Apprenticeship Program
Occupational Standards

IBM Z System Mainframe Administrator

Competency Framework

O*NET CODE: 15-1142.00 (Network and Computer Systems Administrator)
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This document was created by IBM's Apprenticeship Program as an open source standard to help industry accelerate their journey to developing new collar apprenticeship and work-based learning programs.

Contents

Work Process Schedule and Related Instruction Outline 3
Overview 3
Work Processes 4
Competencies and Performance Criteria 5
Competencies 5
Evidence Types 6
Principles and Practices Performance Criteria 7
Knowledge Performance Criteria 9
Skills Performance Criteria 16
Outline of Related Instruction 20
Foundational Instruction 20
System Administrator Instruction 21

Work Process Schedule and Related Instruction Outline

Overview

The occupational standards include the competency framework that outlines the required technical and professional competencies for each occupation. Demonstrated proficiency in all competencies is a requirement for successful completion of a competency-based apprenticeship program.

The following section contains work process, training outline, and related instruction for the IBM **z System Mainframe Administrator Apprenticeship.** The criteria are segregated into three distinct parts.

- **Part I: Work Processes** – This section delineates the general outline of basic, high-level requirements that each participant will need to satisfy including projects, coaching, job shadowing, and training.
- **Part II: Competencies and Performance Criteria** – In support of this competency-based apprenticeship model, this section identifies what technical knowledge and professional behaviors will be evident as a product of achieving proficiency in these areas.
    - Competency Outcomes -These are the skills that apprentices are required to master during their apprenticeship. Competencies are defined as knowledge (K), behavior (B), or skills (S).
    - Assessment Criteria - Outlines the specific knowledge or combination of skills that each apprentice is required to learn to demonstrate proficiency.
    - Evidence types are the mechanisms used to evaluate apprentice's overall proficiency in a stated competency.
- **Part III: Outline of Related Instruction** – This section outlines specific formal training that each participant will be required to complete or demonstrate mastery.

Work Processes

Work Process
Orientation to the Work Environment. The apprentice will be introduced to leadership personnel. He/she will become aware of mission and business objectives. He/she will also gain exposure to required processes as well as business conduct, safety, and security policies. Tips for succeeding in the workplace will be reviewed with him/her. System access will be given. The mentor will meet with the apprentice to assess prior learning and experience and determine specific training requirements for apprentice.
Specific Business Area Knowledge. The manager will provide the apprentice with a detailed overview of the organization's work process and how it relates to other organizations within the company.
Professional Development (Onboarding and Soft Skills Training)
Technical Foundational Training
Technical System Administrator Training
Job Shadowing/Mentoring
Formal/Informal Briefings
Performance Evaluations
On the Job Training:
1. Deploy and manage operating systems
2. Deploy and maintain other system software or products running on the mainframe
3. Implement monitoring, configuration management and reporting functions
4. Define and document best practices and support procedures; complete required documentation
5. Execute change management procedures including risk identification, test plans and back-out procedures
6. Implement system security procedures
7. Assist with capacity management and workload balancing
8. Code JCL
9. Write Simple REXX programs
10. Assist with disaster recovery plans
11. Assist with problem solving
12. Perform other duties as assigned

