APPRENTICESHIP CURRICULUM (OPTIONAL TRADE)

IT-ITeS Sector Skill Council

AI - Database Administrator

Course Code: SSC/Q8109

☒NAPS ☐Non-NAPS

NSQF Level: 5

Table of Contents

Course Details

1.	**Course Name**	AI - Database Administrator
2.	**Course Code**	SSC/Q8109
3.	**Apprenticeship Training Duration:** *(2 to 4 weeks of BT is embedded in this duration as per the requirement of the establishment)*	**Months:6**
	Remarks	
4.	**Credit**	**TBD**
5.	**NSQF Level** (*Mandatory for NAPS*)	**5** **NSQC Approval Date: 22-09-2020**
6.	**Related NSQF aligned qualification details**	
7.	**Brief Job Role Description**	Individuals at this job are responsible for performing different aspects of administration and governance. S/he will be responsible for creating and maintaining databases
8.	**NCO-2015 Code & Occupation** (*Access the NCO 2015 volumes from: https://labour.gov.in/organizationsofmole/directorate-general-employment-training-dget*)	**NCO-2015/2522.0100, Artificial Intelligence and Big Data Analytics**
9.	**Minimum Eligibility Criteria** *(Educational and/ or Technical Qualification)*	Completed 2nd year of UG (UG Diploma) (UG Program of 3 or 4 years) (Engineering/ Science) OR Completed 2nd year of diploma (after 12th) OR Previous relevant Qualification of NSQF Level 4 with 3 Years of relevant experience in relevant field

Related NSQF aligned qualification details (Row 6):

S. No.	QP/ Qualification/ NOS Name (As applicable)	QP/ NOS Code & Version	NQR Code
1.	AI - Database Administrator	SSC/Q8109	QG-05-IT-00492-2023-V1.1-NASSCOM

10	Entry Age for Apprenticeship	22
11	Any Licensing Requirements (*wherever applicable*)	
12	Is the Job Role amenable to Persons with Disability	☐ Yes ☒ No **If yes, check the applicable type of Disability**

☐ Locomotor Disability	☐ Leprosy Cured Person	☐ Cerebral Palsy	☐ Dwarfism	☐ Muscular Dystrophy
☐ Acid Attack Victims	☐ Blindness	☐ Low Vision	☐ Deaf	☐ Hard of Hearing
☐ Speech and Language Disability	☐ Intellectual Disability	☐ Specific Learning Disabilities	☐ Autism Spectrum Disorder	☐ Mental Illness
☐ Multiple Sclerosis	☐ Parkinson's Disease	☐ Haemophilia	☐ Thalassemia	☐ Sickle Cell Disease
☐ Multiple Disabilities				

Remarks:

13	Submitting Body Details	**Name:** Girish Kulkarni **E-mail ID:** girish@nasscom.in **Contact Number:** 8978844577
14	Certifying Body	IT-ITeS Sector Skills Council NASSCOM (SSC NASSCOM)
15	Employment Avenues/Opportunities	*AI - Database Administrator*
16	Career Progression	This entry should refer to one or more of the following: • Access to other qualifications at the same NSQF level – DevOps Engineer, Data Steward, Security Analyst • Access to related qualification(s) at the next NSQF level – Senior Database

		Administrator, Senior DevOps Engineer, Senior Data Steward, Senior Security Analyst • Progression from related qualification(s) or curricula at a lower NSQF level – Curriculum for Artificial Intelligence Foundation Skills						
17	**Trainer's Qualification & Experience:**	**Trainer Prerequisites**						
		Minimum Educational Qualification	**Specialization**	**Relevant Industry Experience**		**Training Experience**		**Remarks**
				Years	*Specialization*	*Years*	*Specialization*	
		Graduate in any discipline	Preferably Science/Computer Science/Electronics and Engineering /Information Technology	5	Experience/ internship in Database Administrator or related roles that involve database querying or management	2	Experience/ internship in Database Administrator or related roles that involve database querying or management	
18	**Curriculum Creation Date**	22-09-2020						
19	**Curriculum Valid up to Date**	22-09-2025						

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Module Details

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
1.	SSC/N8115 – Create new databases NOS Version No. 3 NSQF Level 5	• Identify relevant internal data sources to leverage such as data warehouses, web servers, structured / unstructured flat files, others • Explain the importance of identifying the stakeholders involved • Describe commonly known public, open source, private and paid data sources in case of external data requirements • Discuss the uses and characteristics of different data sources • Interpret the applications of relational and NoSQL databases / data sources • Use different file systems to store structured, unstructured or semi-structured data across file types • Illustrate the methods to select suitable SQL and noSQL databases based on the objective	30	70	70	70
2.	SSC/N8116 – Maintain existing databases NOS Version No. 4 NSQF Level 5	• Identify different functions and methods to query SQL/NoSQL databases • Identify the various techniques to migrate existing databases to new environments • Discuss different automation techniques and procedures • Evaluate the opportunities of automation in back-up, optimization and indexing procedures • Use the CRUD function to add, delete, modify or update data in databases • Perform pre-migration validation using database documentation and apply different approaches to migrate databases • Apply different maintenance procedures and back-up routines for databases, and automate suitable processes • Develop procedures to identify and counter issues with databases • Demonstrate the methods to assess and troubleshoot issues related to	25	75	70	70

