



Model Curriculum

QP Name: Cloud Application Developer

QP Code: SSC/ Q8303

QP Version: 2.0

NSQF Level: 6

Model Curriculum Version: 1.0

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Training Parameters

Sector	IT-ITeS
Sub-Sector	Future Skills
Occupation	Cloud Computing
Country	India
NSQF Level	6
Aligned to NCO/ISCO/ISIC Code	NCO-2015/2512.0204
Minimum Educational Qualification and Experience	Graduate (Engineering/Technology/Statistics/Mathematics /Computer Science/Physical Sciences) with 6 months of relevant full-time work experience in Cloud Computing. The full-time experience would include work, internship and apprenticeship undertaken post completion of regular graduation.
Pre-Requisite License or Training	NA
Minimum Job Entry Age	21 years
Last Reviewed On	May 19, 2021
Next Review Date	May 19, 2026
NSQC Approval Date	TBD
QP Version	2.0
Model Curriculum Creation Date	April 08, 2021
Model Curriculum Valid Up to Date	April 08, 2026
Model Curriculum Version	1.0
Minimum Duration of the Course	388 hours
Maximum Duration of the Course	388 hours

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

Compulsory:

- Describe cloud computing and its basic concepts.
- Use development tools, frameworks, platforms, libraries and for programming on the cloud.
- Define the scope an application by evaluating sample functional and non-functional requirements and determining the operating environment of the application.
- Design scalable, resilient, and fault-tolerant application architecture by applying concepts of cloud-native and cloud-first applications, Identify and Access Management (IAM) and Service-Oriented Architecture (SOA).
- Design secure and highly available cloud applications.
- Migrate application to cloud by re-engineering, re-factoring, or re-architecting sample applications.
- Package software and securely deploy them on the cloud by creating appropriate deployment strategy.
- Monitor and manage application performance using appropriate Application Performance Management (APM) tools.
- Apply the principles of persuasive communication for negotiations and discussions.
- Apply different approaches to build rapport and collaborate with stakeholders.
- Apply different approaches to maintain work ethic and demonstrate professional conduct.
- Identify best practices to maintain an inclusive, and environmentally sustainable workplace.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
<i>Module 1 (Bridge Module): Basics of cloud computing and regulatory standards</i>	10:00	04:00	00:00	00:00	14:00
<i>Module 2 (Bridge Module): Development Tools and Usage</i>	04:00	08:00	00:00	00:00	12:00
SSC/N8318 – Develop functional and non-functional requirements for the defined scope of the application NOS Version No. 2 NSQF Level 6	14:00	24:00	00:00	00:00	38:00

Module 3: Application Requirements	14:00	24:00	00:00	00:00	38:00
SSC/N8319 – Design the application architecture to ensure scalable, resilient, and fault-tolerant cloud applications NOS Version No. 2 NSQF Level 6	20:00	40:00	00:00	00:00	60:00
Module 4: Application Architecture	20:00	40:00	00:00	00:00	60:00
SSC/N8320 Develop and maintain secure, resilient, and highly available application NOS Version No. 2 NSQF Level 6	20:00	40:00	00:00	00:00	60:00
Module 5: Application Development	20:00	40:00	00:00	00:00	60:00
SSC/N8321 – Migrate applications to utilize the full potential of the cloud platform NOS Version No. 2 NSQF Level 6	20:00	40:00	00:00	00:00	60:00
Module 6: Application Migration	20:00	40:00	00:00	00:00	60:00
SSC/N8322 – Package software for secure and successful deployment on the cloud NOS Version No. 2 NSQF Level 6	14:00	34:00	00:00	00:00	48:00
Module 7: Software Packaging and Deployment	14:00	34:00	00:00	00:00	48:00
SSC/N8323 – Monitor and manage cloud applications and the deployed systems NOS Version No. 2 NSQF Level 6	14:00	34:00	00:00	00:00	48:00
Module 8: Application Performance Monitoring	14:00	34:00	00:00	00:00	48:00
SSC/N9010 – Convince others to take appropriate action in different situations NOS Version No. 2 NSQF Level 6	04:00	08:00	00:00	00:00	12:00
Module 9: Persuasive Communication	04:00	08:00	00:00	00:00	12:00
SSC/N9012 Manage and collaborate with stakeholders for project success NOS Version No. 2 NSQF Level 6	04:00	08:00	00:00	00:00	12:00
Module 10: Stakeholder Management	04:00	08:00	00:00	00:00	12:00