Competencies and Performance Criteria

Competencies

#	Type: Knowledge/ Skill/ Behavior	Description
1.0	B	Demonstrate key teamwork and collaborative behaviors
2.0	B	Demonstrate strong communication skills
3.0	K / B	Understand and model good feedback behaviors
4.0	B	Demonstrate a willingness to learn from mentors
5.0	K/B	Demonstrate a methodical approach to implementing change, adopting a risk mitigation approach
6.0	K/B	Demonstrate an ability to follow process and procedures with accurate and complete documentation
7.0	K	Demonstrate knowledge of key computer programming fundamentals including structured programming design and its relationship to data structures
8.0	K	Understand mainframe terminology and basic concepts
9.0	K	Understand mainframe hardware components and the structured nature of the mainframe I/O architecture
10.0	K	Understand access method concepts in MVS and the structure and design of VSAM files
11.0	K	Understand the associated software and system components that comprise a z/OS System, their purpose and how they interact
12.0	K	Understand the concepts and facilities of TSO and IBM's Interactive System Productivity (ISPF), including familiarization with the Editors
13.0	K	Understand the structure of ICF catalogs and the related VTOC and index VTOC
14.0	K	Understand hierarchical and relational DBMS
15.0	K	Understand the concepts, functions, and facilities of CICS
16.0	K	Understand how security is implemented on the mainframe
17.0	K	Understand File Transfer tools, concepts, and configuration
18.0	K	Understand how to use and exploit the additional utilities/ facilities/ program products widely utilized within an enterprise mainframe environment
19.0	K	Understand what can go wrong in a mainframe environment

20.0	S	Be able to code job control statements with sound syntax to execute Mainframe programs and access datasets following best practices and standards
21.0	S	Be able to create and use programs written in the REXX language
22.0	S	Be able to exploit utilities/ facilities/ program products widely utilized within an enterprise mainframe environment such as IEBGENER, IDCAMS etc.
23.0	S	Be able to define an HCD definition to create a z/OS LPAR and connect peripheral devices.
24.0	S	Demonstrate the use of SMP/E to manage the deployment and lifecycle of mainframe software products
25.0	S	Perform and upgrade of a major product in a production like environment, evaluating any risks and taking actions to mitigate/ minimize these risks via proven back-out plan and knowledge of what could wrong including effective testing.

Evidence Types

Evidence Code	Description
O	Observation
Q&A	Questions and answers
P	Learner products
RA	Reflective accounts / personal statements
S	Simulation
PD	Professional discussion
A	Assignments, projects, case studies
MT	Mentor testimony
EW	Expert witness evidence
RPL	Recognition of prior learning

Principles and Practices Performance Criteria

Job Role	IBM z System Mainframe Administrator
O*NET Code	15-1142.00 (Network and Computer Systems Administrators)
Apprenticeship Level	Foundation
Guided Learning Hours	297
Experiential Hours	1731

Competency Outcomes	Assessment Criteria	Evidence Type	Education Module Reference
1.0 Demonstrate teamwork and collaborative behaviors	1.1 Examples of teamwork and collaboration A Taste of Agile; Agile Operations Fundamentals; Agile Program Fundamentals 1.2 Feedback from team members and mentors	☒O ☒Q&A ☐P ☒RA ☐S ☐PD ☒A ☒MT ☒EW ☐RPL	Agile Explorer
2.0 Demonstrate good communication skills	2.1 Examples of ability to present technical information clearly in both oral and written communications Present with a Purpose; Collaborate Effectively; Deliver Quality Work with Agility 2.2 Feedback from team members and mentors on ability to ask relevant questions Solving Problems with Critical and Creative Thinking	☒O ☒Q&A ☐P ☒RA ☐S ☐PD ☒A ☒MT ☒EW ☐RPL	Professional Skills
3.0 Understand and model good feedback behaviors	3.1 Examples of giving and receiving feedback Interpersonal Skills 3.2 Feedback from team members and mentors	☒O ☒Q&A ☐P ☒RA ☐S ☐PD	Professional Skills

			☒A ☒MT ☒EW ☐RPL	
4.0 Demonstrate a willingness to learn from mentors	4.1	Feedback from mentors during progress reviews and "learning moments"	☒O ☒Q&A ☐P ☒RA ☐S ☐PD ☒A ☒MT ☒EW ☐RPL	
5.0 Demonstrate the importance of using a standard approach to implementing change, adopting a risk mitigation approach	5.1 5.2 5.3 5.4	Evidence of following formal/informal change management procedures Evidence of assessing risk when implementing changes and having risk effective mitigation plans for assigned projects. Evidence of developing a back-out plan for assigned projects. Evidence of a test plan when implementing new software/hardware changes	☒O ☒Q&A ☐P ☒RA ☐S ☒PD ☒A ☒MT ☒EW ☒RPL	
6.0 Demonstrate an ability to follow process and procedures with accurate and complete documentation	6.1 6.2 6.3	Evidence of knowledge of processes and procedures and know where to locate documented procedures as required. Create documentation related to implementation of processes and procedures for new or existing implementations. Evidence of documentation of technical procedures for internal users or clients	☒O ☒Q&A ☐P ☒RA ☐S ☒PD ☒A ☒MT ☒EW ☒RPL	

