

## QUALIFICATION FILE

### Cloud Computing Associate

- ☒ Short-Term Training (STT) ☐ Long-Term Training (LTT) ☐ Apprenticeship  
☐ Upskilling ☐ Dual/Flexi Qualification ☐ For ToT ☐ For ToA  
Level  
☐ General ☐ Multi-skill (MS) ☐ Cross Sectoral (CS) ☒ Future Skills ☐ OEM

NCrF/NSQF: 4.5

Submitted By:

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**Table of Contents**

<b>Section 1: Basic Details .....</b>	<b>3</b>
<b>Section 3: Training Related.....</b>	<b>8</b>
<b>Section 4: Assessment Related.....</b>	<b>8</b>
<b>Section 5: Evidence of the need for the Qualification .....</b>	<b>10</b>
<b>Section 6: Annexure &amp; Supporting Documents Check List .....</b>	<b>10</b>
<b>Annexure - I: Evidence of Level .....</b>	<b>11</b>
<b>Annexure - II: Tools and Equipment (Lab Set-Up) .....</b>	<b>13</b>
<b>Annexure III: Industry Validations Summary .....</b>	<b>14</b>
<b>Annexure IV: Training &amp; Employment Details .....</b>	<b>15</b>
<b>Annexure V: Blended Learning.....</b>	<b>15</b>
<b>Annexure-VI: Detailed Assessment Criteria .....</b>	<b>16</b>
<b>Annexure VII: Assessment Strategy.....</b>	<b>18</b>
<b>Annexure-VIII: Career Progression:.....</b>	<b>19</b>
<b>Annexure-IX: Occupational Map.....</b>	<b>20</b>
<b>Annexure- X: Acronym and Glossary.....</b>	<b>20</b>

## Section 1: Basic Details

1.	<b>Qualification Name</b>	Cloud Computing Associate										
2.	<b>Sector/s</b>	IT-ITeS										
3.	<b>Type of Qualification:</b> <input checked="" type="checkbox"/> New <input type="checkbox"/> Revised <input type="checkbox"/> Has Electives/Options <input type="checkbox"/> OEM	<b>NQR Code &amp; version of existing/previous qualification:</b> NA	<b>Qualification Name of existing/previous version:</b> NA									
4.	<b>a. OEM Name</b> <b>b. Qualification Name</b> (Wherever applicable)	-										
5.	<b>National Qualification Register (NQR) Code &amp;Version</b> (Will be issued after NSQC approval)	QG-4.5-IT-00355-2023-V1-NIELIT	<b>6. NCrF/NSQF Level:</b> 4.5									
7.	<b>Award (Certificate/Diploma/Advance Diploma/ Any Other</b> (Wherever applicable specify multiple entry/exits also & provide details in annexure)	Certificate										
8.	<b>Brief Description of the Qualification</b>	This course intends to build a sound Cloud Computing professional for the industry. Based on this belief the concepts of Docker and Cloud Security have been added into this module in order to enable the enrolled probationer to get abreast with the concept of containerization in which the writing of code and its deployment into production environment has been fine-tuned. Cyber security is the need of the hour and plays all the more a critical role in cloud computing environment.										
9.	<b>Eligibility Criteria for Entry for Student/Trainee/Learner/Employee</b>	<b>a. Entry Qualification &amp; Relevant Experience:</b> <table border="1"> <thead> <tr> <th>S. No.</th> <th>Academic/Skill Qualification (with Specialization - if applicable)</th> <th>Required Experience (with Specialization - if applicable)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td> <ul style="list-style-type: none"> <li>Completed 1<sup>st</sup> year of UG</li> <li>Pursuing 1st year of UG and continuous education</li> <li>Pursuing 3rd year of 3-year diploma after 10<sup>th</sup> and continuous education</li> <li>Completed 3-year diploma after 10</li> </ul> </td> <td>NA</td> </tr> <tr> <td>2.</td> <td> <ul style="list-style-type: none"> <li>Completed 2<sup>nd</sup> year of 2 year diploma after 12<sup>th</sup></li> </ul> </td> <td>NA</td> </tr> </tbody> </table>		S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)	1.	<ul style="list-style-type: none"> <li>Completed 1<sup>st</sup> year of UG</li> <li>Pursuing 1st year of UG and continuous education</li> <li>Pursuing 3rd year of 3-year diploma after 10<sup>th</sup> and continuous education</li> <li>Completed 3-year diploma after 10</li> </ul>	NA	2.	<ul style="list-style-type: none"> <li>Completed 2<sup>nd</sup> year of 2 year diploma after 12<sup>th</sup></li> </ul>	NA
S. No.	Academic/Skill Qualification (with Specialization - if applicable)	Required Experience (with Specialization - if applicable)										
1.	<ul style="list-style-type: none"> <li>Completed 1<sup>st</sup> year of UG</li> <li>Pursuing 1st year of UG and continuous education</li> <li>Pursuing 3rd year of 3-year diploma after 10<sup>th</sup> and continuous education</li> <li>Completed 3-year diploma after 10</li> </ul>	NA										
2.	<ul style="list-style-type: none"> <li>Completed 2<sup>nd</sup> year of 2 year diploma after 12<sup>th</sup></li> </ul>	NA										