SSC/N9013 – Inculcate strong work ethic in line with organizational code of conduct NOS Version No. 2 NSQF Level 5	04:00	08:00	00:00	00:00	12:00
Module 11: Work Ethic and Code of Conduct	04:00	08:00	00:00	00:00	12:00
SSC/N9014 Maintain an inclusive, environmentally sustainable workplace NOS Version No. 1 NSQF Level 5	04:00	08:00	00:00	00:00	12:00
Module 12: Inclusive and environmentally sustainable workplaces	04:00	08:00	00:00	00:00	12:00
Total Duration	132:00	256:00	00:00	00:00	388:00

Module Details

Module 1: Basics of cloud computing and regulatory standards

Bridge Module

Terminal Outcomes:

- Explain cloud computing and its basic concepts.
- Describe the use cases of cloud computing.
- Describe the regulations, standards and compliance mechanisms associated with cloud computing

Duration: 10:00	Duration: 04:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the term “cloud computing” and provide an overview of its essential characteristics. • Discuss the evolution of cloud computing and the significance of cloud computing in the IT landscape. • Examine the key business drivers for the adoption of cloud technologies. • List the use cases and applications of cloud technologies across various industry verticals. • Explain the types of cloud deployment models (such as private cloud, public cloud, hybrid cloud, multi-cloud, etc.). • Explain the types of cloud service models (such as SaaS, PaaS, IaaS, etc.). • Explain basic concepts of cloud computing such as virtualization, scalability, data separation, cloud security controls, etc. • Outline popular cloud computing tools/platforms. • Study the regulations, standards, and laws governing cloud computing environment in an organization. • Outline the general principles and basic concepts of data management standards across the globe. • Evaluate various compliance mechanisms associated with cloud computing. 	<ul style="list-style-type: none"> • Create a cloud account to work hands-on with various cloud services. • Demonstrate the differences among various cloud deployment models as well as cloud service models using appropriate platforms.
Classroom Aids:	
<ul style="list-style-type: none"> • Whiteboard and Markers 	

- LCD Projector and Laptop for presentations

Tools, Equipment and Other Requirements

Labs equipped with the following:

- PCs/Laptops
- Chart paper and sketch pens
- Internet with Wi-Fi (Min 2 Mbps dedicated)

Tools and Programming Languages:

- Cloud computing platforms such as Microsoft Azure, Amazon (AWS, Virtual private cloud, etc.), Rackspace, IBM (Public cloud, Bluemix, Relay, etc.)

Module 2: Development Tools and Usage

Bridge Module

Terminal Outcomes:

- Outline all the important tools and platforms required to perform programming in cloud environment.
- Use development tools, frameworks, platforms, libraries, and packages for programming on the cloud.

Duration: 04:00	Duration: 08:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Evaluate the programming concepts applicable to cloud computing. • Discuss popular tools/platforms used for programming in cloud environment. • Describe the procedure to assess software development needs and changes. • Discuss coding principles and best practices. 	<ul style="list-style-type: none"> • Use appropriate tools for building, debugging, testing, tuning, and maintaining programs. • Use scripting languages to automate tasks and write simple programs in cloud environment. • Use various cloud computing platforms and services. • Configure operating system components.
Classroom Aids:	
<ul style="list-style-type: none"> • Whiteboard and Markers • LCD Projector and Laptop for presentations 	
Tools, Equipment and Other Requirements	
Labs equipped with the following:	
<ul style="list-style-type: none"> • PCs/Laptops • Chart paper and sketch pens • Internet with Wi-Fi (Min 2 Mbps dedicated) 	
Tools and Programming Languages:	
<ul style="list-style-type: none"> • Cloud computing platforms such as Microsoft Azure, Amazon (AWS, Virtual private cloud, etc.), Rackspace, IBM (Public cloud, Bluemix, Relay, etc.) • Programming languages such as Java, C#, Python, etc. 	

