUCTION

Why is JavaScript important? What is ECMAScript? Performance. Picking the right Libraries. Developer Tools.

### JAVASCRIPT LANGUAGE FUNDAMENTALS

Using Variables. Primitives and Objects. Functions: more powerful than you'd expect. Understanding Scope. Strict Mode. Error Handling.

### JAVASCRIPT COLLECTIONS

Storing multiple values in Arrays. Useful Functions and Operators. Using Objects as Maps. Sets, Maps and Others.

### JAVASCRIPT CONSTRUCTORS AND CLASSES

Creating your own Objects using Constructors. Prototypes. Class syntax. Using Properties to encapsulate your fields. The 'this' keyword explained.

### DEALING WITH ASYNC CODE IN JAVASCRIPT

Threading in JavaScript. Using Callbacks. Event Handling. Working with Promises. Async and Await.

### STRUCTURING JAVASCRIPT APPLICATIONS AND TOOLING

Using Libraries. Content Delivery Networks. Getting Libraries with npm. Modules versus the Global Object. Using Task Runners like Gulp. Bundling and Minification Tools like WebPack. PolyFills and Transpilers like Babel and TypeScript. Tools for Code Quality.

### REST SERVICES

REST. Verbs and URLs. XML and JSON format. Example with node.js and Express.

### CLIENT-SIDE SERVICE CONSUMPTION

Getting data using AJAX. Fetch API. External Libraries. Vue.js Essentials. Loading Data in a Vue Application.





## UANG

10 - 12 May 2021  
05 - 07 July 2021  
20 - 22 September 2021  
15 - 17 November 2021

## LEARNING GOALS

By using a componentized approach, Angular is better equipped than ever to build performant data-driven web-apps. While Angular takes care of data binding, navigation and server communication; TypeScript allows you to use the most advanced features JavaScript has to offer on any browser.

## TARGET AUDIENCE

Good understanding of JavaScript, HTML and CSS and a notion of node.js and npm.

## INTRODUCTION TO ANGULAR

Evolution in Web App Development. Basic Node.js and Angular project structure. Angular Core and Modules. TypeScript, Dart, Plain Old JavaScript.

## STRONGLY TYPED JAVASCRIPT WITH TYPESCRIPT

Writing Application-Scale JavaScript. Type-Safe JavaScript Development with TypeScript. Typescript configuration. Implementing Types, Classes and Inheritance. Namespaces and Modules.

## CORE CONCEPTS

Components. Modules. Services.

## DATA BINDING

The Importance of Binding. Component to View. Structural Directives. Local Template Variables. Value Conversion. View to Component.

## COMPONENTS

Using Multiple Components. Input and Output. ViewChild and ContentChild. EventEmitter. Directive Life Cycle.

## ATTRIBUTE AND STRUCTURAL DIRECTIVES

Attribute Directives. Structural Directives. Built-in Directives. Custom.

## DEPENDENCY INJECTION AND PROVIDERS

Terminology. Dependency Injection Basics. Services. Providers. Factories. Injection Tokens.

## PIPES

Using a Pipe. Built-in Pipes. Custom Pipes. Pure versus Impure.

## WORKING WITH FORMS

What's in a Form. Responding to Changes. FormBuilder. Data Validation.

## TALKING TO THE SERVER

Sending and Receiving Data. HTTPClient Module. HTTP Interceptors. Observables versus Promises.

## BUILDING A SINGLE PAGE APPLICATION

What is a SPA. Router Module. Route Configuration. Parent-Child Navigation. Route Guards.



## UANGA

19 - 21 May 2021  
12 - 14 July 2021  
27 - 29 September 2021  
22 - 24 November 2021

## LEARNING GOALS

This training will take you from being an average Angular developer to a great one. You'll gain more insight in the workings of Angular and you'll explore more advanced programming techniques like RxJS, Redux and Advanced Forms. This course is constantly being updated to the latest version of Angular, currently Angular 11.

## TARGET AUDIENCE

This course targets professional web developers that really want to master Angular. Participants of this course need to have a decent understanding of Angular and TypeScript.

## REACTIVE EXTENSIONS FOR JAVASCRIPT

What are Reactive Extensions. Observable and Observer. Subjects. Cold versus Hot Observables. Making Async Calls. Combining Observables. Error Handling. Dealing with Back Pressure.

## CHANGE DETECTION

Zones. How Change Detection Works. Immutables and Observables.

## STATE MANAGEMENT WITH NGRX

The Redux Pattern. Major Principles. The Store, Actions and Reducers. Using RxJS within Redux. Efficient Slicing. Using Async Pipes. Tools.

## BRINGING REDUX TO ANGULAR WITH @NGRX

Using RxJS within Redux. Efficient Slicing. Using Async Pipes.

## THE NGRX STORE

Responsibilities. Normalizing Data. Initializing the Store.

## NGRX REDUCERS

Useful Operators. Splitting Up Reducers. NgRx Effects.

## SMART AND DUMB COMPONENTS

Characteristics of Dumb Components. Characteristics of Smart Components. Performance Impact.

## STRUCTURING AN APPLICATION

Domain, Routing, Core and Shared Modules. Exporting and Providing. Clean Imports. Creating Libraries.

## FORMS ADVANCED

Dynamically Adding Elements. FormArray. Nested Forms.

## ANGULAR UNIVERSAL

AOT versus JIT compilation. Server-side rendering with Angular Universal. Hot-Loading with pre-boot.

## TESTING

Challenges. Unit Testing. Jasmine Features. Karma. Writing Testable Code. Getting Started. Isolated Tests. Angular Testing Utility APIs.

## CUSTOM COMPONENTS WITH SVG AND CANVAS

SVG Graphics. Canvas Graphics. Animating Graphics.

## ANGULAR ELEMENTS

Custom Elements. Transforming Angular Components to Custom Elements. Packaging and Using your Custom Element.

# 03 | DEVELOPING WEB APPS WITH REACT

## UREACT

29 - 31 March 2021  
10 - 12 May 2021  
12 - 14 July 2021  
20 - 22 September 2021  
22 - 24 November 2021

### LEARNING GOALS

In this training developers will learn how to use React and its component based development to create rich and dynamic websites.

### TARGET AUDIENCE

This course targets professional web developers who are familiar with JavaScript.

### INTRODUCING REACT

The Evolution of Web Development. Components Everywhere. Combining React with other Libraries. React Tooling.

### REACT FUNDAMENTALS

React App Structure. What is JSX. JavaScript Expressions. JSX Tips and Tricks.

### STATE AND PROPS

Components are State Machines. How does Component State work. Props and Data Flow. Smart and Dumb Components.

### HOOKS

Functional Components. State Hook. Effect Hook. Things to Know when Using Hooks. Building your own Custom Hooks.

### WORKING WITH FORMS

What are refs and How do I use them Correctly? Value Binding to State. Controlled vs Uncontrolled Components. Sanitizing and Validating Input. Using Libraries to Manage your Forms.

### TALKING TO THE SERVER

Fetch API. When and Where to Fetch Data? Using the Effect Hook.

### COMPONENT COMPOSITION

props.children. Working with Context and the useContext Hook. Rendering Dynamic Content with Render Props. Higher Order Components.

### ROUTING

Introducing React Router. Paths and Parameters. Nesting Routes. Lazy Loading. Component Lifecycle.

### PERFORMANCE

Virtual DOM.  
Using Memoization and the Callback Hook.  
Avoiding Computational Work.  
Avoiding Re-rendering.  
Pitfalls.

### STATE MANAGEMENT

Externalizing State from Components. Redux: the State Management Pattern of Champions. Mobx: a Simpler, more Lightweight Alternative to Redux.

### REDUX

What is Redux? Actors: Store, Actions, Reducers. View and Hooks. Asynchronous Actions. Tools.

### JEST AND REACT

What is Jest? Creating Tests with Jest. Asynchronous Methods. Mocking. Testing React components using Snapshots.

# 02 | MOBILE DEVELOPMENT WITH REACT NATIVE

## UREACTN

01 - 02 April 2021  
03 - 04 June 2021  
12 - 13 August 2021  
21 - 22 October 2021

### LEARNING GOALS

React Native aims to reduce the complexity of cross-platform development by letting React developers reuse a lot of the skills they already possess.

### TARGET AUDIENCE

This course targets professional web developers who are familiar with JavaScript.

### INTRODUCTION TO REACT NATIVE

The World of Mobile Development. What is React Native? Why Choose React Native? Setting up a Development Environment.

### GETTING STARTED WITH REACT NATIVE

Project Structure. Debugging an Application. Components. JSX. Building our first page. Adding application state. Reacting to user input.

### LAYOUT AND STYLING

Styling and Layout in Mobile Applications. Layout with Flexbox. The React Native Styling system. Adding Animations to enhance User Experience.

### MANAGING DATA AND RESOURCES

Data in Mobile Apps. Loading resources from an API. Working with ListViews. storing offline data with AsyncStorage. Working with Assets.

### ROUTING AND NAVIGATION

Introducing React Navigation. Basic routing with Stack Navigation. Bringing navigation to the foreground with Tab Navigation. Drawer Navigation: Save screen space while retaining easy navigation. Combining Navigators for a better flow in your app.

# 02 | BUILDING WEB APPS WITH VUE.JS

## UVUE

10 - 11 June 2021  
19 - 20 August 2021  
25 - 26 October 2021  
20 - 21 December 2021

### LEARNING GOALS

Vue aims to be an approachable and progressive framework for building user interfaces. In this 2-day training developers will learn how to use Vue and its component-based development.

### TARGET AUDIENCE

This course targets professional web developers who are familiar with JavaScript and HTML.

### INTRODUCTION TO VUE

The Evolution of Web Development. Components Everywhere. Vue Tools and Ecosystem.

### VUE FUNDAMENTALS

Vue App Structure. The Vue Instance. Component Basics. Lifecycle Hooks.

### DATA BINDING

The Importance of Binding. Directives. Event Handling. Conditionals and Loops. Computed Properties and Watchers. Filters. Class and Style Bindings.

### VIEWMODEL IN VUE

Adding Interactivity. Methods. Computed Properties. Watchers.

### COMPONENTS

Using Multiple Components. Passing Data with Props. Emitting Events. Content Slots.

### WRITING SERVICES

What are Services? Provide / Inject.

### TALKING TO THE SERVER

Fetch API. Where and When to Fetch Data? Loading and Error Indicators.

### ROUTING

Vue Router Library. Routing Directives. Routing Configuration. Nested Routes. Navigation Guards.

### COMPOSITION AND REUSABILITY

Mixins. Composition API.

# JAVASCRIPT

# 04 DAYS | SHAREPOINT SERVER 2016/2019

## USP19P

31 May - 03 June 2021  
05 - 08 July 2021  
30 August - 02 September 2021  
25 - 28 October 2021  
13 - 16 December 2021

### LEARNING GOALS

U2U offers 3 different versions of this course targeting SharePoint Server 2013, SharePoint Server 2016 and SharePoint 2019. Please consult our website for a detailed course description. SharePoint contains a rich set of features and functionalities allowing you to build a platform supporting your business needs. This course will teach you the out-of-the-box functionalities of the product. You will get hands-on experience with the SharePoint user interface and you will learn how to create, configure, secure and maintain SharePoint sites.

### TARGET AUDIENCE

This course targets both IT professionals and business users interested in learning the ins and outs of the different SharePoint functionalities. Participants will leave the training with the skillset necessary to become a SharePoint key user, content manager, site owner... No prior SharePoint knowledge is required.

### OVERVIEW OF SHAREPOINT SERVER 2019

This module provides an overview of SharePoint Server 2019, its key technologies, architecture and user experience. It will position SharePoint Server 2019 versus SharePoint Server 2016 and SharePoint Online and the available hybrid features

### DISCOVERING SHAREPOINT SITES

SharePoint Architecture. Sites vs Site Collections. Classic vs Modern sites. SharePoint Home. SharePoint Modern Team Site. Discovering other site templates.

### SHAREPOINT CONTENT MANAGEMENT

Basics of Apps, Lists and Libraries. Discovering different list templates. Working with metadata and different column types. Creating new views. Creating new Content Types. Content Type guidelines.

### SHAREPOINT STORE APPS

Browsing the SharePoint App Store. Installing and Working with SharePoint Apps.

### CHANGING, CUSTOMIZING AND BRANDING SHAREPOINT SITES

The SharePoint App Launcher and Ribbon. Modern Site Pages. Providing content on your site pages. Wiki Pages and Web Part pages. Working with Web Parts. Different types of Navigation. Changing the theme of your site.

### DOCUMENT MANAGEMENT

Keeping track of different versions. Configuring check-out and approval. Grouping documents in Document Sets. Receive email Alerts. Co-Authoring on Office documents. Recycle Bin.