		<div><div><div></div><div>● Pursuing 2<sup>nd</sup> year of 2- year diploma after 12 and continuous education</div></div></div>													
		<div><div>3.</div><div>Previous relevant Qualification of NSQF Level 4 and with minimum education as 8<sup>th</sup> Grade pass</div></div>	1.5 year relevant experience												
		b. Age: No Bar													
10.	Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))	18 Credits	<div>11. Common Cost Norm Category (I/II/III) (wherever applicable):</div> <div>Category- II (Information and Communication technology)</div>												
12.	Any Licensing requirements for Undertaking Training on This Qualification (wherever applicable)	NA													
13.	Training Duration by Modes of Training Delivery (Specify <b>Total Duration</b> as per selected training delivery modes and as per the requirement of the qualification)	<div><div><input checked="" type="checkbox"/>Offline <input type="checkbox"/>Online <input type="checkbox"/>Blended</div><table><tr><th>Training Delivery Modes</th><th>Theory (Hours)</th><th>Practical (Hours)</th><th>OJT Mandatory (Hours)</th><th>ES</th><th>Total (Hours)</th></tr><tr><td>Classroom (offline)</td><td>150</td><td>240</td><td>90</td><td>60</td><td>540</td></tr></table><div>The mode of delivery shall be based on the regional demand and can be offered in any of the above modes mentioned.</div><div>(Refer Blended Learning Annexure –V for details)</div></div>		Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	ES	Total (Hours)	Classroom (offline)	150	240	90	60	540
Training Delivery Modes	Theory (Hours)	Practical (Hours)	OJT Mandatory (Hours)	ES	Total (Hours)										
Classroom (offline)	150	240	90	60	540										
14.	Aligned to NCO/ISCO Code/s (if no code is available mention the same)	NCO-2015/2511.9900 (System Analysts)													

15.	<b>Progression path after attaining the qualification</b> (Please show Professional and Academic progression)	<b>Academic:</b>  <b>Horizontal:</b>  Level 4.5: Courses in Cloud Computing: None Vertical: Level 5: Courses in Cloud Computing: Certified Cloud Computing Engineer, Cloud Administrator Level 6: Courses in Cloud Computing: Certified Cloud Computing and Virtualization Expert, Cloud Administrator, Cloud Architect, Cloud Consultant, Level 7: Courses in Cloud Computing: Cloud Architect, Cloud Consultant, Level 8: Courses in Cloud Computing: Post Graduate Diploma in Cloud Computing, Cloud Computing  <b>Professional:</b> Cloud Computing Assistant-> Junior Cloud Computing Associate-> Senior Cloud Computing Associate
16.	<b>Other Indian languages in which the Qualification &amp; Model Curriculum are being submitted</b>	Qualification files available in English & Hindi Language.
17.	<b>Is similar Qualification(s) available on NQR-if yes, justification for this qualification</b>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <b>URLs of similar Qualifications:</b>
18.	<b>Is the Job Role Amenable to Persons with Disability</b>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No : a. Locomotor Disability i. Leprosy-Cured Person ii. Dwarfism iii. Muscular Dystrophy iv. Acid Attack Victims  b. Visual Impairment i. Low Vision
19.	<b>How Participation of Women will be Encouraged</b>	Participation of Women Candidates will be ensured as per Existing government norms. Exclusive batches for women would be run for the proposed course. funding of women batches from it for masses scheme /other schemes launched by government from time to time.
20.	<b>Are Greening/ Environment Sustainability Aspects Covered</b> (Specify the NOS/Module which covers it)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