Module 3: Application Requirements

Mapped to SSC/ N8318 (Version No. 2)

Terminal Outcomes:

- Determine ways to gather functional and non-functional requirements.
- Explain various requirements and ways to manage applications while ensuring security of the system.
- Describe the best practices in determining and validating the functional and non-functional requirements of cloud applications.

Duration: 14:00	Duration: 24:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Define the functional and non-functional requirements of an application and how to define the scope of an application. • Discuss how to identify interfacing systems and sub-systems and the corresponding application boundaries. • Discuss best practices for documenting business processes and major functionalities of an application. • Explain how to decide on an application’s intended operating environment. • Discuss what are visual properties of an application. • Describe the term “Service Level Agreement” (SLA) and discuss the mechanisms to improve it. • Explain how to capture and represent visual properties of an application. • Discuss the concepts of Database Management Systems (DBMS). • Describe SQL and NoSQL databases. • Explain how to determine the capacity and scalability requirement for any application. • Discuss the basics of application security. • Explain the concepts of Identity and Access Management (IAM). • Outline the importance of various stakeholders in determining the requirements of cloud applications. 	<ul style="list-style-type: none"> • Create user stories as a reference to understand interaction between an application and its users. • Demonstrate the integration of DBMS and various systems deployed on cloud. • Demonstrate methods to scale up or scale down any application using auto-scaling tools. • Demonstrate how to manage access to different systems and sub-systems to ensure security of the application. • Demonstrate how to implement approaches and methods to identify any maintainability, portability, and security of an application. • Demonstrate how to implement cloud features to manage security and regulatory standards. • Prepare and update the documents relating to application features and specifications.
Classroom Aids:	
<ul style="list-style-type: none"> • Whiteboard and Markers • LCD Projector and Laptop for presentations 	

Tools, Equipment and Other Requirements

Labs equipped with the following:

- PCs/Laptops
- Chart paper and sketch pens
- Internet with Wi-Fi (Min 2 Mbps dedicated)

Tools and Programming Languages:

- Cloud Database Services such as Microsoft Azure SQL Database, MongoDB Atlas, Amazon Relational Database Service, Google BigQuery etc.
- Continuous Integration/Continuous Delivery tools such as Jenkins, CircleCI, GitLab etc.
- Configuration Management Tools such as Puppet, Chef, Ansible, CFEngine, JUJU, Bamboo etc
- Database Management System like Cassandra, MongoDB, Oracle PL/SQL, NoSQL, Amazon DynamoDB, Apache Hive, MySQL, Oracle JDBC etc.
- Workflow management tools like Evernote, Jira, VersionOne, Workzone, Scrum Mate, Trello, SmartTask etc.
- Documentation tools such as MS Word and MS PowerPoint

Module 4: Application Architecture

Mapped to SSC/N8319 (Version No. 2)

Terminal Outcomes:

- Perform impact analysis and define architectural requirements for the cloud application.
- Define and design cloud application architecture.
- Identify ways to secure applications on cloud platform.

Duration: 20:00	Duration: 40:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain what impact analysis is and why is it required. • Explain what an impact analysis document is and how to create one. • Explain the concepts of cloud-native and cloud-first application and their advantages. • Describe micro-services in the context of application development. • Describe the following terms: <ul style="list-style-type: none"> – Service-Oriented Architecture (SOA) – serverless development – infrastructure requirements of an application • Explain how to decide on any application’s intended operating environment. • Explain the term “containers” and describe their uses in cloud computing. • Outline popular load balancing and auto-scaling tools available to fulfil the scalability requirements of an application. • Explain how to identify potential security risks to applications deployed on cloud. • List the types of security tests that can be undertaken to identify security threats. • Outline popular security tools available to assess the security of any application. • Explain how to create a disaster recovery plan for IT systems, applications, and data. • Discuss the best practices related to cloud application architecture, and system backup and recovery. • Outline the importance of various stakeholders in designing and securing cloud application architecture. 	<ul style="list-style-type: none"> • Create cloud-native and cloud-first application architectures. • Demonstrate how to configure the operating environment for hosting cloud-native applications. • Demonstrate how to implement application infrastructure configurations required for hosting applications on cloud. • Demonstrate how to implement security controls and sanity checks in cloud systems to detect threats and security breach. • Create a disaster recovery environment and perform sample backup of systems deployed on cloud using appropriate tools.
Classroom Aids:	
<ul style="list-style-type: none"> • Whiteboard and Markers 	

