# Automate Administration with PowerShell (AZ-040) Training

Duration: **5 Day**

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## Overview

The **Automate Administration with PowerShell (AZ-040)** course provides IT professionals with the core knowledge and practical skills required to administer Windows environments and automate administrative tasks using Windows PowerShell.

Participants learn how to identify the commands they need for specific administration tasks, work effectively with cmdlets and parameters, and combine commands to create more advanced automation workflows.

The programme goes beyond basic command execution. Learners develop the ability to create scripts, automate repetitive activities, query system information, produce administrative reports, manage remote computers, and administer a range of Microsoft cloud and infrastructure services through PowerShell.

The skills covered in this course support a broad range of Microsoft technologies, including Windows Server, Windows Client, Microsoft Exchange Server, Microsoft SharePoint Server, Microsoft SQL Server, and Microsoft System Center.

The course is not focused exclusively on any one Microsoft product. However, Windows Server is used frequently in examples because it provides a common platform across many Microsoft enterprise technologies.

## Prerequisites

This programme is intended for IT professionals who already have experience administering Windows Server and Windows client environments.

Previous experience with PowerShell or another scripting language is not required.

However, familiarity with the following areas will be useful:

- Windows Server administration
- Windows Client administration
- User and group management
- Permissions
- Network and service administration
- General Microsoft infrastructure technologies

Professionals with experience administering Exchange Server, SharePoint Server, SQL Server, or System Center will also benefit from the course.

### MFA Requirements

Access to Microsoft services during the programme may require**Multi-Factor Authentication (MFA)**.

Participants are encouraged to configure the required MFA application before attending and

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confirm that they can authenticate successfully with the accounts used during training.

## Who Should Attend

The course is particularly suitable for:

- Windows Server administrators
- Windows Client administrators
- System administrators
- Infrastructure specialists
- Microsoft 365 administrators
- Azure administrators
- Exchange administrators
- SharePoint administrators
- IT professionals working with SQL Server or System Center environments
- Technical specialists who want to automate administration using PowerShell

**Job Role:** Administrator

## What You Will Learn

By the end of the course, participants will be able to:

- Describe the core functionality of Windows PowerShell
- Find and run basic PowerShell commands
- Identify cmdlets for local system administration
- Work effectively with the PowerShell pipeline
- Use PSProviders and PSDrives to access different data stores
- Query system information using WMI and CIM
- Work with variables, arrays, and hash tables
- Create basic PowerShell scripts
- Manage remote computers through PowerShell
- Administer Azure resources with PowerShell
- Manage Microsoft 365 services using PowerShell
- Create and manage background jobs
- Create and manage scheduled jobs
- Automate repetitive administration tasks
- Generate administrative output and reports

## Outline

### Module 1: Review Windows PowerShell

This module introduces the PowerShell environment, its major versions, and the applications commonly used to host and develop PowerShell.

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Topics include:

- Windows PowerShell fundamentals
- Major PowerShell versions
- Common hosting applications
- Considerations when using PowerShell
- Configuring the PowerShell console
- Configuring PowerShell ISE
- Using Visual Studio Code for PowerShell scripting

### Module 2: Understand PowerShell Command Syntax

Topics include:

- Cmdlet structure
- Parameters
- Tab completion
- About files
- Working with built-in PowerShell documentation

### Module 3: Find Commands and Use Get-Help

Topics include:

- Modules and cmdlets
- Finding commands
- Aliases
- Show-Command
- Get-Help
- Interpreting help content
- Updating local help

### Module 4: Manage Active Directory Domain Services

Topics include:

- User accounts
- Groups and memberships
- Computer accounts
- Organisational Units
- Active Directory objects
- AD administration cmdlets

### Module 5: Manage Windows Network Service Settings

Topics include:

- TCP/IP settings
- IP addresses
- Routing
- DNS client settings
- Windows Firewall

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### Module 6: Manage Windows Server Settings

Topics include:

- Group Policy Objects
- Server roles
- Features
- Services
- Hyper-V
- Virtual machines
- Internet Information Services
- Windows Server automation

### Module 7: Manage Local Windows Settings

Topics include:

- Managing Windows devices
- Local permissions
- Automating local system administration

### Module 8: Understand the PowerShell Pipeline

Topics include:

- Pipeline concepts
- Pipeline objects
- Pipeline output
- Object members
- Discovering object properties
- Output formatting

### Module 9: Select, Sort and Measure Pipeline Objects

Topics include:

- Sort-Object
- Measure-Object
- Select-Object
- Selecting properties
- Calculated properties

### Module 10: Filter Pipeline Objects

Topics include:

- Comparison operators
- Where-Object
- Basic filtering
- Advanced filtering
- Improving pipeline filter performance

### Module 11: Enumerate Pipeline Objects

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Topics include:

- Enumeration concepts
- Basic enumeration
- Advanced enumeration
- Processing individual objects

### Module 12: Send and Export Pipeline Data

Topics include:

- Writing output to files
- CSV
- XML
- JSON
- HTML
- Exporting data
- Passing pipeline data to other destinations
- Cmdlet parameter matching

### Module 13: Pass Pipeline Objects

Topics include:

- Pipeline parameter binding
- ByValue
- ByPropertyName
- Manual parameter overrides
- Parenthetical commands
- Expanding property values