Knowledge Performance Criteria

Competency Outcomes	Assessment Criteria	Evidence Type	Education Module Reference
7.0 Demonstrate basic understanding of structured programming design and its relationship to data structures	7.1 Demonstrate an understanding of pseudocode. 7.2 Demonstrate an understanding of variables, operators, constants and data types. 7.3 Demonstrate an understanding of functions, parameters and recursion. 7.4 Demonstrate an understanding of arrays. 7.5 Demonstrate an understanding of APIs.	☒O ☒Q&A ☐P ☒RA ☐S ☐PD ☒A ☒MT ☒EW ☐RPL	AP Computer Science Principles
8.0 Demonstrate basic understanding of Mainframe terminology and basic concepts	8.1 Describe and compare various System z components: 8.1.1 Frame layout and cage usage 8.1.2 Server models, books, memory, and cache structure 8.1.3 Performance and millions of service units (MSUs) (note: Covered in glossary)	☒O ☒Q&A ☐P ☒RA ☐S ☒PD ☒A ☒MT ☒EW ☐RPL	IBM z/OS Mainframe Practitioner
9.0 Demonstrate basic understanding of mainframe hardware components and the structured nature of the Mainframe I/O architecture	9.1 Describe what IBM Z physical components are used when processing instructions and performing an I/O operation (Also covered in Mainframe Architecture and Mainframe Features). 9.2 Describe the CoD provisioning architecture and which servers can use it 9.3 Describe how logical partitioning is used, resource assignments 9.4 Describe mainframe channels, usage, and CHPID assignments	☒O ☒Q&A ☐P ☒RA ☐S ☐PD ☒A ☒MT ☒EW ☐RPL	IBM z/OS Mainframe Practitioner z/OS Introduction - An IBM Redbooks video course

	9.5 Describe the purpose and use of HCD 9.6 Identify mainframe operating systems and their supported mainframe servers 9.7 Describe the various queues that are used to dispatch work (Also Mainframe Features) 9.8 Describe the difference between a base and Parallel Sysplex (Covered in JES & JCL Part 1 and next several sections. Introduced in Why Use Mainframe) 9.9 List Parallel Sysplex main characteristics 9.10 Describe the purpose and use of the coupling facility 9.11 Identify processor architectural modes and their supported addressing implementations: 9.11.1 Address spaces 9.11.2 Virtual addressing 9.11.3 Storage usage • Introduced in Mainframe Architecture and explained further in z/OS System Libraries. Also covered in Application Infrastructure and **z**/OS Components. 9.12 Use system commands to display active address spaces and identify their current status 9.13 Describe the high level interaction between z/OS, CSS, and I/O devices during I/O processing 9.14 Describe the role of the HMC and SE for System z servers 9.15 Identify and change the HMC user interface style 9.16 Identify CPC and image objects usage on the HMC (Also in Activation Profiles) 9.17 Locate the documentation that List program management services that z/OS provides 9.18 Locate the documentation that List main elements and optional features of the z/OS system 9.19 Explain system libraries, their use, and methods for managing their content 9.20 Describe the responsibilities of JES (Covered in JES & JCL Part 1 and next several sections).		