- LCD Projector and Laptop for presentations

Tools, Equipment and Other Requirements

Labs equipped with the following:

- PCs/Laptops
- Chart paper and sketch pens
- Internet with Wi-Fi (Min 2 Mbps dedicated)

Tools and Programming Languages:

- Integrated Development Environment like Apple Xcode, Android Studio, Eclipse, Microsoft Visual Code, Netbeans etc.
- Continuous Integration/Continuous Delivery tools like Jenkins, CircleCI, GitLab etc.
- Configuration Management Tools like Puppet, Chef, Ansible, CFEngine, JUJU, Bamboo.
- Documentation tools such as MS Word and MS PowerPoint.

Module 5: Application Development

Mapped to SSC/N8320 (Version No. 2)

Terminal Outcomes:

- Develop cloud applications using suitable micro-service architecture and APIs.
- Explain the methods to implement secure platform for the development of applications.
- Identify ways to query specific data using scripting language.

Duration: 20:00	Duration: 40:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the types of application dependencies (such as Databases, Caching, Messaging Queues, Web services, HTTP APIs etc.) • Explain the importance of mapping of application dependencies. • Explain how to map application dependencies. • Explain the procedure to create and manage databases using suitable DBMS. • Explain how to integrate DBMS with different systems deployed on cloud. • List popular caching solutions available for cloud application. • Explain what message queues are and why are they used. • Explain what HTTP APIs, REST APIs and web-services are and how to create them. • Discuss the ways to scale applications horizontally using auto-scaling and load balancing solutions. • Explain how to leverage loosely coupled micro-services-based architecture. • Discuss how to secure applications deployed on cloud. • Explain how to manage security configurations of applications. • Discuss how to encrypt data in transit and data at rest. • List popular encryptions used to encrypt data. • Discuss the concepts of IAM. • Outline the importance of various stakeholders in cloud application development. • Discuss the best practices related to cloud application development. 	<ul style="list-style-type: none"> • Apply suitable tools and techniques to build resilient cloud applications. • Demonstrate how to query data from DBMS for different requirements of sample cloud applications. • Demonstrate how to create micro-services for sample cloud applications. • Build secure APIs and services for sample cloud applications. • Demonstrate how to implement security configurations and controls to ensure regulatory compliance. • Demonstrate authentication and access control mechanisms in sample cloud applications.
Classroom Aids:	

- Whiteboard and Markers
- LCD Projector and Laptop for presentations

Tools, Equipment and Other Requirements

Labs equipped with the following:

- PCs/Laptops
- Chart paper and sketch pens
- Internet with Wi-Fi (Min 2 Mbps dedicated)

Tools and Programming Languages:

- Integrated Development Environment like Apple Xcode, Android Studio, Eclipse, Microsoft Visual Code, Netbeans etc.
- Development Language and SDKs such as C++, Python, R, C#, Java, JavaScript, Ruby, AJAX, Nodejs, ReactJS, AngularJS, Django, Apache Maven, etc.
- Continuous Integration/Continuous Delivery tools like Jenkins, CircleCI, GitLab etc.
- Configuration Management Tools like Puppet, Chef, Ansible, CFEngine, JUJU, Bamboo
- Container Management & Orchestration such as Kubernetes, Apache Mesos, Docker Swarm, OpenShift, Amazon ECS, Azure Container Service, Diego, Fleet, Google Container Engine etc.
- Backup or Recovery Software such as AWS Backup, AWS Snow Family, AWS Cloud Endure Disaster Recovery, Azure Backup, Oracle Data Guard, Oracle Recovery Manager
- Documentation tools such as MS Word and MS PowerPoint

Module 6: Application Migration

Mapped to SSC/N8321 (Version No. 2)

Terminal Outcomes:

- Discuss the methods used to map and integrate legacy systems to sample cloud applications.
- Explain how to re-host applications, re-platform OS/middleware, re-factor/ re-engineer/re-architect applications.
- Test the migrated applications using relevant tools and techniques.