### USER MANAGEMENT & PERMISSIONS

SharePoint Permissions and Permission Levels. Granting access at site and library level. Working with users, domain groups and SharePoint groups. Breaking permission inheritance. Sharing your content with your colleagues.

### USING AND BUILDING CUSTOM WORKFLOWS

Using the out-of-the-box workflows. Creating new workflows with SharePoint Designer 2013 and Visio.

### ENTERPRISE CONTENT MANAGEMENT

Metadata at enterprise level with the Managed Metadata Service Terms and TermSets. Publishing of Enterprise Content Types. Moving Documents with Send To. Classifying documents with the Content Organizer. Record Management. Policies: Auditing, Expiration, Data Loss Prevention and Document Deletion.

### SHAREPOINT SEARCH

Search query syntax. Configuring the Search Engine. Working with Result Sources. Defining and using managed properties. People Search. Query Rules. Search web parts. Result Types.

### WEB CONTENT MANAGEMENT: PUBLISHING PAGES

Publishing Sites vs Team Sites. Publishing of a Publishing Page. Principals of Publishing Pages. Using and creating Page Layouts. Creating Page Layouts with the Design Manager. Device Channels.

### COMMUNICATION SITES

Building Portals with SharePoint Communication Sites. Benefits of SharePoint Communications Sites. Working with Site Designs and Column Layouts. Adding outstanding designs with the Hero Web Part. Managing and Publishing Content.

### WORKING WITH BUSINESS CONNECTIVITY SERVICES

Overview of the BCS architecture. Creating External Content Types. Connecting to databases and OData services. Working with External Lists to support CRUD operations on your data in SharePoint. Integrating external data in Outlook.

### SHAREPOINT SOCIAL FEATURES

SharePoint Newsfeeds. Managing your SharePoint User Profile. Using OneDrive for Business.

# 03 DAYS | MODERN DEVELOPMENT WITH SHAREPOINT SERVER 2019

## USP19AP

The future is now! Long gone are the days that developing for SharePoint only meant writing server-side ASP.NET code running on SharePoint Server. We have new, modern ways to develop for the SharePoint platform, following the general industry tendency towards more client-side development. This course sets you up with the needed knowledge and best practices guidance on the tools and techniques needed to add your creations to the SharePoint 2019 ecosystem: going from Add-ins and the client-side object model, to remote scripting and PnP, to SharePoint Framework and Fluent UI framework. Details see [www.u2u.be/cc/usp19ap](http://www.u2u.be/cc/usp19ap).

# 03 DAYS | ADMINISTERING SHAREPOINT SERVER 2013/2016/2019

## USP19A

This course will provide you with the knowledge and skills to install, configure, manage and maintain a Microsoft SharePoint Server 2013/2016/2019 environment by using the SharePoint Central Administration and Powershell. This course will provide necessary guidelines, best practices, and considerations that will help you optimize your SharePoint server deployment. Details see [www.u2u.be/cc/usp19a](http://www.u2u.be/cc/usp19a).

# 01 DAY | WHAT'S NEW IN SHAREPOINT SERVER 2019

## USP19U

Three years have passed, and the time to become modern is now! Microsoft SharePoint Server 2019 will provide new, improved, modern looking features to your SharePoint on-premises deployments, while at the same time still making it easy to take advantage of cloud innovation through hybrid deployments of SharePoint Server with Office 365. This course will provide you with an extensive overview of all new functionalities in SharePoint Server 2019. Details see [www.u2u.be/cc/usp19u](http://www.u2u.be/cc/usp19u).



05  
DAYS

## MICROSOFT SHAREPOINT ONLINE FOR POWER USERS

### USPOP

19 - 23 April 2021  
07 - 11 June 2021  
02 - 06 August 2021  
20 - 24 September 2021  
25 - 29 October 2021  
06 - 10 December 2021

#### LEARNING GOALS

SharePoint Online, part of Microsoft 365, contains a rich set of features and functionalities that allows you to build a powerful collaboration and communication business platform. This course will teach you the out-of-the-box functionalities of the product. You will get hands-on experience with the SharePoint user interface and you will learn how to create, configure, structure, secure and maintain SharePoint sites. You will leave the training with the skills to build a powerful collaboration environments integrating many Microsoft 365 products like Microsoft Teams, Power Apps and Power Automate.

#### TARGET AUDIENCE

This course targets both IT professionals and business users interested in learning the ins and outs of the SharePoint Online functionalities. Participants will leave the training with the skill set necessary to become a SharePoint key user, content manager, site owner... No prior SharePoint Online knowledge is required.

#### POSITIONING SHAREPOINT ONLINE AND MICROSOFT 365

Understanding Microsoft 365 & Office 365. Office 365 Licensing. SharePoint Online feature overview. Overview of other Office 365 Services: Microsoft Teams, OneDrive for Business, Power Platform...

#### MODERN SHAREPOINT SITES

What is a SharePoint Site? Creating SharePoint Sites. Classic vs Modern Sites. Configuring Sites. Team Sites vs. Communication Sites. Team Sites and Microsoft 365 Groups. Building communication environments with Communication Sites. Multilingual Pages. Site Designs.

#### BUILDING MODERN COLLABORATION & INTRANET ENVIRONMENTS

What is a Site Collection? What is a Hub Site? Hub Sites Shared configuration. Content aggregation. SharePoint look book and site designs. SharePoint Home Site.

#### SHAREPOINT CONTENT MANAGEMENT

Fundamentals of Apps, Lists and Libraries. SharePoint Lists and Document Libraries. Working with the Filter and Details Pane. Working with metadata and different column types. Managing what you see with views. Provide rich experiences with Column and View Formatting. Exporting and Importing Data.

#### SHAREPOINT CONTENT TYPES

Providing reusable metadata with site columns and content types. Content Type guidelines. Working with Document Templates.

#### WORKING WITH PAGES

Working with Site Pages. Enriching your pages with web parts. Authoring and publishing a Site Page. Using pages as news. Page approval. Navigation best practices. Changing the theme.

#### DOCUMENT MANAGEMENT

Working with Views in Modern Document Libraries. Keep track of different versions. Configure check-out and Approval. Grouping documents in Document Sets. Receive email Alerts. Co-Authoring on Office documents. Recycle Bin.

#### ONEDRIVE FOR BUSINESS

Store Work Files in OneDrive for Business. OneDrive Mobile Apps. Synchronize your documents with different devices. Files On-Demand.

#### MICROSOFT TEAMS

Microsoft Teams Feature Overview: Chat, Teams, Meetings, Phone System. Connecting a Team to an Microsoft 365 Groups. Desktop, Mobile and Web Teams Client. Teams, Channels, Tabs, Apps and Connectors. Microsoft Teams configuration options. Integrate SharePoint Online in Microsoft Teams with Tabs. Using the Lists app in Microsoft Teams. Microsoft Teams Governance and Lifecycle Management.

#### USER MANAGEMENT & PERMISSIONS

SharePoint site security architecture. Simplified access with Site Owners, Site Members and Site Visitors. Configuring Site Permissions and Group Membership. Microsoft 365 Groups Permissions. What are the available Sharing Options?

#### EXTERNAL SHARING

External Sharing in SharePoint Online. Sharing Options. Guest and Anonymous Access. Configuration Options.

#### ENTERPRISE CONTENT MANAGEMENT

Metadata at enterprise level with the Managed Metadata Service. Terms and TermSets. Publishing of Enterprise Content Types.

#### MICROSOFT SEARCH

What is Microsoft Search? Search query syntax. Managing the Search Schema. Customizing Microsoft Search. Search Query Modifiers, Verticals, Result Layouts and Connectors.

#### COMPLIANCE FEATURES

Manage Classifications: Labels, Policies and Sensitive Information Types. Data Loss Prevention. Data Deletion Policies. Data Governance: Archive, Retention, Disposition and Revision.

#### MICROSOFT POWER APPS

What is Microsoft Power Apps? Power Apps Flavours. Power Apps pricing. Creating a Power App from a template, from a data source or from blank. Adding Screens and controls to your app. Building custom SharePoint list forms with Power Apps. Adding a Power App as a webpart to a SharePoint page.

#### MICROSOFT POWER AUTOMATE

What is Microsoft Power Automate? Power Automate pricing. Using out-of-the-box flows in SharePoint Online. Building flows from a template. Working with approvals. Building flows from scratch: Adding triggers and actions. Running and managing flows.

02  
DAYS

## MICROSOFT SHAREPOINT ONLINE TECHNOLOGY OVERVIEW

### USPOT

In this SharePoint training you will get a technology overview of SharePoint Online, part of Office 365. You will discover the different areas and capabilities of the product. The goal is to make you familiar with all the SharePoint features like Document Management, Collaboration, Search... position the role of the end users, power users, developers and administrators and help you to make better technology decisions. This course does not include any hands-on exercises. Details see [www.u2u.be/cc/uspot](http://www.u2u.be/cc/uspot).



## U0365P

10 - 12 May 2021  
05 - 07 July 2021  
06 - 08 September 2021  
08 - 10 November 2021

### LEARNING GOALS

This training targets all the key components of Office 365: Microsoft Exchange Online, SharePoint Online and Microsoft Teams. You will learn how to configure and manage an Office 365 environment, how to create a mailbox, setup a SharePoint site and configure conferencing with Microsoft Teams. As part of your Office 365 subscription you also get access to lots of new cloud services: Planner, Power Apps, Power Automate, Forms...

### TARGET AUDIENCE

Business users who need a strong knowledge of the different Office 365 Services.

### UNDERSTANDING MICROSOFT 365

Introduction to Microsoft 365. Key Microsoft 365 Features. Microsoft 365 Subscription plans. Office 365 Connectivity. Office 365 Security. Office 365 Service Continuity.

### MANAGING OFFICE 365

Managing Clients. Office 365 Management Portals. Compliance Features.

### USER MANAGEMENT

Overview of Azure AD. Managing Users. Managing Groups. Assigning Licenses. Multi-Factor Authentication.

### MICROSOFT 365 GROUPS

Microsoft 365 Groups Overview. Collaboration in Mind. Creating Microsoft 365 Groups.

### EXCHANGE ONLINE

Exchange Online Management Tools. Create and Manage Mailboxes. Using Outlook and OWA. Working with Shared and Resource Mailboxes. Distribution Groups.

### MODERN SHAREPOINT ONLINE SITES

Modern Team Sites. Communication Sites. Site Designs. What is a Hub Site?

### SHAREPOINT CONTENT MANAGEMENT

Fundamentals of Apps, Lists and Libraries. Working with the Filter and Details Pane. Working with metadata and different column types. Managing what you see with views. Finding your content with search.

### ONEDRIVE FOR BUSINESS

Store Work Files in the Cloud with OneDrive for Business. Sharing Documents. Synchronize documents to your local machine.

### EXTERNAL SHARING

Adding a Guest User to a Team or Group. Guest Invitations. Sharing SharePoint Sites. Sharing Documents from SharePoint or OneDrive.

### MANAGING TASKS WITH PLANNER AND TODO

Organize Your Teamwork with Office 365 Planner. Get a Personal Tasks Overview with Todo.

### MICROSOFT TEAMS

Microsoft Teams Feature Overview: Chat, Teams, Meetings, Phone System. Connecting a Team to an Microsoft 365 Groups. Desktop, Mobile and Web Teams Client. Teams, Channels, Tabs, Apps and Connectors. Microsoft Teams configuration options. Integrate SharePoint Online in Microsoft Teams with Tabs. Using the Lists app in Microsoft Teams. Microsoft Teams Governance and Lifecycle Management.

### MICROSOFT FORMS

Get Started with Microsoft Forms. Setup for Microsoft Forms. Share form and collaborate with others. Embed your Form. Use built-in analytics to evaluate responses.

### MICROSOFT POWER APPS

What is Microsoft Power Apps? Power Apps Flavours. Power Apps pricing. Creating a Power App from a template, from a data source or from blank. Adding Screens and controls to your app. Building custom SharePoint list forms with Power Apps. Adding a Power App as a webpart to a SharePoint page.

### MICROSOFT POWER AUTOMATE

What is Microsoft Power Automate? Power Automate pricing. Using out-of-the-box flows in SharePoint Online. Building flows from a template. Working with approvals. Building flows from scratch: Adding triggers and actions. Running and managing flows.





03  
DAYS

## DEVELOPING FOR MICROSOFT TEAMS

### UTEAMSD

29 - 31 March 2021  
31 May - 02 June 2021  
09 - 11 August 2021  
04 - 06 October 2021  
29 November - 01 December 2021

#### LEARNING GOALS

This course shows students the options for extending and customizing the Microsoft Teams experience. Learn how Apps built on the Microsoft Teams platform can be bridge the Teams client with your services and workflows. See how to create rich content pages to show in Tabs, enrich messages with Extensions, provide interaction with Bots and connect with Microsoft Teams to publish or read Card content from chats and channels.

#### TARGET AUDIENCE

Developers with .NET or JavaScript experience with a need to customize Microsoft Teams.