	9.21 9.22 9.23 9.24 9.25 9.26 9.27 9.28 9.29 9.30 9.31 9.32 9.33 9.34	Describe the use of traditional DB/DC applications like CICS, IMS, and DB2 on z/OS (And Part 2, plus proceeding sections) Describe the purpose of the Language Environment (Specifically covered in Language Environment) Describe the support provided for object-oriented application development on z/OS (Briefly covered in JES & JCL Part 1 but this is mostly pre-req knowledge covered in section 7). Explain the differences between authorization and authentication (Covered in z/OS Security and Transaction Level Security) Describe the Lightweight Directory Access Protocol (LDAP) – Covered in QUIZ in reference to glossary. Describe the purpose and benefit of z/OS Management Facility List SDSF commands used to display jobs, active users, and tasks (Exercise 2) Demonstrate knowledge of how to filter SDSF output based on DEST, PREFIX, OWNER and SYSNAME (Exercise 1 and 2) Describe the main features of UNIX System Services (USS) in z/OS Describe briefly the UNIX shell and utilities Describe the hierarchical file system Describe the application services provided in USS Describe how to start and manage a process in USS JCL Lecture TSO / ISPF / SDSF Lecture		IBM z/OS V2R2 CS TCP/IP Implementation Volume 2: Standard Applications
10.0 Demonstrate basic understanding of access method concepts in MVS and the structure and design of VSAM files	10.1 10.2	Discuss VSAM data set creation through JCL Describe the following data sets and how they are used and accessed (random or sequential): 10.2.1 KSDS 10.2.2 ESDS 10.2.3 RRDS	☒O ☒Q&A ☐P ☒RA ☐S ☒PD ☒A	

	10.2.4 LDS Covered in VSAM. Note we do not use the term LDS, but rather Linear Data Set.	☒MT ☒EW ☐RPL	
11.0 Demonstrate basic understanding of the associated software and system components that comprise a z/OS System, their purpose and how they interact	11.1 Demonstrate example of how z/OS provides support for On Demand Business 11.2 Describe how security is ensured in a z/OS environment (Covered in z/OS Security and proceeding sections). 11.3 Characterize the major products and facilities that support z/OS systems 11.4 Describe z/OS connectivity, communication facilities, and interfaces (Mainframe Architecture, Mainframe Features, Why Use Mainframe) 11.5 Describe the concept, strategy, and benefits of the z/OS environment (Mainframe Architecture, Mainframe Features, Why Use Mainframe) 11.6 Describe security support provided by z/OS (And proceeding sections) 11.7 Describe the different types of Systems Management support (SMP/E, SMF, and RMF) 11.8 Describe the scalability, availability, backup, and recovery features in z/OS (Mainframe Features, Sysplex) 11.9 Describe System Services support (storage management, job management, work management, data sets, and data set management) (z/OS Components, Working with Datasets)	☒O ☒Q&A ☐P ☒RA ☐S ☐PD ☒A ☒MT ☒EW ☐RPL	IBM z/OS Mainframe Practitioner
12.0 Demonstrate basic understanding and application of the concepts and facilities of TSO and IBM's Interactive System Productivity (ISPF), including familiarization with the Editors	12.1 Log on to TSO and navigate through ISPF/PDF dialogs and use the basic ISPF/PDF functions and the ISPF Editor 12.2 Use ISPF/PDF to allocate data sets and edit data sets (including hierarchical file system replace with ZFS as previously stated bfiles) using the ISPF Editor primary and line commands 12.3 Use ISPF to create and manipulate (copy, rename, delete, list, sort, and merge) data sets 12.4 List attributes of TSO/E	☒O ☒Q&A ☐P ☒RA ☒S ☐PD ☒A ☒MT ☒EW ☐RPL	IBM z/OS Mainframe Practitioner