Duration: 20:00	Duration: 40:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss how to interpret and understand business requirements. • Explain what cloud migration is and the benefits of migrating applications to the cloud. • Describe various cost components that impact the migration of cloud applications. • Discuss ways to optimize various cost components of cloud migration. • Discuss the dependencies to be considered while migrating applications to cloud. • Discuss the concepts of cloud-native and cloud-first applications. • List the popular cloud-native and cloud-first frameworks available to create cloud applications. • Explain how to identify components of applications and OS/middleware that need modifications before migrating to cloud. • Examine how to re-engineer non-compatible components for the application for migration. • Examine how to re-factor source code for hosting on cloud platforms. • List popular tools for migrating data and application to cloud. • List popular tests frameworks available to check if the migrated application performs as per expectations. • Describe the tests to check successful integration of application systems and sub-systems. • Discuss the best practices and the importance of various stakeholders 	<ul style="list-style-type: none"> • Develop Standard Operating Procedures (SOPs) to analyse source code of an application to ensure compatibility with cloud platform and for migrating applications to cloud. • Demonstrate how to execute methods to map application data between sample applications and cloud platforms. • Perform migration of sample applications to cloud platforms. • Create an integration platform between cloud platforms and other sample applications/systems and sub-systems. • Perform testing on sample applications/features using tools and techniques.

associated with migration of systems/ applications to the cloud.	
Classroom Aids:	
<ul style="list-style-type: none"> • Whiteboard and Markers • LCD Projector and Laptop for presentations 	
Tools, Equipment and Other Requirements	
<p>Labs equipped with the following:</p> <ul style="list-style-type: none"> • PCs/Laptops • Chart paper and sketch pens • Internet with Wi-Fi (Min 2 Mbps dedicated) <p>Tools and Programming Languages:</p> <ul style="list-style-type: none"> • Documentation tools such as MS Word and MS PowerPoint • Integrated Development Environment like Apple Xcode, Android Studio, Eclipse, Microsoft Visual Code, Netbeans etc. • Continuous Integration/Continuous Delivery tools like Jenkins, CircleCI, GitLab etc. 	

Module 7: Software Packaging and Deployment

Mapped to SSC/N8322 (Version No. 2)

Terminal Outcomes:

- Explain how to deploy cloud applications.
- Examine how applications are packaged and deployed.
- Determine the tools and techniques to implement deployment plans.

Duration: 14:00	Duration: 34:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain how to package application source code into deployment units. • List popular tools and formats for creating deployment units from application source code. • Describe the ideal service configurations for deploying source code on cloud. • List the popular tools for managing service configurations for cloud deployment. • Examine the security configurations essential for secure deployment to the cloud. • Explain what containers are and their uses in cloud computing. • Explain how to create containers using container orchestration platforms to provision, deploy and manage containers. • Discuss common technical issues with the deployment process. • Describe the security protocols to be incorporated for application code/source code deployment. • Discuss the methods to resolve issues related to deployment. • Discuss the best practices and the importance of various stakeholders associated with application deployment on the cloud. 	<ul style="list-style-type: none"> • Demonstrate how to leverage container technologies to deploy application code. • Apply deployment strategies for cloud applications for project success. • Create an operational checklist for cloud deployments. • Demonstrate how to automate deployment processes using scripting languages. • Develop an SOP to address and manage deployment issues.
Classroom Aids:	
<ul style="list-style-type: none"> • Whiteboard and Markers • LCD Projector and Laptop for presentations 	
Tools, Equipment and Other Requirements	
Labs equipped with the following:	
<ul style="list-style-type: none"> • PCs/Laptops • Chart paper and sketch pens 	