#### MICROSOFT TEAMS DEVELOPMENT OVERVIEW

Teams Development introduction. Creating Microsoft Teams Apps with Node and .NET. Yeoman Generator for Microsoft Teams. Microsoft Teams Toolkit for Visual Studio Code. App elements: Tabs, Bots, Connectors, Messaging Extensions. Using Teams App Studio.

#### CREATING EMBEDDED EXPERIENCES WITH TABS

Channel/Group vs Personal tabs. Building Tabs using ASP.NET (Core). Building Tabs using Node.js and React. Interact with Teams using the Teams JavaScript SDK. Building Tabs using SharePoint Framework (SPFx). Embedded experiences with Power Apps in a Teams Tab. Authentication options for your Teams Tabs.

#### STYLE TEAMS APP CONTENT USING FLUENT UI

Using Fluent UI. Styling your apps with Fluent UI framework. Integrating Fluent UI components.

#### CARDS AND TASK MODULES

Designing Teams Cards. Responding to Card actions. Create interactive workflows with Task Modules.

#### BUILDING RICH CONVERSATIONS WITH BOTS

Creating a bot compatible web service. Debugging your bot with the bot Emulator. Turns, Messages and Activities. Conversations and Channels. Registering your bot with Microsoft Azure's Bot Framework.

#### BOTS FOR MICROSOFT TEAMS

Creating a bot for Teams. Registering your bot with App Studio. Adding bot capabilities in the app manifest. Creating simple bots with Power Virtual Agents.

#### ENRICH MESSAGES WITH MESSAGING EXTENSIONS

Request user input with Action Commands and Tasks. Provide search results based on Search Commands. Enrich URL rendering with Link Unfurling.

#### MICROSOFT GRAPH

Microsoft Graph API. Discovering the different APIs: Mail, Contacts, Calendar, People, Teams... Microsoft Graph SDK.

#### WEBHOOKS AND CONNECTORS

Basic webhook concepts. Receive updates from a channel with an outgoing webhook. Publish card content to a channel in Teams using incoming webhooks. Use Office 365 Connectors to publish content to Teams or Outlook.

#### DEPLOYING TEAMS APPS

Creating a Teams App Manifest. Composing a Teams App Package. Using App Studio for Microsoft Teams. Testing and Debugging your Teams app. Deploying directly or through an app catalog. Adding your app to AppSource.

#### TEAMS ADMINISTRATION OPTIONS

Teams admin center. Configuring App Setup Policies. Configuring Settings for Apps, bots & Connectors. Managing Teams with PowerShell. Managing Teams with the Office365 CLI.

05  
DAYS

## MODERN DEVELOPMENT WITH SHAREPOINT ONLINE AND OFFICE 365

### USPOAP

17 - 21 May 2021  
09 - 13 August 2021  
04 - 08 October 2021  
13 - 17 December 2021

#### LEARNING GOALS

The future is now! Long gone are the days that developing for SharePoint only meant writing server-side ASP.NET code running on SharePoint Server. We have new, modern ways to develop for the SharePoint platform, Teams and other parts of Office 365, following the general industry tendency towards more client-side development. This course sets you up with the needed knowledge and best practices guidance on the tools and techniques needed to add your creations to the Office 365 ecosystem: going from Add-ins and the client-side object model, to remote scripting and PnP, to SharePoint Framework and Fluent UI framework.

#### TARGET AUDIENCE

This training is targeted at developers that want to use modern development techniques in their customizations for SharePoint, Teams and Office 365. No prior development knowledge on SharePoint is required. Being familiar with .NET and JavaScript is strongly advised, as well as having user-experience with SharePoint. The training is also targeting existing SharePoint developers that have been using the classic solution development approach and now want to get started with more modern techniques.

#### INTRODUCTION TO SHAREPOINT AND O365 DEVELOPMENT

Office 365 overview: SharePoint Online, Exchange Online, Microsoft 365 Groups, Teams... SharePoint On-Premise vs SharePoint Online development options. The modern development environment.

#### CLIENT SIDE DEVELOPMENT USING CSOM

Getting started with CSOM. Authentication with CSOM. Consuming SharePoint data. Code efficiency with CSOM. Additional libraries. Administering your tenant with CSOM.

#### REST AND ODATA

Authentication with REST APIs. OData querying syntax. Batch processing. The need for digest tokens.

#### JAVASCRIPT CLIENT SIDE DEVELOPMENT

JavaScript embedding options. JavaScript Object Model (JSOM) library. Using the REST APIs. The Cross-domain library. The PnPJS library.

#### INTRODUCTION TO SHAREPOINT ADD-INS

SharePoint add-in hosting options. Visual Studio Project Templates. The anatomy of the project. SharePoint Add-in Packages. Declaratively provisioning artifacts. Creating Custom Actions & Add-in parts.

#### SHAREPOINT ADD-IN AUTHENTICATION

User versus add-in authentication in SharePoint. OAuth 2.0 and the SharePoint authentication flow: Context Tokens, Refresh Tokens and Access Tokens. Server to Server High Trust Authentication. Requesting and granting permissions. Delegated versus app-only authentication.

#### DEPLOYING YOUR SHAREPOINT ADD-INS

Application registration. Corporate App Catalog. Client IDs and Client Secrets. Publishing the remote parts. Publishing the SharePoint add-in package.

#### THE FLUENT UI FRAMEWORK

Branding your applications with Fluent UI Framework. Using the Fluent UI styles. Integrating Fluent UI components.

#### INTRODUCTION TO PNP

What is PnP? Using the PnP Core in your applications. Simplifying authentication using the PnP IdentityModel. Reusable solutions for SharePoint On-Prem and Online with the Partner Pack. Using the PnP PowerShell CmdLets.

#### REMOTE PROVISIONING AND REMOTE TIMERJOBS

Why do we need (remote) provisioning? Using JSON site designs. The PnP provisioning engine. Building remote timerjobs.

#### SHAREPOINT AND OFFICE 365 WEBHOOKS

Webhook subscriptions and event notifications. Using SharePoint Webhooks. Using Office 365 Webhooks. Debugging Webhooks.

#### INTRODUCTION TO SHAREPOINT FRAMEWORK

SharePoint Framework overview. The SharePoint Framework toolset: Yeoman, npm, gulp, Typescript and React. On-Prem vs Online. SPFX Roadmap.

#### BUILDING CLIENT-SIDE WEB PARTS

Client-side web part fundamentals. SPFX Project Structure. Adding multiple web parts to a project. Full Page Apps.

#### MICROSOFT IDENTITY PLATFORM

Microsoft Identity Platform overview. Registering your apps. OAuth authentication flows. User authentication with Microsoft Identity Platform. Application authentication with Microsoft Identity Platform. Microsoft Authentication Libraries (MSAL).

#### MICROSOFT GRAPH

The Microsoft Graph API. Discovering the different APIs: Mail, Contacts, Calendar, People, Mail, Teams,... The Microsoft Graph SDK. Graph webhooks. Extending the Graph with extensions.

#### AZURE UTILITIES

Relaying messages with Azure Queue-storage. Delegate functionalities to Azure Functions. Application Insights.

#### MICROSOFT TEAMS DEVELOPMENT OVERVIEW

Teams Development introduction. Creating Microsoft Teams Apps with Node and .NET. Using existing App Templates. Yeoman Generator for Microsoft Teams. Microsoft Teams Toolkit for Visual Studio Code. App elements: Tabs, Bots, Connectors, Message Extensions.

#### BUILDING RICH TEAMS CONVERSATIONS WITH BOTS

Creating a bot compatible web service. Debugging your bot with the bot Emulator. Turns, Messages and Activities. Conversations and Channels. Registering your bot with Microsoft Azure's Bot Framework. Building a simple bot using the Power Virtual Agent tools.

#### ENRICH MESSAGES WITH MESSAGING EXTENSIONS

Request user input with Action Commands and Tasks. Provide search results based on Search Commands. Enrich URL rendering with Link Unfurling.

#### TEAMS ADMINISTRATION OPTIONS

Teams admin center. Configuring App Setup Policies. Configuring Settings for Apps, bots & Connectors. Managing Teams with PowerShell. Managing Teams with the Office365 CLI.



## USPFX

26 - 30 April 2021  
21 - 25 June 2021  
16 - 20 August 2021  
11 - 15 October 2021  
06 - 10 December 2021

## LEARNING GOALS

SharePoint Framework or SPFx is a client-side development model that allows us to create modern SharePoint experiences using modern web parts and UI extensions. SPFx is available for SharePoint Online, 2019 and 2016. Development is done through open-source tools and using common web development techniques making it easier for web developers to start developing for SharePoint.

This course will teach you all the skills you need to start customizing the modern SharePoint experience.

## TARGET AUDIENCE

Participants in this training ideally have a few years of development experience. No TypeScript or JavaScript experience is required. Knowing your way around SharePoint Online is advised.

## PART 1 - BUILDING SHAREPOINT FRAMEWORK COMPONENTS

## WHAT IS SHAREPOINT FRAMEWORK

SharePoint Framework overview. SharePoint Framework tools. On-Prem vs Online.

## PREPARING YOUR MACHINE FOR THE SHAREPOINT FRAMEWORK

Visual Studio Code. Node.js/NPM - local hosting and module management. Yeoman - project scaffolding. Gulp - task runner. Webpack - bundling tool.

## NODE MODULES

Npm modules. Versioning. Dependencies and types. Typescript intellisense with declaration files.

## BUILDING CLIENT-SIDE WEB PARTS

Client-side web parts fundamentals. Web Part Project Structure. Adding multiple web parts to a project. Full Page Apps.

## STRONGLY TYPED JAVASCRIPT WITH TYPESCRIPT

Overview of the TypeScript language. The ECMAScript standard. Why use TypeScript as a SharePoint developer? Typescript transpilation and configuration. Variables, Objects, Interfaces, Classes and more. Base classes and inheritance features. Namespaces and Modules.

## WEB PART PROPERTIES

Extending the web part property pane. Validating web part properties. Using custom controls in the property pane. Property pane life cycle. Storing web part data.

## LOADING SHAREPOINT DATA IN SHAREPOINT FRAMEWORK

Working with OData REST Services. Discovering the SharePoint REST endpoints. Using the built-in SharePoint client to get data. Adding or updating data from client-side code. Using PNP/JS to fetch data. Using list subscriptions to receive updates from a list/library (webhooks).

## LOADING OTHER FRAMEWORKS

Loading jQuery and plugins. Using Angular and Angular Elements. Loading packages from a CDN. Bundling and Externals.

## SPFX PROJECT ARCHITECTURE

General project structure strategies. Shared code using the library component. Creating your own npm packages.

## DEPLOYMENT OVERVIEW

What is an app catalog and how do we create it? Deploying your bundle and package. Versioning in SPFx. Deploying SharePoint Assets like Lists, Content Types and more. Deploying Extensions. Tenant-wide, Site Collection or Site specific deployments. Deploying to Microsoft Teams.

## PART 2 - WORKING WITH REACT AND OTHER LIBRARIES

## USING AND BUILDING REACT COMPONENTS FOR THE SHAREPOINT FRAMEWORK

React App Structure. What is JSX. JavaScript Expressions. JSX Tips and Tricks. Building your first component.

## REACT COMPONENTS DEEP-DIVE

Working with multiple components. Transferring Props. Dynamic data with component state. Form Components. Component Lifecycle. Loading Data into a component. React Virtual DOM.

## BRAND YOUR CLIENT WEB PARTS WITH SASS AND OFFICE-UI-FABRIC

SASS, the dynamic stylesheet language. SASS Variables, Mixins, Nesting, functions, ... SASS Preprocessing. Office UI Fabric styles. Office UI Fabric components. Fluid Framework preview.

## CONNECTING TO MICROSOFT GRAPH

Microsoft Graph API. The Graph API Client. Consuming Microsoft Graph. Registering and approving permissions to access Microsoft Graph. Domain Isolated Web Parts.

## CONSUMING AZUREAD PROTECTED APIS

Using the AadHttpClient. Azure AD applications. Setting permissions. Calling Azure AD protected resources.

## CALL SHAREPOINT THROUGH YOUR OWN API

Make secure calls into SharePoint using your own API. Elevated privileges with App Only. Pick a technology: .NET/JAVA/Azure Functions...

## PART 3 - SHAREPOINT FRAMEWORK EXTENSIONS

## APPLICATION CUSTOMIZER

Creating an application customizer. Using dialogs and alerts. Injecting controls into modern page placeholders.

## FIELD CUSTOMIZER

Creating a Field Customizer. Using field data. Injecting React controls into your field customizer.

## COMMAND SET

Creating a Command Set. Executing scripts when a button is clicked. Show your button conditionally based on item selection, location, etc.

## SEARCH EXTENSION - PREVIEW

Creating a Search Extension. Manipulating the search results.