	12.5 Name the three data set types 12.6 Describe the attributes of data set names 12.7 Use line and prefix commands while editing data set 12.8 Describe and use TSO/E commands 12.9 Invoke a REXX exec and TSO CLIST 12.10 Invoke UNIX processes 12.11 Manipulate HFS directories and file systems using the UNIX SystemServices ISHELL Note: Covered in Introduction to System Programming on IBM Z between viewed content, labs, and attachments.		
13.0 Demonstrate basic understanding of the structure of ICF catalogs and the related VTOC and index VTOC	13.1 Describe the classical z/OS data management 13.1.1 DASD init: VTOC, VTOC index 13.1.2 ICF catalog creation: BCS, VVDS 13.1.3 MCAT/UCAT 13.1.4 IDCAMS utility 13.1.5 DFSMS: DFSMSdss, DFSMShsm 13.1.6 Data, storage, and management classes 13.1.7 Define a zFS file system Detailed in DFSMS Using Data Sets reference.	☒O ☒Q&A ☐P ☒RA ☐S ☐PD ☒A ☒MT ☒EW ☐RPL	IBM z/OS Mainframe Practitioner
14.0 Demonstrate basic understanding of the hierarchical and relational DBMS	14.1 Explain how databases are used in a typical online business. 14.2 Describe two models for network connectivity for large systems 14.3 Explain the role of DB2 in online transaction processing 14.4 List common DB2 data structures 14.5 Describe how SQL works on z/OS 14.6 Give an overview of application programming with DB2 14.7 Explain what the IMS components are 14.8 Describe the structure of the IMS DB subsystem	☒O ☒Q&A ☐P ☒RA ☐S ☒PD ☒A ☒MT ☒EW ☐RPL	Db2 - Db2 Fundamentals V12 IMS Fundamentals
15.0 Demonstrate basic understanding of the concepts, functions and facilities of CICS	15.1 Describe the role of large systems in a typical online business 15.2 List the attributes common to most transaction systems 15.3 Explain the role of CICS in online transaction processing 15.4 Describe CICS programs, CICS transactions, and CICS tasks	☒O ☒Q&A ☐P ☒RA ☐S	IBM CICS Video Course Series Controlling CICS

	15.5 Discuss the CICS IMS components	☐PD ☒A ☒MT ☒EW ☐RPL	Transaction Server Operations 5.6
16.0 Demonstrate basic understanding of how security is implemented on the mainframe	16.1 List and describe the basic features and concepts of zSeries architecture and of the z/OS operating system as they relate to security administration 16.2 Identify the security requirements of a system 16.3 Describe the components of network security 16.4 Describe how security is handled in USS 16.5 Use the basic facilities and features of the implemented security product 16.6 Use the security product to define users and protect resources Covered in z/OS Security and proceeding sections.	☒O ☒Q&A ☒P ☒RA ☐S ☒PD ☒A ☒MT ☒EW ☐RPL	IBM z/OS Mainframe Practitioner
17.0 Knowledge: Have a basic understanding of file transfer tools, concepts and configurations	17.1 Connect to a remote host to get/put files 17.2 Describe Managed File Transfer including auditability, security, recoverability and platform connectivity.	☒O ☒Q&A ☐P ☒RA ☐S ☒PD ☒A ☒MT ☒EW ☐RPL	IBM z/OS Mainframe Practitioner
18.0 Have a basic understanding of how to use and exploit the additional utilities/ facilities/ program products widely utilized within an enterprise mainframe environment	18.1 Describe the system initialization process of the z/OS operating systems 18.2 State the differences between an address space, data space, and hyperspace 18.3 Describe the basic process of translating a virtual address to a real address (IPL and Mainframe Architecture) 18.4 Explain the difference between paging and swapping (Note, swapping is described but the term swapping is not used. This is generally an Intel/PC term.)	☒O ☒Q&A ☐P ☒RA ☐S ☐PD ☒A ☒MT ☒EW ☐RPL	IBM z/OS Mainframe Practitioner z/OS Introduction - An IBM Redbooks video course