- Internet with Wi-Fi (Min 2 Mbps dedicated)

Tools and Programming Languages:

- Program Testing Software such as Selenium, Junit, Jmeter, HP LoadRunner, YourKit Java Profiler
- Documentation tools such as MS Word and MS PowerPoint

Module 8: Application Performance Monitoring

Mapped to SSC/N8323 (Version No. 2)

Terminal Outcomes:

- Explain the ways to measure and improve application performance among the deployed systems.
- Examine methods to optimize cost and resource utilization.
- Evaluate application log reports to identify issues in application performance.

Duration: 14:00	Duration: 34:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain how application performance is related to business outcomes. • Discuss the different types of cloud deployment models. • Explain cloud resource utilization patterns. • Explain how to define KPIs (Key Performance Indicators) to measure the performance of systems deployed on cloud. • Describe the parameters for monitoring performance of cloud systems. • Examine application log reports to find clues to problems related to application performance. • Explain how to automate the performance monitoring process using scripting language • List popular Application Performance Monitoring (APM) tools. • Study sample reports and evaluate the performance of applications and deployed systems. • Discuss ways to provide actionable insights for re-engineering the application. 	<ul style="list-style-type: none"> • Demonstrate how to monitor KPIs to review performances of application and deployed systems. • Demonstrate the methods to optimize cost and resource utilization. • Demonstrate the use of log data in reducing performance issues and stabilizing the deployed systems. • Demonstrate how to automate performance monitoring using scripting languages. • Create and document application performance reports from application monitoring tools.
Classroom Aids:	
<ul style="list-style-type: none"> • Whiteboard and Markers • LCD Projector and Laptop for presentations 	
Tools, Equipment and Other Requirements	
Labs equipped with the following:	
<ul style="list-style-type: none"> • PCs/Laptops • Chart paper and sketch pens • Internet with Wi-Fi (Min 2 Mbps dedicated) 	
Tools and Programming Languages:	

- Cloud Monitoring Tools such as Cloudability, Cloudyn, Dell Boomi, Enstratus, Informatica, CloudHub, AppDynamics, Retrace etc.
- Documentation tools such as MS Word and MS PowerPoint

Module 9: Persuasive Communication

Mapped to SSC/N9010 (Version No. 2)

Terminal Outcomes:

- Evaluate the principles of persuasive communication, credibility, and trust.
- Discuss methods to persuade groups of people to build consensus.

Duration: 04:00	Duration: 08:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss the principles of persuasive communication, credibility, and trust. • Discuss the differences between persuasion and manipulation. • Discuss the importance of listening to people in order to persuade them. 	<ul style="list-style-type: none"> • Demonstrate the use of evidence to support arguments. • Frame goals by finding common ground with those to be persuaded. • Apply visual and verbal communication techniques to influence perspectives and change behaviours.
Classroom Aids:	
<ul style="list-style-type: none"> • Whiteboard and Markers • Chart paper and sketch pens • LCD Projector and Laptop for presentations 	
Tools, Equipment and Other Requirements :	
Labs equipped with the following: <ul style="list-style-type: none"> • PCs/Laptops • Internet with Wi-Fi (Min 2 Mbps Dedicated) 	

Module 10: Stakeholder Management

Mapped to SSC/N9012 (Version No. 2)

Terminal Outcomes:

- Apply different approaches to build rapport and collaborate with stakeholders.

Duration: 04:00	Duration: 08:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the principles of stakeholder relationship management. • Explain ways to collaborate with various stakeholders and manage a wide range of situations. • Explain ways to improve one-on-one communication and build rapport with various stakeholders. • Explain conflict resolution techniques. • Describe the fundamentals of negotiations such as negotiating positions, BATNA (Best Alternative to a Negotiated Agreement) and integrative and distributive negotiations. 	<ul style="list-style-type: none"> • Apply the principles of stakeholder relationship management to collaborate with various stakeholders. • Demonstrate the ways to understand stakeholder needs and manage expectations effectively. • Apply effective persuasion and negotiation techniques to deal with challenging behaviours. • Apply strategies to gain stakeholder cooperation and support for project success. • Apply conflict resolution techniques to handle difficult situations.
Classroom Aids:	
<ul style="list-style-type: none"> • Whiteboard and markers • Chart paper and sketch pens • LCD Projector and Laptop for presentations 	
Tools, Equipment and Other Requirements	
Labs equipped with the following: <ul style="list-style-type: none"> • PCs/Laptops • Internet with Wi-Fi (Min 2 Mbps Dedicated) 	