### Module 14: Connect to Data Stores with PowerShell Providers

Topics include:

- PowerShell providers
- Provider capabilities
- Built-in providers
- Provider help

### Module 15: Use PowerShell Drives

Topics include:

- PSDrives
- File system administration
- Creating and deleting files and directories
- Registry management
- Certificates
- Other PowerShell drives

### Module 16: Review CIM and WMI

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Topics include:

- CIM architecture
- WMI architecture
- Management repositories
- Repository classes
- Online class documentation

### Module 17: Query Configuration Information with CIM and WMI

Topics include:

- Namespaces
- Classes
- CIMv2
- WMI Query Language
- Remote queries
- CIM sessions
- Querying remote repository classes

### Module 18: Manipulate Repository Objects with CIM and WMI

Topics include:

- Repository methods
- Discovering methods
- Win32_Service
- Win32_OperatingSystem
- Win32_Process
- Invoking CIM and WMI methods

### Module 19: Manage Variables in PowerShell Scripts

Topics include:

- Variables
- Naming rules
- Values
- Data types
- String variables
- Date variables
- Variable methods and properties

### Module 20: Work with Arrays and Hash Tables

Topics include:

- Arrays
- Array lists
- Array manipulation
- Hash tables
- Managing hash table content

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### Module 21: Create and Run PowerShell Scripts

Topics include:

- PowerShell scripts
- Creating and modifying scripts
- PowerShell Gallery
- PowerShellGet
- Execution policies
- AppLocker
- Digital signatures
- Script signing

### Module 22: Work with Scripting Constructs

Topics include:

- ForEach
- If
- Switch
- For
- Loop constructs
- Break
- Continue

### Module 23: Import Data into Scripts

Topics include:

- Get-Content
- Import-Csv
- Import-Clixml
- ConvertFrom-Json
- Working with text, CSV, XML, and JSON input

### Module 24: Accept User Input

Topics include:

- Read-Host
- Get-Credential
- Out-GridView
- Script parameters
- Handling variable user input

### Module 25: Troubleshoot Scripts and Handle Errors

Topics include:

- Error messages
- Troubleshooting output
- Breakpoints
- Error actions

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- Debugging PowerShell scripts

### Module 26: Use Functions and Modules

Topics include:

- Functions
- Variable scope
- Dot sourcing
- Creating modules
- Building reusable PowerShell components

### Module 27: Manage Computers with PowerShell Remoting

Topics include:

- PowerShell remoting architecture
- Remote administration
- Remoting security
- Enabling remoting
- One-to-one remoting
- One-to-many remoting
- Local and remote output differences

### Module 28: Use Advanced PowerShell Remoting

Topics include:

- Advanced remoting settings
- Sending parameters remotely
- Working with local variables
- Scope modifiers
- Multi-hop remoting
- Authentication

### Module 29: Manage Persistent PowerShell Sessions

Topics include:

- Persistent connections
- PSSessions
- Sending commands
- Disconnecting
- Reconnecting
- Implicit remoting

### Module 30: Review Azure PowerShell and the Az Module

Topics include:

- Azure PowerShell
- Az module
- Installing the Az module

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- Migrating from AzureRM to Az
- Microsoft Entra ID PowerShell modules

### Module 31: Review Azure Cloud Shell

Topics include:

- Azure Cloud Shell
- Cloud Shell capabilities
- Available tools
- Using Azure Cloud Shell

### Module 32: Manage Azure Resources with PowerShell

Topics include:

- Azure PowerShell environment
- Azure virtual machines
- Azure Storage
- Azure subscriptions
- Cloud resource administration

### Module 33: Manage Microsoft Entra ID Users, Groups and Licences

Topics include:

- Benefits of PowerShell for Microsoft 365
- Connecting to a Microsoft 365 tenant
- Users
- Groups
- Roles
- Licences
- Microsoft Entra ID administration

### Module 34: Manage Exchange Online

Topics include:

- Connecting to Exchange Online
- Mailboxes
- Resources
- Administrative roles
- Exchange Online PowerShell

### Module 35: Manage SharePoint Online

Topics include:

- SharePoint Online Management Shell
- Users
- Groups
- Sites
- External sharing

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- SharePoint Online administration

### Module 36: Manage Microsoft Teams

Topics include:

- Microsoft Teams PowerShell module
- Module installation
- Connecting to Microsoft Teams
- Managing teams
- Managing user permissions

### Module 37: Create and Manage Background Jobs

Topics include:

- Local jobs
- Remote jobs
- CIM/WMI jobs
- Starting jobs
- Monitoring jobs
- Retrieving job results

### Module 38: Create and Manage Scheduled Jobs

Topics include:

- Running PowerShell scripts as scheduled tasks
- Scheduled jobs
- Job options
- Job triggers
- Registering scheduled jobs
- Retrieving scheduled job results

## Hands-On Learning

Throughout the programme, participants practise:

- Building PowerShell commands
- Working with pipeline-based administration
- Automating Windows Server tasks
- Managing Active Directory objects
- Querying systems with CIM and WMI
- Developing reusable PowerShell scripts
- Managing Azure resources
- Administering Microsoft 365 services
- Working with PowerShell remoting
- Creating background and scheduled jobs

The course is designed to help participants use PowerShell not simply as a command-line interface, but as a complete automation and administration platform for modern Microsoft environments.

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