## OFFICE ADD-INS

Building an Outlook plugin. Interacting with e-mail content.

## PART 4 - ADVANCED DEVELOPMENT

## DYNAMIC DATA

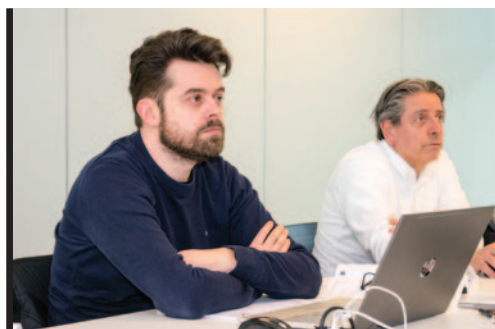
Writing a data provider. Writing a data consumer. Data serialization. Handling data updates.

## UNIT TESTING

Creating unit tests for your typescript code using Enzyme, Sinon, Chai, ... Running tests using Karma. Running tests with Jest.

## TIPS AND TRICKS

Debugging with Visual Studio Code. Logging with Azure Application Insights. Extending the build process with your own Gulp tasks. Taking control over your bundles with WebPack configuration.



04  
DAYS

## CONFIGURING AND ADMINISTERING OFFICE 365

### U0365A

25 - 28 May 2021  
12 - 15 July 2021  
13 - 16 September 2021  
02 - 05 November 2021

#### LEARNING GOALS

Office 365 contains a broad range of services that work well together. This training targets all the key components of Microsoft Office 365, with a focus on the technical services Azure Active Directory, Exchange Online, SharePoint Online and Microsoft Teams. In this training you will become familiar with the different subscription models for Office 365. You will learn how to configure and manage the services both with the different Admin Portals and with PowerShell.

#### TARGET AUDIENCE

This course is designed for experienced IT Professionals, IT Decision Makers, Administrators, ... who will be responsible for configuring and managing an Office 365 environment.

#### UNDERSTANDING OFFICE 365

Introduction to Microsoft 365. Key Office 365 Features. Office 365 Security & Privacy.

#### MICROSOFT CLOUD OFFERINGS

Azure Active Directory. Office 365. Intune. Security. Azure Information Protection. Enterprise Mobility and Security. Microsoft 365.

#### MANAGING OFFICE 365

Managing Clients. Deploying Microsoft 365 Apps. Microsoft 365 Admin Center. Connecting to Office 365 with PowerShell and/or Office365 CLI.

#### AZURE ACTIVE DIRECTORY

Azure AD Overview. Azure AD Editions. Add your domain to Azure AD. User and Group Management. Managing AzureAD objects with PowerShell. Azure AD Security Roles. Azure AD Business to Business.

#### AZURE ACTIVE DIRECTORY SIGN-IN OPTIONS

Azure AD Connect. Directory Synchronization. Password Synchronization. Pass-Through Authentication. Federation.

#### EXCHANGE ONLINE

Exchange Online Feature Overview. Management Tools. Role-based Access Control. Creating and Managing Recipients. Working with Address Lists. Exchange Online Archiving. Exchange Online Transport Rules.

#### MICROSOFT 365 GROUPS

Microsoft 365 Groups Overview. Creating Microsoft 365 Groups. Microsoft 365 Group Connectors. Microsoft 365 Groups Administration.

#### MICROSOFT TEAMS

Microsoft Teams Feature Overview. Teams Clients. Teams Admin Tools. Teams Policies. Communication Services: Presence, Chat, Audio/Video. Meetings and Live Events. Cloud Voice: Phone System, Call Queues, Dial Plans. Collaboration Services: Teams, Channels, Tabs, Apps and Connectors. External Access and Guest Users.

#### SHAREPOINT ONLINE ARCHITECTURE

Modern SharePoint Team Sites and Communication Sites. Connecting Environments with Hub Sites. Self Service Site Creation Governance. Building Modern Collaboration & Intranet Environments. SharePoint Lists and Libraries.

#### SHAREPOINT ONLINE ADMINISTRATION

External Access. SharePoint Migration Tool. Content Services: Term Store, Content Type Gallery. SharePoint Modern Search.

#### MICROSOFT 365 SECURITY

Microsoft Defender for Office 365. Anti-malware Protection. Anti-spam Protection. Anti-phishing and Anti-spoofing. Email Authentication: SPF, DKIM and DMARC. Attack Simulator. Safe Attachments and Safe Links. Threat Protection for Collaboration. Threat Protection Reports and Secure Score.

#### MICROSOFT 365 COMPLIANCE

Information Protection: Sensitivity Labels and Data Loss Prevention. Information Governance: Retention Policies. eDiscovery. Auditing and Alert Policies. Compliance Score.

03  
DAYS

## MICROSOFT ENDPOINT MANAGER: CONFIGURING DEVICES WITH MICROSOFT INTUNE

### U0365B

03 - 05 May 2021  
28 - 30 June 2021  
30 August - 01 September 2021  
18 - 20 October 2021  
13 - 15 December 2021

#### LEARNING GOALS

Microsoft Endpoint Manager is a single, integrated endpoint management platform for all your endpoints. It integrates Configuration Manager and Microsoft Intune. This course focuses on Intune: a cloud-based service in the enterprise mobility management (EMM) space that helps enable your workforce to be productive while keeping your corporate data protected.

#### TARGET AUDIENCE

This course is intended for IT professional technical specialists responsible for managing devices in the cloud.

#### INTUNE OVERVIEW

Intune Subscriptions. Intune Management. Mobile Device Management (MDM). Mobile App Management (MAM). Azure Active Directory. Role-Based Administrative Control (RBAC).

#### DEVICE ENROLLMENT

Device Enrollment. Device Management Capabilities. Enrollment Options. Windows Enrollment. Android Enrollment. iOS Enrollment.

#### DEVICE CONFIGURATION

Configure Device Profiles. Configure Device Features. Configure Device Restrictions. Configure Settings: Email, VPN, Wi-Fi. Administrative Templates. Upgrade Editions. Kiosk Devices.

#### APP MANAGEMENT

App Lifecycle. Add apps to Intune: Store Apps - Office 365 - Web Apps - LOB Apps - Win32 Apps - PowerShell Scripts. Monitor Apps. App Configuration Policies.

#### DEVICE AND APP PROTECTION

Device Compliance Policies. App Protection Policies. Windows Information Protection. Conditional Access.

#### ENDPOINT PROTECTION

Endpoint Protection. Microsoft Defender for Endpoint. Integration between Intune and Defender for Endpoint. Enforce Compliance with Conditional Access. Remediate Vulnerabilities.

#### DEVICE MANAGEMENT

Lock, Restart or Remove Device. Locate Lost Device. Logout or Remove User. Bypass Activation Lock. Reset Passcode. Remote Control Mobile Devices. Synchronize Device.

#### KIOSK DEVICES

Windows 10 Kiosk Devices. Android Kiosk Devices. iOS Kiosk Devices.

#### WINDOWS AUTOPILOT

Windows Autopilot Overview. Windows Autopilot Requirements. Deployment Scenarios. Administering Windows Autopilot.



# 02 | MANAGING MICROSOFT TEAMS

## MS-700

29 - 30 April 2021  
25 - 26 May 2021  
01 - 02 July 2021  
26 - 27 August 2021  
21 - 22 October 2021  
22 - 23 December 2021

### LEARNING GOALS

The Managing Microsoft Teams course is designed for persons who are aspiring to the Microsoft 365 Teams Admin role. Microsoft Teams admins configure, deploy, and manage Office 365 workloads for Microsoft Teams that focus on efficient and effective collaboration and communication in an enterprise environment.

### TARGET AUDIENCE

Students in this course are interested in Microsoft Teams or in passing the Microsoft Teams Administrator Associate certification exam.

### MICROSOFT TEAMS OVERVIEW

Overview of Microsoft Teams. Overview of security and compliance in Microsoft Teams. Overview of managing Microsoft Teams.

### IMPLEMENT MICROSOFT TEAMS GOVERNANCE, SECURITY AND COMPLIANCE

Implement Governance and Lifecycle Management for Microsoft Teams. Implementing Security for Microsoft Teams. Implementing Compliance for Microsoft Teams.

### PREPARE THE ENVIRONMENT FOR A MICROSOFT TEAMS DEPLOYMENT

Upgrade from Skype for Business to Microsoft Teams. Plan and configure network settings for Microsoft Teams. Deploy and Manage Microsoft Teams endpoints.

### DEPLOY AND MANAGE TEAMS

Create and manage teams. Manage membership. Manage access for external users.

### MANAGE COLLABORATION IN MICROSOFT TEAMS

Manage chat and collaboration experiences. Manage settings for Teams apps.

### MANAGE COMMUNICATION IN MICROSOFT TEAMS

Manage Live event and meetings experiences. Manage phone numbers. Manage Phone System for Microsoft Teams. Troubleshoot audio, video, and client issues.



# 02 | MICROSOFT CLOUD SECURITY

## UASEC

28 - 29 April 2021  
24 - 25 June 2021  
26 - 27 August 2021  
21 - 22 October 2021

### LEARNING GOALS

Security should be a top priority for any organization, whether you have an on-prem or a cloud infrastructure. However, it can also be complex and challenging in today's world where users are working from any location on different device. Microsoft has a broad range of cloud services focused on Microsoft Azure and Microsoft 365 that can help you to protect and secure your identities, your devices, your apps and your infrastructure in your organisation.

### TARGET AUDIENCE

This course is intended for IT professional specialists responsible for securing the IT environment.

### CLOUD SECURITY OVERVIEW

Threat Landscape. Common Threats and Attack Types. The Defender's Dilemma. Identity and Access Management. Threat Protection. Security Management. Information Protection.

### SECURING YOUR IDENTITIES WITH MICROSOFT DEFENDER FOR IDENTITY

Multi-Factor Authentication. Privileged Identity Management. Identity Protection. Conditional Access. Microsoft Defender for Identity.

### MICROSOFT DEFENDER FOR OFFICE 365

Protect Against Malware, Spam, Phishing, Spoofing. Email Authentication: SPF, DKIM and DMARC. Attack Simulator. Safe Attachments and Safe Links. Threat Protection for Collaboration: SharePoint, OneDrive and Teams. Secure Score.

### MICROSOFT DEFENDER FOR ENDPOINT

Protect Your Devices. Onboarding Devices. Endpoint Detection and Response. Threat and Vulnerability Management. Secure Score for Devices.

### CLOUD APP SECURITY

Cloud Discovery. Control Access to Apps. Data Retention and Compliance. Investigate Risky Users.

### DETECT AND STOP ATTACKS WITH MICROSOFT 365 DEFENDER

Protect Your Environment. Onboard Security Services. Attack Investigation. Threat Hunting.





## UPOWER

19 - 22 April 2021  
14 - 17 June 2021  
02 - 05 August 2021  
20 - 23 September 2021  
02 - 05 November 2021  
20 - 23 December 2021

## LEARNING GOALS

In this course, participants will get familiar with the concepts of Microsoft Power Apps and Microsoft Power Automate. They will learn how to use these services to create Canvas Apps and Flows without needing any development skills.

## TARGET AUDIENCE

This course targets power users, content managers, business analysts and many more. No prior knowledge to Power Apps or Power Automate is required.

## INTRODUCTION TO THE POWER PLATFORM

Overview of the Microsoft Power Platform. Power Apps, Power Automate, Power BI, Power Virtual Agents & AI Builder. Connectors and Connections overview. Microsoft Dataverse and Dynamics 365. Real world use case of the Power Platform.

## POWER PLATFORM LICENSING GUIDE

Licensing Overview. What is included with existing licensing models? Standard vs Premium connectors. API Call Limits.

## GETTING STARTED WITH POWER APPS

What is Power Apps? Canvas Apps vs. Model-Driven Apps vs. Power Apps Portals. Getting started with Canvas Apps using templates. Generating Canvas Apps from your data. Power Apps on mobile.

## BUILDING CANVAS APPS WITH POWER APPS

Creating Canvas Apps with Power Apps Studio. Working with connections. Adding Screens and Screen Controls. Working with Galleries. Introduction to Forms.

## CONNECTING WITH POPULAR DATA SOURCES

SharePoint list items and documents. Microsoft Teams Channels and Messages. Managing tasks in Outlook and Planner. Sending Emails with Outlook, Gmail, ... Office 365 Users. Manipulating Excel. Microsoft Dataverse database and Dynamics 365.

## FORMS IN CANVAS APPS

Customizing Edit- and Detail Forms. How do data cards work? Data card templates and customization. Input validation. Dynamic controls: use formulas to make fields required, hidden, etc.

## POWER APPS DATA SOURCES AND LOCAL DATA

Configuring data sources. Using variables and collections. Data source manipulations. Manually patching data sources. Handling and preventing errors. Refreshing data and searching. Data source delegation.

