Trainer Preparation Guide for Course 10962C: Advanced Automated Administration with Windows PowerShell

Design of the course

This course provides students with the advanced knowledge and skills to create production-quality scripts by using Windows PowerShell. It teaches students how to automate administrative tasks by using Windows PowerShell 5.1. Students learn core scripting skills, such as creating advanced functions, writing controller scripts, and handling script errors. Students learn how to work with Windows PowerShell Workflow, the REST API, XML-formatted data files, and JSON-formatted data files. Students also learn how to use new administration tools, such as Desired State Configuration (DSC) and Just Enough Administration (JEA), to configure and help secure servers.

This course consists of eight modules, delivered over three days.

Module 1 occupies the entire first day. It is important to keep students on track by monitoring their progress through the increasingly complex Module 1 labs. Instructor notes in the labs provide per-task timing estimates, and the Lab Answer Key (LAK) provides sample solutions that can help students catch up if they fall behind.

Module 1, "Creating advanced functions," explains how to parameterize a command and create an advanced function, convert a script and function into a script module, define parameter attributes and input validation for a function, enumerate objects by using scripting constructs, modify a function to accept pipeline input, produce complex pipeline output in a function, document a function by using comment-based Help, and create functions that support *-WhatIf* and *-Confirm* to parameterize a command into an advanced function.

Module 2, "Using Microsoft .NET Framework and REST API in Windows PowerShell," explains how to use Microsoft .NET Framework classes and instances and the REST API to supplement the functionality that Windows PowerShell commands provide.

Module 3, "Writing controller scripts," discusses how to differentiate tools from controller scripts, write controller scripts that present a user interface, and write controller scripts that automate a business process.

Module 4, "Handling script errors," explains how to perform basic error handling by using scripts. It discusses adding error handling to existing tools, primarily as a time-saving mechanism (as opposed to having students write new tools). A side benefit of this approach is that it helps build the skills to analyze and reuse existing code written by someone else. The topics include describing the shell's default error response mechanisms and adding error handling code to existing tools.

Module 5, "Using XML, JSON, and custom formatted data," explains how to read, manipulate, and write data files in XML, JSON, and custom formatted data files. XML files provide a robust yet straightforward way of storing both flat and hierarchical data. XML files provide more flexibility than comma-separated values (CSV) files, better accessibility for small amounts of data than Microsoft SQL Server, and more ease when coding against than Microsoft Excel automation.

Module 6, "Enhancing server management with Desired State Configuration and Just Enough Administration," explains how to write DSC configuration files, deploy those files to servers, and monitor servers' configurations. This module also explains how to restrict administrative access by using JEA.

Module 7, "Analyzing and debugging scripts," explains how to use native Windows PowerShell features to analyze and debug existing scripts.

Module 8, "Understanding Windows PowerShell workflow," describes the features of the Windows PowerShell Workflow technology. Because this is a niche technology, the module focuses on helping the students understand what it does and when it's appropriate to use.

Required materials to teach this course

To teach this course, you need the following materials:

- Course Handbook
- Course Companion Content on the http://www.microsoft.com/learning/companionmoc/ site
- Microsoft PowerPoint files
- Microsoft OneNote Trainer Pack (OTP) on the Microsoft Learning Download Center at https://learningdownloadcenter.microsoft.com
- Microsoft Hyper-V Classroom Setup Guide
- Course virtual machines

Important We recommend that you use PowerPoint 2007 or newer to display the slides for this course. If you use PowerPoint Viewer or an older version of PowerPoint, the slide features might not display correctly.

Prerequisite knowledge to teach this course

To present this course, you must have the following knowledge and skills:

- Experience with Windows networking technologies and implementation
- Experience with Windows Server administration, maintenance, and troubleshooting
- Experience with Windows Client administration, maintenance, and troubleshooting
- Experience using Windows PowerShell to run commands and to create basic non-modularized scripts
- Foundational knowledge of Windows PowerShell

Preparation tasks

To prepare for this course, complete the tasks described in this section.

Courses or workshops

We recommend that you audit the latest version of the following course:

- Course 10961C: *Automating Administration with Windows PowerShell*

Technical preparation activities

We recommend that you complete the following technical preparation activities:

- Read the additional readings and references included in the Course Companion Content at http://www.microsoft.com/learning/companionmoc.

- Use the OTP on the Microsoft Learning Download Center https://learningdownloadcenter.microsoft.com, and note that:
  - The OTP includes the following content on each page (and in this order):
    - Slides
    - Instructor notes
    - Student Handbook content
  - Each module also includes the LAKs.
- If you are using on-premises labs, become familiar with the course's virtual machines and how you set up and configure them. This includes understanding the base images, mid-tier files, and activation states. Practice setting up the classroom by following the instructions in the Microsoft Hyper-V Classroom Setup Guide.
- If you are using third-party hosted labs for Microsoft Courseware, become familiar with how you configure and access the labs. Ensure that you are ready to demonstrate their use to students and work with the lab hoster who provides trainer access for course preparation. You can purchase third-party hosted labs for Microsoft Courseware for use during course delivery at the same time you order the course materials.

  Important If you are intending to use third-party hosted labs for Microsoft Courseware, you need to ensure that full lab coverage is available before use. This is because of the presence of Boot-to-VHD labs in some courses and the modifications to some lab steps that are required to facilitate a hosted lab platform. There are no Boot-to-VHD or native boot scenarios in the labs in this course.

- If you are using digital Microsoft Official Courses (MOC) via the arvato Skillpipe reader, become familiar with how to access and configure the digital content to ensure smooth setup and access processes for students. Also, ensure that everything is in place for students to have a smooth experience when signing in for the first time and accessing their content.