Module 11: Work Ethic and Code of Conduct

Mapped to SSC/N9013 (Version no.2)

Terminal Outcomes:

- Apply different approaches to maintain work ethic and demonstrate professional conduct

Duration: 04:00	Duration: 08:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss the importance of organizational codes of conduct. • Describe the guidelines commonly observed by organizations pertaining to dressing, hygiene, cleanliness, data, Intellectual Property, use of company resources, etc. • Explain employee rights and obligations with respect to harassment, privacy, and technology policies. • Explain the meaning of work ethics and professionalism. • Discuss the significance and impact of maintaining work ethics. • Explain how to handle unethical conduct at the workplace. • Describe whistleblowing policies relevant to the workplace. 	<ul style="list-style-type: none"> • Apply the approaches of moral decision making at the workplace. • Demonstrate the ways to maintain professional conduct and work etiquette. • Demonstrate how to handle unethical conduct at the workplace.
Classroom Aids:	
Whiteboard and Markers	
Chart paper and sketch pens	
LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
Labs equipped with the following:	
Internet with Wi-Fi (Min 2 Mbps Dedicated)	

Module 12: Inclusive and environmentally sustainable workplaces

Mapped to SSC/N9014 (Version No.1)

Terminal Outcomes:

- Illustrate sustainable practices at workplace for energy efficiency and waste management.
- Apply different approaches to maintain gender equality and increase inclusiveness for PwD.

Duration: 04:00	Duration: 08:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe different approaches for efficient energy resource utilisation and waste management. • Describe the importance of following the diversity policies. • Identify stereotypes and prejudices associated with people with disabilities and the negative consequences of prejudice and stereotypes. • Discuss the importance of promoting, sharing, and implementing gender equality and PwD sensitivity guidelines at organization level. 	<ul style="list-style-type: none"> • Practice the segregation of recyclable, non-recyclable and hazardous waste generated. • Demonstrate different methods of energy resource use optimization and conservation. • Demonstrate essential communication methods in line with gender inclusiveness and PwD sensitivity.
Classroom Aids:	
Whiteboard and Markers	
Chart paper and sketch pens	
LCD Projector and Laptop for presentations	
Tools, Equipment and Other Requirements	
Labs equipped with the following:	
PCs/Laptops	
Internet with Wi-Fi (Min 2 Mbps Dedicated)	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduate	Science/Computer Science/Electronics and Engineering /Information Technology	5 years of full-time experience in cloud application developer or related roles	The full-time experience would include work, internship and apprenticeship undertaken post completion of regular graduation	1 year of full-time experience in cloud application developer or related roles		

Trainer Certification	
Domain Certification	Platform Certification
Certified for Job Role: “Cloud Application Developer” mapped to QP: “SSC/Q8303, V2.0”. Minimum accepted score is 80%	Recommended that the trainer is certified for the Job role “Trainer” mapped to the Qualification Pack “MEP/Q2601, V1.0”. Minimum accepted score is 80% aggregate

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
Graduate	Science/Computer Science/Electronics and Engineering /Information Technology	5 years of full-time experience in cloud application developer or related roles	The full-time experience would include work, internship and apprenticeship undertaken post completion of regular graduation	1 year of full-time experience in cloud application developer or related roles		

Assessor Certification	
Domain Certification	Platform Certification
Certified for Job Role: “Cloud Application Developer” mapped to QP: “SSC/Q8303, V2.0”. Minimum accepted score is 80%	Recommended that the assessor is certified for the Job role “Assessor” mapped to the Qualification Pack “MEP/Q2701, V1.0”. Minimum accepted score is 80% aggregate

Assessment Strategy

This section includes the processes involved in identifying, gathering and interpreting information to evaluate the learner on the required competencies of the program.