## CONFIGURING AND PUBLISHING POWER APPS

Configuring Power Apps. Saving, sharing and publishing Apps. Sharing and permissions. Use your Power App from SharePoint pages. Embed your Power App as a Teams app. App analytics.

## CUSTOMIZING SHAREPOINT FORMS

Customizing a SharePoint form. SharePoint Integration Control. Differentiate your form based on the mode: view, edit, new. Adding dynamic behavior. Wide screen SharePoint forms.

## GETTING STARTED WITH POWER AUTOMATE

What is Power Automate? Flow types. Flow building blocks. Using Connections in Flows. Trigger types. Basic Actions. The Power Automate Mobile App.

## BUILDING BASIC FLOWS

Building flows from Templates or from Blank. Start a flow when something happens with Automatic triggers. Start a flow with the push of a button or for a selected item with Manual triggers. Run a flow on a schedule with a Scheduled trigger. Flow action connection basics. Adding a simple condition. Monitoring Flows and fixing errors.

## POWER AUTOMATE CONNECTORS AND ACTIONS

Connection credentials and configuration. Default actions overview: SharePoint, Teams, Dynamics 365, Exchange, Planner, ... Manipulating Office documents: Word, Excel. Using HTTP connectors to call APIs. Custom Connectors explained. Data Operations: Compose, CSV, JSON. Variables: string, number, array.

## POWER AUTOMATE PATTERNS

Actions, Conditions, Parallelism and Loops. Advanced trigger configuration. Flow error handling: configure run after. Limits and Configuration of Flows. Handling complex scenario's by using parent-child Flows.

## WORKFLOW DEFINITION LANGUAGE

Introduction to WorkFlow Definition Language. Expressions, Operators and Functions. Using Expressions in Flows.

## SHARING FLOWS AND FLOW PERMISSIONS

Sharing a Flow. Co-Ownership and Team Flows. Flow permissions. Connections and credentials. Run only users and connections.

## MODERN APPROVALS WITH POWER AUTOMATE

Approval with Power Automate. Approval types. Approving and Rejecting. Processing the approval outcome.

## POWER AUTOMATE FOR MOBILE

Introduction to Power Automate for Mobile. Tracking Activity. Starting a Flow. Flow Management.

## COMBINING POWER PLATFORM TOOLS

Start a Flow from Power Apps. Open a Power App with a push notification from Power Automate. Trigger Flows from Power BI. Embed a Power BI report into your Power App. Embed a Power App in Power BI and integrate with your data.

## USING POWER APPS AND POWER AUTOMATE ON ON-PREMISES DATA

What is an on-premise data gateway? Technical overview of how a gateway works. Setting up a Gateway for on premises connections. Consuming on-premises connections in Power Apps and Power Automate.

## POWER PLATFORM ADMIN CENTER

Managing Environments and Security. Environments and Solutions. Understanding Licensing & Capacity. Data Integration Overview. Admin Center reporting tools. Microsoft Dataverse and permissions. Data Policies: Blocking Connectors. Migrating Power Apps and Flow between tenants / environments. Power Automate vs Azure Logic Apps.



05  
DAYS

# BUILDING MODEL-DRIVEN APPS ON THE POWER PLATFORM & DYNAMICS 365

## UCDS

29 March - 02 April 2021  
17 - 21 May 2021  
16 - 20 August 2021  
04 - 08 October 2021  
22 - 26 November 2021

### LEARNING GOALS

With the Power Platform Microsoft has released a powerful set of tools that allow you to create powerful business solutions to create, manage and share your business data. What was once just Dynamics CRM is now a set of model driven apps - Sales, Customer and Field Service, Marketing - and tools like Power Apps, Power Automate and Power BI storing their data in Microsoft Dataverse. This course will teach you how to use and customize the Microsoft Dataverse and model-driven apps using the Microsoft Power Platform.

### TARGET AUDIENCE

This 5-day course is intended for power users, consultants and key business users that want to work with and customize the out-of-the-box functionality of the Power Platform.

### INTRODUCTION TO THE MICROSOFT POWER PLATFORM

The past. From Dynamics CRM to Dynamics 365 for Customer Engagement, The Common Data Model and Model-Driven Apps. Overview of the Microsoft Power Platform. Introduction to Microsoft Dataverse. The Common Data Model. Dynamics 365 Sales, Customer Services, ... as model-driven apps on Microsoft Dataverse.

### OVERVIEW OF MODEL-DRIVEN APPS/DYNAMICS 365

Creating and working with environments. The relationship between environments and Microsoft Dataverse. Navigating and using a model-driven app.

### WORKING WITH SOLUTIONS

Introduction to customizing Model-Driven Apps. Working with Publishers and Solutions. Difference between Managed and Unmanaged Solutions. Adding components to your solutions. Working with managed properties. Importing and Exporting Solutions. Versioning solutions.

### CREATING AND WORKING WITH APPS

Concepts of an app. The structure of a Site Map. Creating a Site Map for an app. Creating apps with the App Designer. Navigating between apps. Managing apps in Solutions. Securing an app.

### CUSTOMIZING TABLES

Store your own data using custom tables. Advanced tables options explained. Activity tables to store user todo's. Importing rows in tables using Dataflows.

### CUSTOMIZING COLUMNS

Adding custom columns to Tables. Supported column data types. Using the Status and Status Reason columns. Aggregating data with Rollup Columns. Calculate data based on other column with Calculated Columns.

### MANAGING RELATIONSHIPS

Plan, create, and configure Table Relationships. Creating and using relationships - 1:N, N:N. Connections and Connection Roles. Defining self-referential relationships. Defining hierarchy visualizations.

### CUSTOMIZING FORMS

Define the structure. How to add, remove or modify the components using the Form Designer. Placing image column. Configure and use Quick Create, Quick View and Card Forms. Securing Forms.

### BUSINESS RULES

How to create and apply Business Rules. Defining the scope of Business Rules. Business Rules limitations.

### CUSTOMIZING VIEWS

Different types of system, public and personal Views. Create and modify Views. Configure quick find, advanced find and associated Views. Configure views with custom controls like the Editable grid.

### CHARTS AND DASHBOARDS

Build Interactive Charts to show in Views or on Dashboards. Classic Dashboards showing Charts, Data or web pages. Interactive Dashboards with dynamic sorting and filtering. Working with the Tabular Data Stream (TDS) endpoint. Using Power BI Desktop with data stored in Microsoft Dataverse. Creating embedded Power BI Dashboards.

### IMPLEMENTING SECURITY

Building a Security Model. Business Units and their role in security modeling. Define Privileges and access levels in Security Roles. Creating and maintaining users. Team management.

### POWER AUTOMATE

Overview. Trigger a Flow based on a create, update or delete of a table row. Consuming Microsoft Dataverse data inside Power Automate. Schedule a Flow. Modern Approval with Power Automate.

### INTRODUCING POWER APPS PORTALS

Creating a Power Apps Portal. Creating a web page in Portals Studio. Adding an entity list to a portal web page. Adding an entity form to a portal web page.

05  
DAYS

# DEVELOPING FOR THE POWER PLATFORM WITH MICROSOFT DATAVERSE

## UCDSD

03 - 07 May 2021  
09 - 13 August 2021  
11 - 15 October 2021  
06 - 10 December 2021

### LEARNING GOALS

This course will teach developers how they can extend Microsoft Dataverse and Model-driven apps with custom code. This course is specifically designed to help .NET and JavaScript developers learn the various development features of Microsoft Dataverse and Model-driven apps. And since most Dynamics 365 Apps like Sales, Services, Marketing, ... are just model-driven build using Microsoft Dataverse, this training also applies to developers who would like to extend their Dynamics 365 Apps with custom code.

### TARGET AUDIENCE

This course is targeting developers who have none or very limited development skills with the Power Platform and Model-driven apps or Dynamics 365. Before attending the course, delegates must have the following prerequisite knowledge and experience.

### EXTENSIBILITY OVERVIEW

Introduction to Dataverse. Overview of the Dataverse extensibility model. overview of the Power Platform SDKs that are available from Microsoft via NuGet. Introducing XrmToolBox.

### WORKING WITH THE DATAVERSE WEB API

Introduction to the Dataverse Web API. Registering client applications with Azure Active Directory. Authenticate with the Dataverse Web API using OAuth 2.0 and MSAL. Performing a simple Create operation using the Dataverse Web API. Composing HTTP requests and error handling. Dataverse Web API URL and versions. The different HTTP methods and headers. Executing your first HTTP requests.

### USING THE DATAVERSE WEB API

Query Data using the Dataverse Web API. Creating, Updating and Deleting rows in tables. Executing Actions and Functions. Executing batches. Impersonate another user using the Dataverse Web API. Detect duplicate data using the Dataverse Web API.

### WORKING WITH THE MICROSOFT DATAVERSE ORGANIZATION SERVICE

What is the Organization Service endpoint. The IOrganizationService interface. The OrganizationServiceProxy class. Early versus late binding when accessing table rows. An introduction to XRM Tooling. Working with CrmServiceClient. Use connection strings in XRM Tooling. Create, update, delete and retrieve table rows using XRM Tooling. Retrieving data using the QueryExpression and QueryByAttribute classes.

### QUERYING MICROSOFT DATAVERSE WITH FETCHXML

Introduction to FetchXML. Writing FetchXML queries. Using XrmToolBox FetchXML Builder to create FetchXML queries. Executing FetchXML queries using the Dataverse Web API. Executing FetchXML queries using the Dataverse XRM Tooling.

### PLUG-INS

Plug-in overview. Writing custom plug-ins. Register and deploy plug-ins using the Plug-In Registration Tool. Debugging plug-ins in the Dataverse. Deploying Plug-Ins with Solutions. Automate Plug-in deployment using Spkl. Using Plugin Trace Viewer in XrmToolBox.

### AZURE INTEGRATIONS

Overview of the Azure integration with the Dataverse. Integration with Azure Service Bus. Configuring the Azure-aware OOB plug-in. Write a custom Azure-aware plug-in. Integration between the Dataverse and Web Hooks.

### IMPLEMENTING BUSINESS PROCESSES

Creating processes. Writing custom Workflow activities. Deploying and debugging custom workflow activities. Creating Custom Actions. Using Custom Actions with the Web API. Using Custom Actions in Power Automate.

### CLIENT SCRIPTING IN MODEL-DRIVEN APPS USING JAVASCRIPT

Creating JavaScript Web Resources. Handling Form/View and Field events. Root objects in the Client API object model. Working with the Client API execution context object. The Client API Form context object. Interacting with forms and attributes using the Client API object model. The Client API grid context object. The Client API Xrm object. Best practices in writing client-side Code.

### CUSTOMIZING THE COMMAND BAR IN A MODEL-DRIVEN APP

Overview of the Command Bar. Available Command Bars in model-driven apps. Working with Display and Enable rules. Creating a custom Ribbon Action. Pass data or URL parameters to a Ribbon Action. Adding or removing Commands in the Command Bar. Working with URL addressable forms and views. Using Ribbon Workbench to customize the command Bar.

### CREATING WEB RESOURCES

Web resources overview. Building custom HTML Web Resources. Using the Xrm.WebApi JavaScript object model to access, create and manage records.

### AN INTRODUCTION TO POWER APPS COMPONENT FRAMEWORK

Install the Microsoft Power Apps CLI. Using the Microsoft Power Apps CLI. Create and build a code component. Package a code component in a Solution.

03  
DAYS

## ANALYZING YOUR DATA WITH POWER BI FOR BUSINESS USERS

### UBIPBE

10 - 12 May 2021  
28 - 30 June 2021  
23 - 25 August 2021  
11 - 13 October 2021  
29 November - 01 December 2021

#### LEARNING GOALS

In this training you learn how to write queries with Power BI Desktop and Power BI Excel to collect data from databases, cubes, online Excel files... You will learn how to enrich the data model with relationships, hierarchies, DAX calculated columns and measures... And finally you will see how to create interactive reports using the large set of visualization available in Power BI Desktop and share them using PowerBI.com and Power BI Mobile apps.

#### TARGET AUDIENCE

This course is intended for people who have no prior knowledge of Power BI.

#### INTRODUCTION TO POWER BI

The need for Business Intelligence. Self-Service BI versus Enterprise BI. Core concepts of Power BI. Introducing Power BI Desktop. Introducing the Power BI Service.

#### CREATING QUERIES WITH POWER BI DESKTOP

Core concepts of Power Query. Creating Queries to load data. Applying basic transformations. Working with Direct Query.

#### ENHANCING A DATA MODEL IN POWER BI DESKTOP

Renaming columns and tables. Hiding columns and tables from the Data Model. Column data type and formatting. Working with numerical fields. Sorting data in columns. Data categorization. Creating Hierarchies in tables. Defining calculated columns and measures using DAX. Working with Quick Measures. Defining relationships between tables.