  You can purchase digital MOC for use during course delivery when you order the course materials.
- Review the learning product error log, which is available on the Microsoft Learning Download Center at https://learningdownloadcenter.microsoft.com.
- If you have taught a previous version of this course, review the course change log, also available on the MCT Download Center.
- Practice using the Microsoft products and tools associated with this learning product.

Instructional preparation activities

We recommend that you complete the following instructional preparation activities:

- Read the "About This Course" section at the beginning of the course handbook for the learning product.
- Walk through the introduction slide deck for the learning product.
- Walk through each module's presentation slide deck, and read the instructor notes (located in the notes view of the slide deck). Note that each slide deck uses additional, hidden slides to accommodate the amount of instructor notes for a topic.

- Familiarize yourself with the Course Handbook and the Course Companion Content at http://www.microsoft.com/learning/companionmoc. Make note of when to direct students' attention to the Course Companion Content for further learning support. The introduction slide deck has more information pertaining to the course components.
- Practice presenting each module:
  - Identify the key points and "must know" information for each topic.
  - Perform each demonstration and hands-on lab.
  - Anticipate the questions that students might have.
  - Identify examples, analogies, impromptu demonstrations, and additional delivery tips that will help to clarify module content and provide a more meaningful learning experience for your specific audience.
  - Note any problems that you might encounter during a demonstration or lab exercise, and determine a course of action for how you will resolve the problems in the classroom. To access the LAKs, refer to the appendix in the Course Handbook.
  - Work through the "Module Review and Takeaways" section at the end of each module, and determine how you will use this section to reinforce student learning and promote knowledge transfer to on-the-job performance.
  - Customize and enhance your instructor notes.
- Consult the Born To Learn forums for additional tips and strategies—posted by your fellow Microsoft Certified Trainers (MCTs)—for teaching the learning product.
- Review the updated information about the Microsoft Certification Program on the Microsoft Learning Certifications website.

Instructor computer setup

Set up the instructor computer by following the setup instructions in the Microsoft Hyper-V Classroom Setup Guide. This document provides the hardware requirements for the instructor computer in addition to detailed setup instructions.

Depending on whether you use on-premises labs or hosted Microsoft Labs Online (MLO), your setup will be different.

Course timing

The following schedule is an estimate of the course timing. Your timing might vary. Every student might not finish every lab. Use your judgment to set a reasonable time to move on to the next module.

This schedule has been developed to provide about six hours of training per day. Each day starts at 9:00 AM, ends about 5:00 PM, and includes two 15-minute breaks and one hour for lunch. Each day also includes time to review the previous day's topics and to answer questions from the students. Be realistic about your timings.

Day 1

Start	End	Module
9:00	9:30	Introduction
9:30	10:00	Module 1: Creating advanced functions
10:00	10:30	Lab A: Converting a command into an advanced function
10:30	10:45	Break
10:45	11:35	Module 1: Creating advanced functions *(continued)*
11:35	12:00	Lab B: Creating a script module
12:00	1:00	Lunch
1:00	1:45	Module 1: Creating advanced functions *(continued)*
1:45	2:15	Lab C: Defining parameter attributes and input validation
2:15	2:25	Lab D: Writing functions that use multiple objects
2:25	2:50	Module 1: Creating advanced functions *(continued)*
2:50	3:00	Lab E: Writing functions that accept pipeline input
3:00	3:15	Break
3:15	3:40	Module 1: Creating advanced functions *(continued)*
3:40	4:00	Lab F: Producing complex function output
4:00	4:15	Module 1: Creating advanced functions *(continued)*
4:15	4:25	Lab G: Documenting functions by using comment-based Help
4:25	4:40	Module 1: Creating advanced functions *(continued)*
4:40	5:00	Lab H: Supporting –WhatIf and –Confirm

Day 2

Start	End	Module
9:00	9:15	Day 1 review
9:15	10:15	Module 2: Using Microsoft .NET Framework and REST API in Windows PowerShell
10:15	10:45	Lab A: Using .NET Framework in Windows PowerShell
10:45	11:00	Break
11:00	11:40	Module 2: Using Microsoft .NET Framework and REST API in Windows PowerShell *(continued)*
11:40	12:10	Lab B: Using REST API in Windows PowerShell to manage IIS websites
12:10	1:10	Lunch
1:10	1:45	Module 3: Writing controller scripts
1:45	2:45	Lab A: Writing controller scripts that display a user interface
2:45	3:00	Break
3:00	3:20	Module 3: Writing controller scripts *(continued)*
3:20	4:20	Lab B: Writing controller scripts that produce HTML reports
4:20	5:05	Module 4: Handling script errors
5:05	5:35	Lab: Handling errors that occur when running a script

Day 3

Start	End	Module
9:00	9:15	Day 2 review
9:15	9:35	Module 5: Using XML, JSON, and custom formatted data
9:35	10:35	Lab: Reading, manipulating, and writing XML-formatted data
10:35	10:50	Break
10:50	11:10	Module 5: Using XML, JSON, and custom formatted data *(continued)*
11:10	12:10	Module 6: Enhancing server management with Desired State Configuration and Just Enough Administration
12:10	1:10	Lunch
1:10	2:10	Lab A: Creating and deploying a DSC configuration
2:10	2:40	Module 6: Enhancing server management with Desired State Configuration and Just Enough Administration *(continued)*
2:40	3:10	Lab B: Creating and using JEA
3.10	3:25	Break
3:25	4:00	Module 7: Analyzing and debugging scripts
4:00	5:00	Lab: Analyzing and debugging an existing script
5:00	5:20	Module 8: Understanding Windows PowerShell workflow
5:20	5:50	Lab: Creating and running a Windows PowerShell workflow