Assessment System Overview

A uniform assessment of job candidates as per industry standards facilitates progress of the industry by filtering employable individuals while simultaneously providing candidates with an analysis of personal strengths and weaknesses.

Assessment Criteria

Criteria for assessment for each Qualification Pack will be created by the Sector Skill Council (SSC). Each Performance Criteria (PC) will be assigned marks proportional to its importance in NOS. SSC will also lay down the proportion of marks for Theory and Skills Practical for each PC.

The assessment for the theory part will be based on a knowledge bank of questions created by the SSC. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

Guidelines for Assessment			
Testing Environment	Tasks and Functions	Productivity	Teamwork
<ul style="list-style-type: none"> Carry out assessments under realistic work pressures that are found in the normal industry workplace (or simulated workplace). Ensure that the range of materials, equipment and tools that learners use are current and of the type routinely found in the normal industry workplace (or simulated workplace) environments. 	<ul style="list-style-type: none"> Assess that all tasks and functions are completed in a way, and to a timescale, that is acceptable in the normal industry workplace. Assign workplace (or simulated workplace) responsibilities that enable learners to meet the requirements of the NOS. 	<ul style="list-style-type: none"> Productivity levels must be checked to ensure that it reflects those that are found in the work situation being replicated. 	<ul style="list-style-type: none"> Provide situations that allow learners to interact with the range of personnel and contractors found in the normal industry workplace (or simulated workplace).

Assessment Quality Assurance framework

NASSCOM provides two assessment frameworks NAC and NAC-Tech.

NAC (NASSCOM Assessment of Competence)

NAC follows a test matrix to assess Speaking & Listening, Analytical, Quantitative, Writing, and Keyboard skills of candidates appearing for assessment.

NAC-Tech

NAC-Tech test matrix includes assessment of Communication, Reading, Analytical, Logical Reasoning, Work Management, Computer Fundamentals, Operating Systems, RDBMS, SDLC, Algorithms & Programming Fundamentals, and System Architecture skills.

Methods of Validation

To pass a QP, a trainee should score an average of 70% across generic NOS' and a minimum of 70% for each technical NOS. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Method of assessment documentation and access

The assessment agency will upload the result of assessment in the portal. The data will not be accessible for change by the assessment agency after the upload. The assessment data will be validated by SSC assessment team. After upload, only SSC can access this data.

Recommended Supplemental Readings

The learning modules covered in the Model Curriculum for Cloud Application Developer are designed to meet the expected outcomes as per the QP. While the modules aligned to NOS are focused on technical/ behavioral competencies, bridge modules cover the prerequisite/ preparatory topics that are indispensable to complete the course. However, to provide additional QP specific knowledge to the learners, the following supplemental readings on related topics are recommended. These readings will equip the learners with an understanding of advanced or ancillary concepts to take up more complex tasks as listed in the QP.

QP	Recommended Supplemental Reading
SSC/Q8303: Cloud Application Developer	<ol style="list-style-type: none">1. Omni-cloud System2. Platform-as-a-Service and Serverless platforms3. App development in Edge Computing environment

References

Glossary

Term	Description
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training .
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module . A set of terminal outcomes help to achieve the training outcome.
National Occupational Standard	National Occupational Standard specify the standard of performance an individual must achieve when carrying out a function in the workplace
Persons with Disability	Persons with Disability are those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others.

Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
SSC	Skill Sectors Councils
NASSCOM	National Association of Software & Service Companies
NCO	National Classification of Occupations
ISO	International Organization for Standardization
SLA	Service Level Agreement
IT	Information Technology
RDBMS	Relational Database Management System
SDLC	Software Development Life Cycle
CRM	Customer Relationship Management
PC	Performance Criteria
PwD	Persons with Disability
SOP	Standard Operating Procedure
DBMS	Database Management System
SOA	Service Oriented Architecture
IAM	Identity and Access Management
KPI	Key Performance Indicator