#### DESIGNING REPORTS IN POWER BI DESKTOP

Overview of the Report Canvas. Adding text boxes, shapes and images. Using built-in visualizations. Add style and branding through themes. Printing a Power BI Report. Creating Power BI Templates.

#### ENHANCING REPORTS IN POWER BI DESKTOP

Working with Slicers and Filters. Working with drill through report pages. Working with Bookmarks. Visual hierarchies and drill-down behavior. Grouping and Binning. Using Custom Visuals. Create reports that are optimized for phones. Miscellaneous features.

#### INTRODUCTION TO POWER BI SERVICE

What is the Power BI Service? Power BI Service pricing and features. Working with Datasets and Reports. Creating and using App Workspaces.

#### CREATING DATASETS AND REPORTS IN POWER BI SERVICE

Creating Datasets in the Power BI Service. DirectQuery for Power BI datasets and Azure Analysis Services. Using Quick Insights. Creating Reports in the Power BI Service. Printing Reports. Export to Power-Point. Embedding Reports in SharePoint Online.

#### CREATING DASHBOARDS AND ANALYZING DATA WITH POWER BI SERVICE

Creating Dashboards. Printing Dashboards. Configuring Dashboards for Mobile Devices. Working with Power BI Q&A. Analyze in Excel.

#### SHARING CONTENT IN THE POWER BI SERVICE

Sharing Reports and Dashboards with internal and external users. Sharing content inside an App Workspace. Creating Power BI Apps. Consuming Power BI Apps. Publishing Reports to the web. Subscribing to Report updates. Embedding a report in SharePoint Online or Teams. Report usage metrics.

#### USING POWER BI WITH MOBILE DEVICES

Supported Platforms. Accessing Reports and Dashboards from mobile devices.

05  
DAYS

## ANALYZING YOUR DATA WITH POWER BI FOR BI PROFESSIONALS

### UBIPB

19 - 23 April 2021  
21 - 25 June 2021  
16 - 20 August 2021  
27 September - 01 October 2021  
29 November - 03 December 2021

#### LEARNING GOALS

This course will teach you all aspects of creating Power BI Data Models and Reports and publishing and maintaining them on the Power BI online service. The course will cover technical topics on DAX and Power Query. It also explains how to configure the Data Gateway so that you can connect the Power BI online service to your on-premise data sources. We finish the training with the brand new Dataflows and an overview on how to implement Row Level Security in Power BI.

#### TARGET AUDIENCE

This course is intended for technical people who have a background in Business Intelligence. U2U also offers a 3-day course Analyzing your data with Power BI for Business Users targeted at people without a technical background.

#### INTRODUCTION TO POWER BI

The need for Business Intelligence. Self-Service BI versus Enterprise BI. Power BI core concepts. Introducing Power BI Desktop. Introducing the Power BI Service. Power BI Service Tiers and Features.

#### CREATING QUERIES USING POWER BI DESKTOP

Creating Power Queries and working with Query steps. Loading data from CSV and Excel files. Loading data from relational databases. Applying basic transformations. Query Folding. Importing data, using Direct Query or using Live Connections.

#### WRITING ADVANCED QUERIES IN POWER BI DESKTOP

Advanced Transformations in Power Query. Appending and Merging Queries. Working with Query Parameters. Defining and using Query Functions. Managing Data Source Security.

#### BUILDING A DATA MODEL

Why do we need a Data Model? Authoring data models in Power BI Desktop. Controlling field formatting. Creating hierarchies inside tables. Data model storage in import mode. Analyzing storage costs using the Vertipaq Analyzer or DAX Studio.

#### CREATING RELATIONSHIPS

Cardinality of relationships. Handling role-playing dimensions. The Cross-Filter direction of relationships.

#### WORKING WITH STORAGE MODES

Importing data. Using DirectQuery. Using a Live connection. Creating aggregation tables.

#### DATA ANALYSIS EXPRESSIONS (DAX)

DAX introduction. Creating Calculated Columns. Creating Tables. Creating Measures. Working with CALCULATE. Time Intelligence Functions.

#### DESIGNING REPORTS IN POWER BI DESKTOP

Overview of the Report Canvas. Adding textboxes, shapes and images. Using built-in visualizations. Add style and branding through themes. Creating Power BI Templates.

#### ENHANCING REPORTS IN POWER BI DESKTOP

Working with Slicers and Filters. Working with Drill through report pages. Creating custom Tooltips. Working with Bookmarks. Visual hierarchies and drill-down behavior. Grouping and Binning data. What If Parameters. Using Custom Visuals. Create reports that are optimized for phones.

#### INTRODUCTION TO POWER BI SERVICE

What is the Power BI Service? Power BI Service pricing and features. Creating and using Workspaces. Working with Datasets and Reports.

#### CREATING DATASETS AND REPORTS IN POWER BI SERVICE

Creating Datasets in the Power BI Service. Connecting to a dataset from the service in Power BI Desktop. DirectQuery for Power BI datasets and Azure Analysis Services. Using Quick Insights. Creating Reports in the Power BI Service. Printing Reports. Export to Power-Point.

#### CREATING DASHBOARDS AND ANALYZING DATA WITH POWER BI SERVICE

Creating Dashboards. Printing Dashboards. Configuring Dashboards for Mobile Devices. Working with Power BI Q&A. Analyze a dataset from the service in Excel.

#### SHARING CONTENT IN THE POWER BI SERVICE

Sharing Reports and Dashboards with internal and external users. Sharing content inside a Workspace. Creating and consuming Power BI Apps. Publishing Reports to the web. Working with Report Subscriptions. Embedding a report in SharePoint online or Microsoft Teams. Report usage metrics.

#### WORKING WITH DATA GATEWAYS

Scheduling Dataset refreshes. The need for a Data Gateway. Installing and configuring a Data Gateway. Creating Data Sources on a Data Gateway. Configuring incremental data refreshes.

#### WORKING WITH DATAFLOWS

What are Dataflows? Dataflows, Entities and the Common Data Model. Creating Dataflows. Scheduling refreshes for Data Flows. Using Dataflows in Power BI Desktop. Dataflow licensing.

#### SECURING A DATA MODEL

Enhancing a Data Model with Row Level Security. Configuring Row Level Security. Implementing Dynamic Security. Security and Relationships.



# 03 | MASTERING DAX

## UDAX

10 - 12 May 2021  
05 - 07 July 2021  
23 - 25 August 2021  
18 - 20 October 2021  
06 - 08 December 2021

### LEARNING GOALS

DAX or Data Analysis Expressions is a language used in Power BI and SQL Server Analysis Services Tabular Models to define expressions and formulas. In this course you will learn how you can use DAX to create calculated columns and measures and how you can use DAX as a query language.

### TARGET AUDIENCE

This course is intended for BI people who wish to enhance their tabular models in Power BI or SQL Server Analysis Services Tabular with the DAX language.

### AN INTRODUCTION TO DAX

DAX use cases. Understanding calculated columns and measures. Building tables with DAX. DAX as a query language. DAX for row level security. DAX patterns.

### DAX STUDIO

Introducing DAX Studio. Installing DAX Studio. Writing DAX queries: EVALUATE, ORDER BY and START AT. Constructing tables with FILTER, DISTINCT, ROW, SELECTCOLUMNS and SUMMARIZECOLUMNS. Who's eating up the resources: Querying meta-data. Performance tuning. Profiling DAX queries.

### DAX EXPRESSIONS

DAX data types. Getting started with constants. Mathematical, boolean and string operators. The most important scalar functions in DAX.

### CREATING DAX MEASURES

Introduction to evaluation context. The CALCULATE function and the row and filter context. Aggregation functions. Defining table scopes. Using ALL and VALUES.

### USING CALCULATE FOR TIME INTELLIGENCE

Creating calendar tables using CALENDAR and CALENDARAUTO. Working with multiple data tables. Mark as Data Table. Computing YTD/QTD and MTD totals. Comparing data over time using DAX. Calculating Rolling Totals. Calculating Moving Averages.

### WORKING WITH CALCULATION GROUPS

The need for calculation groups. Creating calculation groups. Format strings in calculation groups. Excluding measures from calculation items.

### MORE ON MEASURES: ITERATORS

SUMX aggregation function. Linking to different tables with RELATED. More iterators: RANKX, CONCATENATEX, ... Using variables in DAX. Context transition.

### INSPECTING AND CONTROLLING THE EXECUTION CONTEXT

Why do we need the context? HASONEVALUE. ISFILTERED. ISCROSSFILTERED. ISINSCOPE. SELECTEDVALUE. ALLSELECTED. Handling hierarchies in DAX. Calculate ratio's to a parent subtotals. Raising errors in DAX.

### ADVANCED DAX CONSTRUCTS

CALCULATE modifiers USERELATIONSHIP, CROSSFILTER, ... Expanded tables. CALCULATETABLE. Calculating cumulative percentages - pareto analysis. ABC analysis. Calculating customer churn - new customer, lost customers.

# 03 | MANAGING A POWER BI ENVIRONMENT

## UPBIM

03 - 05 May 2021  
02 - 04 August 2021  
04 - 06 October 2021  
13 - 15 December 2021

### LEARNING GOALS

Power BI is a suite of business analytics tools to analyze data and share insights. This training shows you how to setup and manage Power BI in an enterprise business environment. It focusses on the challenges that might appear when a large group of people need to develop and access the Power BI infrastructure: How to do versioning? How to check data lineage? How to control the tenant settings? How to setup security? ....

### TARGET AUDIENCE

BI and IT professionals responsible for an enterprise deployment and management of Power BI solutions in the cloud. Participants are expected to have some experience with Power BI Desktop.

### CONFIGURING WORKSPACES

Creating workspaces. Set a Workspace OneDrive. Shared versus dedicated capacity. Workspace connectivity with the XMLA endpoint. Configuring Azure Data Lake Gen 2 integration. Automating Workspace creation using PowerShell. Creating and working with Service principals. Power BI Governance.

### MANAGING DATASETS

Working with datasets in the Power BI Service. Versioning using the open-source ALM Toolkit. Versioning and ALM using Visual Studio with Analysis Services projects. Working with shared datasets. Dataset Lineage. Certifying and promoting datasets. Automating Dataset deployment using PowerShell.

### DEPLOYING CONTENT USING DEPLOYMENT PIPELINES

The need for different workspaces. Using Deployment Pipelines.

### CONFIGURING WORKSPACE SECURITY

Configuring Workspace security. Security when sharing Dashboards and Reports. Securing data at rest. Securing data in transit.

### REFRESHING DATASETS

Data Gateways. Standard versus Personal mode. Import versus DirectQuery versus live connections. Configuring Data Refresh Credentials. Gateway clusters. Monitoring Gateways and data refresh. Configuring incremental refresh. Incremental refreshes and partitioning. Dataset refresh using the XMLA endpoint.

### WORKING WITH DATAFLOWS

What are Dataflows? Dataflows, Entities and the Common Data Model (CDM). Dataflows and Azure Data Lake Gen 2 storage. Creating Dataflows. Working with linked and computed Entities. Scheduling refreshes for Dataflows. Using Dataflows in Power BI Desktop. Consuming and creating dataflows using Azure Synapse, Azure Databricks and Azure ML. Dataflow licensing.

### ADMINISTERING A POWER BI TENANT

Configuring tenant settings. Sharing settings. Custom visuals settings. Managing custom data sources.

### MONITORING POWER BI

Monitor Power BI via reports. Monitoring workspace usage. Customizing workspace usage reporting. Power BI Premium Capacity Metrics and Alerts. Integrated Unified Office 365 Audit Logging.



## UBIPBD

28 - 30 April 2021

28 - 30 June 2021

27 - 29 September 2021

29 November - 01 December 2021

## LEARNING GOALS

Developing for the Power BI platform is an intensive 3-day training targeted at developers. In this course, participants will learn how to develop custom applications on top of Power BI.

## TARGET AUDIENCE

This course is intended for developers who would like to develop custom applications for the Power BI platform. Participants should have a basic understanding of Power BI Desktop and the Power BI Service. Students should also have previous programming experience with .NET and/or JavaScript in Visual Studio.

## INTRODUCTION TO POWER BI DEVELOPMENT

Overview of Power BI Desktop and Power BI Service. How can developers extend Power BI? Introducing Power BI REST API. Overview of Power BI Embedded. Overview of developing custom Visuals.

## THE POWER BI REST API

Overview of Power BI REST API. Registering applications with Azure Active Directory. Authenticate with the Power BI REST API using OAuth 2.0 and ADAL. Working with App Workspaces. Working with Datasets. Pushing rows into dataset tables. Publishing Power BI Desktop PBIX files. Configuring data sources and dataset refresh settings.

## WORKING WITH STREAMING DATASETS

Introduction to streaming datasets. Different types of streaming datasets. Creating and using streaming datasets in the Power BI Service UI. Creating and using streaming datasets using the Power BI REST API. Creating streaming datasets using the Azure Stream Analytics. Building real-time dashboards.