	18.5 18.6 18.7 18.8 18.9 18.10 18.11 18.12 18.13 18.14 18.15	Describe how a z/OS task is created. (z/OS Components and JES & JCL 1) Describe dispatching, interrupt processing, supervisor calls, cross memory services, and serialization Describe the purpose of the Job Entry Subsystem (JES) Illustrate the flow of a job through the z/OS environment Describe the allocation process for data sets in the z/OS environments Illustrate how an I/O request is processed in a z/OS environment Describe how workload management is accomplished in a z/OS environment (Covered in Introduction to System Programming, z/OS Components, Mainframe Features, Sysplex) Explain the z/OS recovery processes and list available Problem Determination Tools Describe z/OS storage management concepts (z/OS Components) Describe the UNIX System Services functions provided in the z/OS environments Explain the network topologies and protocol support provided in z/OS		
19.0 Demonstrate basic understanding of what can go wrong in a mainframe environment	19.1	Select the appropriate IBM publication to provide further technical information (SRLs, Technical Bulletins, Self-study and other z/OS courses)	☒O ☒Q&A ☐P ☒RA ☐S ☒PD ☒A ☒MT ☒EW ☐RPL	IBM z/OS Mainframe Practitioner

Skills Performance Criteria

Competency Outcomes	Assessment Criteria	Evidence Type	Education Module Reference
20.0 Demonstrate basic understanding and ability of how to code or update job control statements with sound syntax to execute mainframe programs and access datasets following local practices and standards	20.1 Use JOB, EXEC, DD and COMMENT statements in a multistep job 20.2 Explain JCL errors, return codes, and ABENDs 20.3 Use the functions of system and data set utility programs 20.4 Use the COND parameter and conditional execution of job steps 20.5 Use various record formats supported by z/OS 20.6 Use blocked and unblocked data sets 20.7 Discuss system-determined block size 20.8 Awareness of SMS-managed data sets Differentiate between PDS and PDSE data sets 20.9 Describe a procedure 20.10 Differentiate between a cataloged procedure and in-stream procedure 20.11 Describe procedure modifications through overriding, adding, or nullifying parameters 20.12 Compare the PROC and EXEC statements for supplying symbolic parameters 20.13 Code or identify and describe basic JCL statements using proper syntax and coding rules, including JCL for: 20.13.1 Creating new data sets 20.13.2 Referencing existing data sets 20.13.3 Condition code testing 20.13.4 IF/THEN/ELSE/ENDIF constructs 20.13.5 Generation data groups 20.13.6 Output routing 20.13.7 Invoking a program and passing PARM parameters 20.13.8 Using the DISP parameter	☒O ☒Q&A ☐P ☒RA ☐S ☒PD ☒A ☒MT ☒EW ☐RPL	IBM z/OS Mainframe Practitioner Introduction to z/OS JCL

	20.14 Identify Storage Management Subsystem requirements and: code or identify and describe in an existing job: 20.14.1 instream and cataloged procedures 20.14.2 symbolic parameters in procedures 20.14.3 procedure overrides and additions super 20.14.4 selected utility programs 20.14.5 tape processing facilities 20.15 Code or identify the sort and merge control statements and associated JCL statements 20.16 Tailor existing JCL and submit batch jobs 20.17 Use symbolic parameters to modify procedures • The entirety of this section, including hands-on labs, are covered in the Systems Programming on IBM Z course.		
21.0 Demonstrate basic understanding of and ability on how - to create and use programs written in the REXX language	21.1 Write and execute a program using the REXX language using various data parsing techniques and built-in REXX functions 21.2 Create user-defined internal and external functions and subroutines 21.3 Issue host commands from within REXX execs 21.4 Code programs that read and write data sets 21.5 Use instructions and commands that manipulate the data stack 21.6 Explain how a CLIST differs from a REXX exec	☒O ☒Q&A ☐P ☒RA ☐S ☒PD ☒A ☒MT ☒EW ☐RPL	z/OS REXX Programming
22.0 Demonstrate basic understanding to know when to exploit IBM utility programs such as IEBGENER, IDCAMS etc.	22.1 Demonstrate an understanding of the utility control statements appropriate for: 22.1.1 IEBGENER 22.1.2 IEBPTPCH 22.1.3 IEHLIST 22.1.4 IDCAMS • System Programming on IBM Z, Exercise 4, and Utilities section.	☒O ☒Q&A ☐P ☒RA ☐S ☒PD ☒A ☒MT ☒EW ☐RPL	IBM z/OS Mainframe Practitioner