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
		database completeness and veracity				
3.	SSC/N9014 – Maintain an inclusive, environmentally sustainable workplace NOS Version No. 1 NSQF Level 5	• Describe different approaches for resourceful energy utilisation and waste management • Describe the importance of following the diversity policies • Identify stereotypes and prejudices associated with differently abled people and its negative consequences • Discuss the importance of promoting, sharing and implementing gender equality and PwD sensitivity guidelines at organization level • 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	20	80	70	70
4.	DGT/VSQ/N0102 Employability Skill 60 Hours Version No. 1 NSQF Level 4	• Discuss the Employability Skills required for jobs in various industries • List different learning and employability related GOI and private portals and their usage • Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen • Show how to practice different environmentally sustainable practices • Discuss importance of relevant 21st century skills. • Exhibit 21st century skills like Self-Awareness, Behaviour Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.	20	50	70	70

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
		• Describe the benefits of continuous learning • Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone • Read and interpret text written in basic English • Write a short note/paragraph / letter/e -mail using basic English • Create a career development plan with well-defined short- and long-term goals • Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette. • Explain the importance of active listening for effective communication • Discuss the significance of working collaboratively with others in a team • Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD • Discuss the significance of escalating sexual harassment issues as per POSH • Outline the importance of selecting the right financial institution, product, and service • Demonstrate how to carry out offline and online financial transactions, safely and securely • Describe the role of digital technology in today's life • Demonstrate how to operate digital devices and use the associated applications and features, safely and securely • Discuss the significance of displaying responsible online behaviour while browsing, using various social media platforms, e-mails, etc., safely and securely • Create sample word documents, excel sheets and presentations using basic features • utilize virtual collaboration tools to work effectively • Explain the types of entrepreneurship and enterprises • Discuss how to identify opportunities for potential business, sources of funding and				

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
		associated financial and legal risks with its mitigation plan • Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement • Create a sample business plan, for the selected business opportunity • Describe the significance of analysing different types and needs of customers • Explain the significance of identifying customer needs and responding to them in a professional manner. • Discuss the significance of maintaining hygiene and dressing appropriately • Create a professional Curriculum Vitae (CV) • Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively • Discuss the significance of maintaining hygiene and confidence during an interview • Perform a mock interview				
5.	SSC/N8117 – Manage database access and configuration NOS Version No. 2 NSQF Level 5	• Assess the need for encrypting the database • Summarize the issues that may arise in case of a distributed denial of service (DDoS) attack • Select the right tools and mechanisms to monitor and database capacity • Select suitable metrics to measure database utilization, availability and performance • Assess various database vulnerabilities • Create encryption standards for the database • Apply different approaches to perform load / stress testing and ensure database functionality in case of a DDoS attack • Develop checks and measures to remediate database vulnerabilities • Devise a disaster recovery strategy for the database environment • Apply different approaches to recover lost or corrupted data from databases	30	70	70	70

S. No	Module/NOS Name, Code, Version	Outcomes	Assessment Marks		Passing Percentage	
			Th.	Pr.	Th.	Pr.
6.	SSC/N8118 – Manage computing cluster administration NOS Version No. 2 NSQF Level 5	• Evaluate different capacity planning considerations for clusters such as data redundancy, overhead and compression, IOPS • Evaluate the methods and tools employed in cluster creation, configuration and management • Discuss the importance of validating computing clusters with relevant stakeholders • Discuss the need for defining encryption standards for the cluster • Differentiate between the encryption requirements for data at rest and in motion • Illustrate the use of various open-source and paid-for tools in deploying clusters, and monitoring cluster performance • Recommend different measures to improve cluster efficiency • Demonstrate the methods to create access rules for the cluster • Develop checks and measures to remediate cluster vulnerabilities	27	73	70	70
	Total Marks		152	418	70	70

Glossary

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
PwD	Persons with Disability
NCO	National Classification of Occupations
ISCO	International Standard Classification of Occupations
ISIC	International Standard Industrial Classification
ISO	International Organization for Standardization
SLA	Service Level Agreement
ICT	Information and Communication Technology
IDS	Intrusion Detection System
IPS	Intrusion Prevention System
OSI	Open Systems Interconnection
SSL	Secure Sockets Layer
TLS	Transport Layer Security
TCP	Transmission Control Protocol
FTP	File Transfer Protocol
SSH	Secure Shell
SFTP	SSH File Transfer Protocol
SNMP	Simple Network Management Protocol
VPN	Virtual Private Network
RDP	Remote Desktop Protocol
HTTPS	Hypertext Transfer Protocol Secure
2FA	Two-Factor Authentication
RDBMS	Relational Database Management System
SDLC	Software Development Lifecycle

PIC DSS	Payment Card Industry Data Security Standard
ITIL	Information Technology Infrastructure Library
CRM	Customer Relationship Management
PC	Performance Criteria

Acronyms

Acronym	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
Performance Criteria	Performance Criteria indicates what specific characteristics an individual should be able to demonstrate in order to achieve the learning outcomes
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.

Annexure 1: Tools and Equipment

List of Tools and Equipment

The tools and equipment required are:

S. No.	Tool / Equipment Name	Specification
1	Software tools	
2	Internet Connection	
3	PCs/Laptops	
4	LCD Projector and Laptop for presentations	
5	Chart paper and sketch pens	
6	Whiteboard and Markers	

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. Projector
2. Computer/laptops
3. Internet connectivity
4. Whiteboard

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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. 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**
• 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.	• 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.	• Productivity levels must be checked to ensure that it reflects those that are found in the work situation being replicated.	• 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

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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% or more. 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 AI-Database Administrator 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/Q8109: AI- Database Administrator	1) Database Management Concepts 2) Database Security

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Annexure 3: Mode of Training

The following Modules/NOS may also be delivered online for which the resources are provided in the given table.

S. No.	Module Name/NOS Name (As Per Curriculum)	Name of Mapped Online Component	URL of Mapped Online Component
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA

Infra requirement:

- *NA*
- *NA*