## POWER BI EMBEDDED

Overview of Power BI Embedded. Power BI Embedded licensing models. Authentication scenarios for Power BI Embedded. The Power BI Embedded JavaScript API. Embedding dashboards. Embedding reports. Embedding Tiles. Event handling on embedded reports and dashboards.

## GETTING STARTED WITH DEVELOPING CUSTOM VISUALS

Installing Node.js. Working with the Node Package Manager. Installing developer certificates. Installing and using the Power BI Visual Tools (pbiviz). Creating your first Power BI custom Visual. Overview of the Power BI Visual project structure. Testing and debugging a custom Visual. Working with external JavaScript libraries and Type Definition Files.

## DEVELOPING CUSTOM POWER BI VISUALS

Overview of the Power BI custom Visual object model. Define capabilities and data view mappings. Define custom properties. How to format numbers, dates, ... in a custom Visual. Package and deploy a custom Visual.



## UTSQL

03 - 05 May 2021  
28 - 30 June 2021  
06 - 08 September 2021  
02 - 04 November 2021  
20 - 22 December 2021

## LEARNING GOALS

The goal of this course is to provide students with the technical skills required to write basic Transact-SQL queries for Microsoft SQL Server. The course covers querying SQL Server 2019 or previous versions as well as Azure SQL Databases..

## TARGET AUDIENCE

This course is intended for SQL Server database administrators, implementers, system engineers, and developers who are responsible for writing queries but have no or very limited experience in writing T-SQL SELECT statements.

## INTRODUCTION TO TRANSACT-SQL AND THE QUERYING TOOLS

Object Hierarchy. SQL Server Management Studio. Azure Data Studio. Using the graphical query builder in Management Studio. Connecting to SQL Server from Excel or Power BI. Brief history of SQL Server.

## SELECT FUNDAMENTALS

Basic SELECT Statement. T-SQL Expressions. Formatting Result Sets. The CASE Statement. Fetching Data from Tables. Filtering Data. Sorting Data. Combining Multiple Result Sets: UNION, EXCEPT and INTERSECT.

## AGGREGATING DATA

Using Aggregation Functions. GROUP BY Fundamentals. Filtering on Groups Using the HAVING Clause. Computing Subtotals Using the ROLLUP and CUBE Clauses.

## JOINING MULTIPLE TABLES

Normalization. Using Aliases for Table Names. Inner, outer, cross and self joins. Nested Queries.

## ADVANCED SELECT

Using Functions. Data Types. Conversion Between Data Types. The CROSS APPLY Statement.

## MODIFYING DATA

Using Transactions. Inserting Data. Updating Data. Deleting Data. Truncating a Table.

## ADVANCED QUERYING TECHNIQUES

SQL Scripts. Common table expressions. Writing recursive CTEs. Using the OVER-clause. Windowing functions. Ranking functions. Analytic functions. PIVOT and UNPIVOT statement.

## VIEWS, STORED PROCEDURES AND FUNCTIONS

Introduction to Views. Introduction to Stored Procedures. Introduction to User-defined Functions. Functions and procedures.

## USQLD

17 - 21 May 2021  
12 - 16 July 2021  
13 - 17 September 2021  
15 - 19 November 2021

## LEARNING GOALS

This instructor-led course introduces SQL Server 2019 (or earlier) and describes logical table design, indexing and query plans. It also focuses on the creation of database objects including views, stored procedures, along with parameters, and functions. Other common aspects of procedure coding, such as indexes, concurrency, error handling, and triggers are also covered in this course. Also this course helps you prepare for the Exam 70-464. Most skills learned in this course are also applicable when developing Azure SQL databases.

## TARGET AUDIENCE

The primary audience for this course is IT Professionals who want to become skilled on SQL Server 2019 (or earlier) product features and technologies for implementing a database.

## INTRODUCTION TO DATABASE DEVELOPMENT

Introduction to the SQL Server Platform. Working with SQL Server Tools. Configuring SQL Server Services.

## DESIGNING AND IMPLEMENTING TABLES

Designing Tables. Working with Schemas. Creating and Altering Tables.

## ENSURING DATA INTEGRITY THROUGH CONSTRAINTS

Enforcing Data Integrity. Implementing Domain Integrity. Implementing Entity and Referential Integrity.

## INTRODUCTION TO INDEXING

Core Indexing Concepts. Single Column and Composite Indexes. SQL Server Table Structures. Working with Clustered Indexes.

## ADVANCED INDEXING

Execution Plan Core Concepts. Common Execution Plan Elements. Working with Execution Plans. Designing Effective Non-clustered Indexes. Performance Monitoring. Query Store.

## COLUMNSTORE INDEXES

Columnstore Indexes. Best Practices for Columnstore Indexes.

## DESIGNING AND IMPLEMENTING VIEWS

Introduction to Views. Creating and Managing Views. Performance Considerations for Views.

## DESIGNING AND IMPLEMENTING STORED PROCEDURES

Introduction to Stored Procedures. Working With Stored Procedures. Implementing Parameterized Stored Procedures. Controlling Execution Context.

## DESIGNING AND IMPLEMENTING USER-DEFINED FUNCTIONS

Overview of Functions. Designing and Implementing Scalar Functions. Designing and Implementing Table-Valued Functions. Implementation Considerations for Functions. Alternatives to Functions.

## RESPONDING TO DATA MANIPULATION VIA TRIGGERS

Designing DML Triggers. Implementing DML Triggers. Advanced Trigger Concepts.

## USING IN-MEMORY TABLES

Memory-Optimized Tables. Native Stored Procedures.

## IMPLEMENTING MANAGED CODE IN SQL SERVER

Introduction to SQL CLR Integration. Importing and Configuring Assemblies. Implementing SQL CLR Integration.

## OPTIONAL STORING AND QUERYING XML DATA IN SQL SERVER

Introduction to XML and XML Schemas. Storing XML Data and XML Schemas in SQL Server. Implementing XML Indexes. Using the Transact-SQL FOR XML Statement. Getting Started with XQuery. Shredding XML.

## WORKING WITH SPATIAL DATA IN SQL SERVER

Introduction to Spatial Data. Working with Spatial Data Types in SQL Server. Using Spatial Data in Applications.

## INCORPORATING DATA FILES INTO DATABASES

Considerations for Working with Data Files in SQL Server. Implementing FILESTREAM and FileTables. Searching Data Files.





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DAYS

# ADMINISTERING MICROSOFT SQL SERVER DATABASES

## USQLA

07 - 11 June 2021  
23 - 27 August 2021  
25 - 29 October 2021

### LEARNING GOALS

This course provides students with the knowledge and skills to maintain a Microsoft SQL Server 2019 or previous version. The course focuses on teaching individuals how to use SQL Server product features and tools related to maintaining a database.

### TARGET AUDIENCE

The primary audience for this course is individuals who administer and maintain SQL Server databases.

### INTRODUCTION TO SQL SERVER DATABASE ADMINISTRATION

Database Administration Overview. Introduction to the SQL Server Platform. Database Management Tools and Techniques.

### INSTALLING AND CONFIGURING SQL SERVER

Planning SQL Server Installation. Installing SQL Server. Post-Installation Configuration.

### WORKING WITH DATABASES AND STORAGE

Introduction to Data Storage with SQL Server. Managing Storage for System Databases. Managing Storage for User Databases. Moving Database Files. Configuring the Buffer Pool Extension.

### PLANNING AND IMPLEMENTING A BACKUP STRATEGY

Understanding SQL Server Recovery Models. Planning a Backup Strategy. Backing up Databases and Transaction Logs. Using Backup Options. Ensuring Backup Reliability.

### RESTORING SQL SERVER DATABASES

Understanding the Restore Process. Restoring Databases. Advanced Restore Scenarios. Working with Point-in-Time Recovery.

### IMPORTING AND EXPORTING DATA

Introduction to Transferring Data. Importing and Exporting Table Data. Copying or Moving a Database.

### MONITORING SQL SERVER

Introduction to Monitoring SQL Server. Dynamic Management Views and Functions. Performance Monitor.

### TRACING SQL SERVER ACTIVITY

Tracing SQL Server Workload Activity. Using Traces.

### MANAGING SQL SERVER SECURITY

Introduction to SQL Server Security. Managing Server-Level Security. Managing Database-Level Principals. Managing Database Permissions.

### AUDITING DATA ACCESS AND ENCRYPTING DATA

Auditing Data Access in SQL Server. Implementing SQL Server Audit. Encrypting Databases.

### PERFORMING ONGOING DATABASE MAINTENANCE

Ensuring Database Integrity. Maintaining Indexes. Automating Routine Database Maintenance.

### AUTOMATING SQL SERVER MANAGEMENT

Automating SQL Server Management. Implementing SQL Server Agent Jobs. Managing SQL Server Agent Jobs. Managing Job Step Security Contexts. Managing Jobs on Multiple Servers.

### MONITORING SQL SERVER BY USING ALERTS AND NOTIFICATIONS

Monitoring SQL Server Errors. Configuring Database Mail. Configuring Operators, Alerts, and Notifications.



05  
DAYS

# SQL SERVER PERFORMANCE TUNING AND OPTIMIZATION

## USQLOP

29 March - 02 April 2021  
17 - 21 May 2021  
05 - 09 July 2021  
20 - 24 September 2021  
22 - 26 November 2021

### LEARNING GOALS

The 5 day class offers a comprehensive coverage of SQL Server architecture, performance, indexing and statistics strategies, optimize transaction log operations, tempdb and data file configuration, transactions and isolation levels, and locking and blocking.

### TARGET AUDIENCE

The primary audience for this course is individuals who develop, administer and maintain SQL Server databases.

### INTRODUCTION INTO SQL PERFORMANCE TUNING

#### CPU AND PROCESS SCHEDULING

Threads and workers. Worker thread binding. Wait stats analysis.

#### IO AND DATABASE STRUCTURE

Databases. Data files. Filegroups. Log files.

#### MEMORY USE

Dynamic memory allocation. Memory consumers. Monitoring memory consumption.

#### DATA TYPES AND TABLES

Importance of data type selection. Storage cost. Variable versus fixed length. Implicit and explicit data type conversions.

#### INDEXES AND STATISTICS

Heaps. Clustered and non-clustered indexes. Monitoring allocation units. Non-clustered and clustered columnstore indexes. Delayed durability. In-memory OLTP.

#### QUERY EXECUTION AND QUERY PLANS

Execution context. Execution plans. Plan cache and plan reuse. Plan recompilation. Parameterization. Query store. Adaptive Query Processing. Automatic regressed plan detection.

### INDEX AND QUERY TUNING

Understanding the query plan operators. How to measure query cost. Common query tuning techniques.

### IMPROVED CARDINALITY ESTIMATOR

Cardinality estimates. Improvements in the new cardinality estimator. Which estimator is used? Discovering slower queries with the Query Store.

### CONCURRENCY AND TRANSACTIONS

Transactions. Optimistic versus pessimistic concurrency control. Locking and lock types. Isolation levels. Monitoring locks.

### MONITORING SQL SERVER

Performance monitor. Profiler. Extended Events. Data collector.

### EXTENDED EVENTS

Profiler versus Extended events. Defining sessions. Using extended events to detect common performance issues.

## 05 DAYS | IMPLEMENTING DATA WAREHOUSES WITH INTEGRATION SERVICES

### USQLIS

This course describes how to implement a data warehouse platform to support a BI solution. Students will learn how to create a data warehouse with Microsoft SQL Server 2019 or earlier, implement ETL with SQL Server Integration Services, and validate and cleanse data with SQL Server Data Quality Services and SQL Server Master Data Services. Details see [www.u2u.be/cc/usqlis](http://www.u2u.be/cc/usqlis).

## 03 DAYS | MICROSOFT SQL SERVER REPORTING SERVICES

### USQLRS

This course introduces the SQL Server Reporting Services platform, and teaches the necessary skills to develop, deploy and maintain Reporting Services reports on SQL Server. Details see [www.u2u.be/cc/usqlrs](http://www.u2u.be/cc/usqlrs).

## 05 DAYS | MICROSOFT SQL SERVER ANALYSIS SERVICE

### USQLAS

When analyzing business data, two challenges pop up frequently: the complexity of writing and maintaining queries which retrieve the proper data, and the performance issues which might surface when querying large amounts of data. OLAP (OnLine Analytical Processing) cubes provide fast aggregation querying over large amounts of data in a user-friendly way. In this course, you learn how to build, maintain and query OLAP cubes with Microsoft SQL Server Analysis Services.

This course focusses on the multi-dimensional cubes and the MDX language. Since SQL Server 2012, Analysis Services contains an additional tabular engine and the DAX language, but this aspect of Analysis Services is not discussed in detail in this course. Please, see the Microsoft SQL Server Analysis Services Tabular course for more details on the tabular modeling.