23.0 Demonstrate basic knowledge of HCD	23.1 Identify and discuss the HCD definition process sequence 23.2 Demonstrate how the HCD dialogs are used to define a configuration 23.3 Demonstrate knowledge in how to connect peripheral devices 23.4 Assist with the connection of peripheral devices when possible	☒O ☒Q&A ☐P ☒RA ☐S ☒PD ☒A ☒MT ☒EW ☐RPL	Course: z/OS System Services Structure (ibm.com)
24.0 Demonstrate basic understanding of the use of SMP/E to manage the deployment and lifecycle of mainframe software products	24.1 Use the SMP/E dialogs to install a product and its related service 24.2 Manage exception SYSMOD data 24.3 Use primary and secondary data sets as required by SMP/E 24.4 Analyze output from SMP/E processing and resolve commonly encountered problems 24.5 Use the REPORT command to determine software dependencies between zones 24.6 Use the BUILDMCS process to create a function SYSMOD from an installed product and its service 24.7 Use SMP/E functions to install software service automatically over the internet 24.8 Implement support for communication server FTP client 24.9 Use the RECEIVE ORDER command to order and install z/OS maintenance automatically over the Internet	☒O ☒Q&A ☐P ☒RA ☐S ☒PD ☒A ☒MT ☒EW ☐RPL	Badges: SMP/E for z/OS Workshop - IBM Training - Global
25.0 Demonstrate basic understanding of how to Perform and upgrade a major product in a production	Demonstrate basic knowledge of: 25.1 Implementation plans 25.2 Risk assessments 25.3 Back out plans 25.4 Test plans 25.5 Change management processes to execute the implementation plan	☐O ☒Q&A ☐P ☐RA ☐S ☒PD ☐A ☒MT ☒EW ☐RPL	Badges: SMP/E for z/OS Workshop - IBM Training - Global

Outline of Related Instruction

Foundational Instruction

Training	Type	Formal Training Hours
Onboarding and Softskill/Business Software Training • Agile Explorer • Professional Skills	Online & Instructor Led	50
AP Computer Science Principles • Algorithms • Data structures • Software Engineering • Writing Computer Programs	Online	10
IBM Z Xplore	Online	32
IBM z/OS Mainframe Practitioner: (3 courses) • Introduction to IBM z/OS • Introduction to z/OS Commands and Panels on IBM Z • Introduction to Systems Programming on IBM Z	Online	50
z/OS REXX Programming • Writing functions and subroutines • Debugging and error handling • Executing host commands • Compound variables and the data stack • Reading and writing data sets in REXX • The parse instruction • REXX: REXX compiler, REXX in batch, MVS console commands	Online	8
Db2 - Db2 Fundamentals V12 IMS Fundamentals IBM CICS Video Course Series CICS TS - Controlling CICS Transaction Server Operations 5.6 CICS TS - Concepts and Operation Assessment 5.6 z/OS Introduction - An IBM Redbooks video course Introduction to z/OS JCL	Online	54

IBM z/OS V2R2 Communications Server TCP/IP Implementation: Volume 2 Standard Applications (Chapter 3)	Self-Study Reading	7

System Administrator Instruction

Training		Formal Training Hours
• Course: z/OS System Services Structure (ibm.com) • Operating environment initialization • Task management • Addressability • Input/Output supervisor • Storage management • Recovery termination manager	Online	40
• Course: SMP/E for z/OS Workshop (ibm.com) • SMP/E as a tool for system maintenance • SYSMOD, REPORT, BUILDMCS, RECEIVE, ORDER • Install products and services • Primary and secondary data sets • SMP/E problem resolution	Online	40
IBM z/OS Communications Server TCP/IP Implementation http://www.redbooks.ibm.com/redbooks/pdfs/sg248361.pdf	Online	7
JCL -Lecture	Instructor Led	3
TSO / ISPF / SDSF - Lecture	Instructor Led	6
Total		**300**