After completing the course, students will be able to create and manage Analysis Services cubes, use features such as translations, Key Performance Indicators and calculated members. They will also be able to process cubes, design aggregations, decide upon which type of storage is optimal. Details see [www.u2u.be/cc/usqlas](http://www.u2u.be/cc/usqlas).

## 02 DAYS | MICROSOFT SQL SERVER ANALYSIS SERVICES TABULAR

### USQLAT

This instructor-led course will provide you with the knowledge and skills to develop Tabular models in SQL Server Analysis Services 2019 or earlier: Loading data from different sources, enrich data with business concepts (e.g. year-to-date) using DAX, define KPIs and hierarchies,... The course describes as well how to administer tabular databases: Backup, security, monitoring and automating the maintenance of Analysis Services Tabular. Details see [www.u2u.be/cc/usqlat](http://www.u2u.be/cc/usqlat).



# 03 DAYS | SCRIPTING WITH POWERSHELL

## UPSHELL

19 - 21 April 2021  
12 - 14 July 2021  
20 - 22 September 2021  
15 - 17 November 2021

### LEARNING GOALS

This course will get you acquainted with PowerShell and PowerShell Core. You will learn how to customize the PowerShell environment to your needs and how to automate and script administration, configuration, monitoring and deployment of Windows based servers and applications.

### TARGET AUDIENCE

System Administrators who are responsible for the management and configuration of a Windows Server, a Microsoft Azure or Microsoft 365 Infrastructure. Developers interested in automation and embedding PowerShell in their application.

### POWERSHELL OVERVIEW

PowerShell Overview. Brushing up on objects. PowerShell Versions. Windows PowerShell versus PowerShell Core. Concepts and Terminology. Getting Commands. Getting Help. Providers and Drives. PowerShell Aliases. PowerShell Aliases.

### POWERSHELL SHELLS

PowerShell Console. Integrated Scripting Environment (ISE). Visual Studio Code.

### CORE CONCEPTS

Viewing Object Structure. Object Pipeline. Using Format Cmdlets to Change Output. Export Data with Out Cmdlets. Using Variables to Store Objects. Working with the Object cmdlets: Where-Object, Foreach-Object, ...

### OBJECT PIPELINE PROCESSING

Where-Object. Foreach-Object. Select-Object. Sort-Object. Measure-Object. Compare-Object. Group-Object. Tee-Object.

### WORKING WITH OBJECTS

Files and Folders. Registry Keys and Values. COM Objects. WMI Objects. .NET Objects. Static Classes.

### EXTENDING POWERSHELL FUNCTIONALITY

Modules. Package Manager. PowerShell Gallery. PowerShell Profiles. Operators and Expressions.

### POWERSHELL REMOTING

PowerShell Remoting Overview. WS-Management (WSMAN). Remote CIM Sessions. Import/Export Remoting Sessions. WinRM Security. WinRM Double Hop Problem. Using Variables in Remoting Sessions. Remoting with PowerShell Core.

### POWERSHELL SECURITY

PowerShell Execution Policy. Script Signing. Security Sensitive Information in Scripts.

### POWERSHELL SCRIPTING

Foreach and For. While - do while - do until. If - Switch. Break - Continue.

### MANAGING YOUR ENVIRONMENT

Networking. File Shares. Data Import. Security. Server Management. Active Directory. Certificates.

# 05 DAYS | MASTERING POWERSHELL

## UPSHELLA

19 - 23 April 2021  
12 - 16 July 2021  
20 - 24 September 2021  
15 - 19 November 2021

### LEARNING GOALS

This course will get you acquainted with PowerShell and PowerShell Core. You will learn how to customize the PowerShell environment to your needs and how to automate and script administration, configuration, monitoring and deployment of Windows based servers and applications.

### TARGET AUDIENCE

System Administrators who are responsible for the management and configuration of a Windows Server, a Microsoft Azure or Microsoft 365 Infrastructure. Developers interested in automation and embedding PowerShell in their application.

### POWERSHELL OVERVIEW

PowerShell Overview. Brushing up on objects. PowerShell Versions. Windows PowerShell versus PowerShell Core. Concepts and Terminology. Getting Commands. Getting Help. Providers and Drives. PowerShell Aliases. PowerShell Aliases.

### POWERSHELL SHELLS

PowerShell Console. Integrated Scripting Environment (ISE). Visual Studio Code.

### CORE CONCEPTS

Viewing Object Structure. Object Pipeline. Using Format Cmdlets to Change Output. Export Data with Out Cmdlets. Using Variables to Store Objects. Working with the Object cmdlets: Where-Object, Foreach-Object, ...

### OBJECT PIPELINE PROCESSING

Where-Object. Foreach-Object. Select-Object. Sort-Object. Measure-Object. Compare-Object. Group-Object. Tee-Object.

### WORKING WITH OBJECTS

Files and Folders. Registry Keys and Values. COM Objects. WMI Objects. .NET Objects. Static Classes.

### EXTENDING POWERSHELL FUNCTIONALITY

Modules. Package Manager. PowerShell Gallery. PowerShell Profiles. Operators and Expressions.

### POWERSHELL REMOTING

PowerShell Remoting Overview. WS-Management (WSMAN). Remote CIM Sessions. Import/Export Remoting Sessions. WinRM Security. WinRM Double Hop Problem. Using Variables in Remoting Sessions. Remoting with PowerShell Core.

### POWERSHELL SECURITY

PowerShell Execution Policy. Script Signing. Security Sensitive Information in Scripts.

### POWERSHELL SCRIPTING

Foreach and For. While - do while - do until. If - Switch. Break - Continue.

### MANAGING YOUR ENVIRONMENT

Networking. File Shares. Data Import. Security. Server Management. Active Directory. Certificates.

### POWERSHELL JOBS

Background Jobs. Remoting Jobs. Scheduled Jobs.

### ERROR HANDLING

Debugging options. Error Handling. Trap Statement. Try - Catch Statement.

### DEVOPS: DESIRED STATE CONFIGURATION

Desired State Configuration Overview. DSC Components: Configuration - Node - Resource. Apply DSC Configurations. Push versus Pull Mode. Azure Automation DSC.

### ADVANCED SCRIPTING

Functions. Script Basics. Advanced Functions. Advanced Parameter Configuration. Command Documentation. Creating a PowerShell Module. Creating your own Cmdlets.

### JEA: JUST ENOUGH ADMINISTRATION

JEA Overview. Role Capabilities. Session Configurations. Register JEA Endpoint. Auditing and Reporting.

### POWERSHELL ON LINUX

Install PowerShell Core on Linux. Manage Linux Systems. Manage Windows Systems from Linux. Remoting over SSH.

# POWERSHELL



## WS-011

05 - 09 July 2021

27 September - 01 October 2021

06 - 10 December 2021

## LEARNING GOALS

This five-day instructor-led course is designed primarily for IT professionals who have some experience with Windows Server. It is designed for professionals who will be responsible for managing identity, networking, storage and compute by using Windows Server 2019, and who need to understand the scenarios, requirements, and options that are available and applicable to Windows Server 2019.

## TARGET AUDIENCE

This course is intended for Information Technology (IT) Professionals who have some experiencing working with Windows Server and are looking for a single five-day course that covers core administration components and technologies in Windows Server 2019.

## WINDOWS SERVER ADMINISTRATION OVERVIEW

Introducing Windows Server 2019. Windows Server Core Overview. Windows Server administration principles and tools overview.

## IDENTITY SERVICES IN WINDOWS SERVER

AD DS Overview. Deploying Windows Server domain controllers. Azure AD overview. Implementing Group Policy. Active Directory Certificate Services overview.

## NETWORK INFRASTRUCTURE SERVICES IN WINDOWS SERVER

Deploying and managing DHCP. Deploying and managing DNS service. Deploying and managing IPAM. Remote Access Services in Windows Server.

## FILE SERVERS AND STORAGE MANAGEMENT IN WINDOWS SERVER

Volumes and File Systems in Windows Server. Implementing sharing in Windows Server. Implementing Storage Spaces in Windows Server. Implementing Data Deduplication. Implementing iSCSI. Deploying Distributed File System.

## HYPER-V VIRTUALIZATION AND CONTAINERS IN WINDOWS SERVER

Hyper-V in Windows Server. Configuring VMs. Securing virtualization in Windows Server. Containers in Windows Server. Overview of Kubernetes.

## HIGH AVAILABILITY IN WINDOWS SERVER

Planning for failover clustering implementation. Creating and configuring failover cluster. Overview of stretch clusters. High availability and disaster recovery solutions with Hyper-V VMs.

## DISASTER RECOVERY IN WINDOWS SERVER

Hyper-V Replica. Backup and restore infrastructure in Windows Server.

## WINDOWS SERVER SECURITY

Credentials and privileged access protection. Hardening Windows Server. JEA in Windows Server. Securing and analyzing SMB traffic. Windows Server update management.

## RDS IN WINDOWS SERVER

Overview of RDS. Configuring a session-based desktop deployment. Overview of personal and pooled virtual desktops.

## REMOTE ACCESS AND WEB SERVICES IN WINDOWS SERVER

Implementing VPNs. Implementing Always On VPN. Implementing NPS. Implementing Web Server in Windows Server.

## SERVER AND PERFORMANCE MONITORING IN WINDOWS SERVER

Overview of Windows Server monitoring tools. Using Performance Monitor. Monitoring event logs for troubleshooting.

## UPGRADE AND MIGRATION IN WINDOWS SERVER

AD DS migration. Storage Migration Service. Windows Server migration tools.

## UADFS

20 - 23 September 2021

17 - 20 January 2022

## LEARNING GOALS

This course provides students with the skills to install and configure AD FS. They will also learn how to design AD FS for security and high availability.

## TARGET AUDIENCE

IT administrators who are responsible for the setup and configuration of claims-based authentication.

## CLAIMS-BASED AUTHENTICATION

Claims-based Authentication Overview. Identity Management Solutions. The evolution of AD FS. AD FS Scenarios. AD FS Terminology.

## AD FS PREREQUISITES

Prerequisites. Attribute Stores. Web Applications. Web Services.

## PUBLIC KEY INFRASTRUCTURE

AD FS Certificate Requirements. Cryptography Overview. Certification Authorities. PKI Design.

## INSTALLING AD FS

Federation Server Roles. Installing the AD FS Role. Federation Server Configuration. Administering AD FS.

## AD FS IN A SINGLE ORGANIZATION

AD FS in a Single Organization. Configure AD FS for a Single Organization. Claim Rules. Access Control Policies.

## AD FS IN A BUSINESS-TO-BUSINESS FEDERATION

AD FS in a Federated Environment. Configure AD FS in a B2B Scenario. Managing Claims Across Organizations.

## FEDERATION WITH THE CLOUD

Azure AD and Office 365. Synchronize Users with Azure AD Connect. Configure Federation to the Cloud with AD FS. Azure MFA.

## ADVANCED AD FS SCENARIOS

High Availability. AD FS Attribute Stores. Identity Delegation. SAML 2.0.

## CLAIM RULE LANGUAGE

Claim Sets Review. Claim Rule Language Syntax. Condition Statements. Issuance Statements. Advanced Options.

## WEB APPLICATION PROXY

Web Application Proxy Overview. Web Application Proxy Requirements. WAP Authentication.

## TROUBLESHOOTING AD FS

Event Logging and Auditing. Claims X-Ray. Loop Detection. Certificate Issues. Fiddler. Diagnostics Analyzer.

## BACKUP AND UPGRADE

Rapid Restore Tool. Upgrade AD FS.

## UPKI

This course provides students with the knowledge and skills to design, deploy, and manage a public key infrastructure (PKI) to support applications that require distributed security. Students get hands-on experience implementing solutions to secure PKI-enabled applications and services, such as Exchange Server, IIS, Outlook, and remote access services. The Active Directory Certificate Services role in Windows Server is used to deploy a complete PKI infrastructure in the organization. Individuals should have knowledge and experience to install and configure Active Directory and security mechanisms for computers running Windows Server. Details see [www.u2u.be/cc/upki](http://www.u2u.be/cc/upki).

# THE U2U TRAINING CENTER

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## OUR LOCATION



### U2U nv/sa

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1731 Brussels (Zellik)  
Belgium  
VAT BE 0541 885 352



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www.u2u.be

## HOW TO GET HERE?



### By car

U2U is located next to the Brussels ring-road (R0) at exit 10. Our training center provides ample parking space.



### By bus

From bus stop "Ganshoren Sport" (bus 84 or 87) it takes 5 minutes walking to get to our training center.



### By train

The walking path takes you in 15 minutes from the city railway station Sint-Agatha-Berchem to the U2U training center.



### By air

From Brussels International Airport, it takes 15 minutes by taxi or 35 minutes by train to arrive at U2U. From the airport Brussels South (Charleroi), it takes less than 1 hour by shuttle bus, train or taxi.