21.	<b>Is Qualification Suitable to be Offered in Schools/Colleges</b>	Schools <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Colleges <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
22.	<b>Name and Contact Details of Submitting / Awarding Body SPOC</b> (In case of CS or MS, provide details of both Lead AB & Supporting ABs)	Name: Akash Sharan Email: akashsharan@nielit.gov.in Contact No.: 01881-257008	
23.	<b>Final Approval Date by NSQC: 29.03.2023</b>	<b>24. Validity Duration: 3 years</b>	<b>25. Next Review Date: 29.03.2026</b>

## Section 2: Module Summary

### NOS/s of Qualifications

1. Conceptualize Operating Systems (Windows and Linux)
2. Introduction to Network Management
3. Implementing Virtualization and Basics of Cloud Computing
4. Conceptualizing Advance Linux
5. Managing Cloud Architecture with OpenStack
6. Emphasizing Cloud Computing Services
7. Conceptualize Docker and Containers
8. Conceptualize Cloud Security
9. Employability Skills
10. OJT/Project\*

### Mandatory NOS/s:

**Th.-Theory** **Pr.-Practical** **OJT-On the Job** **Man.-Mandatory** **Training Rec.-Recommended Proj.-Project**

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/ Non-Core	NCrF/ NSQF Level	Credits as per NCrF	Training Duration (Hours)			Assessment Marks			
						Th.	Pr.	Total	Th.	Pr.	Total	Weightage (%) (if applicable)
1	NOS 1: Conceptualize Operating Systems (Windows and Linux)	NIE/ITS/N1210	Core	4.5	2	15	45	60	33.33	13.84	47.17	13.47
2	NOS 2: Introduction to Network Management	NIE/ITS/N1211	Core	4.5	2	35	25	60	33.33	13.84	47.17	13.47

S. No	NOS/Module Name	NOS/Module Code & Version (if applicable)	Core/ Non-Core	NCrF/ NSQF Level	Credits as per NCrF	Training Duration (Hours)			Assessment Marks			
						Th.	Pr.	Total	Th.	Pr.	Total	Weightage (%) (if applicable)
3	NOS 3: Implementing Virtualization and Basics of Cloud Computing	NIE/ITS/N121 2	Core	4.5	4	60	60	120	57.14	27.69	84.83	24.23
4	NOS 4: Conceptualize Advance Linux	NIE/ITS/N121 3	Core	4.5	1	5	25	30	16.66	6.92	23.58	6.73
5	NOS 5: Managing Cloud Architecture with Open Stack	NIE/ITS/N121 4	Core	4.5	1	5	25	30	16.66	6.92	23.58	6.73
6	NOS6: Emphasizing Cloud Computing Services	NIE/ITS/N121 5	Core	4.5	1	5	25	30	14.28	6.92	21.2	6.05
7	NOS 7: Conceptualize Docker and Containers	NIE/ITS/N121 6	Core	4.5	1	10	20	30	14.28	6.92	21.2	6.05
8	NOS 8: Conceptualize Cloud Security	NIE/ITS/N121 7	Core	4.5	1	15	15	30	14.28	6.92	21.2	6.05
<b>Sub-total</b>						<b>150</b>	<b>240</b>	<b>390</b>	<b>200</b>	<b>90</b>	<b>290</b>	<b>82.78</b>
9	Employability Skills	DGT/VSQ/N0 102	Core	4.5	2	60			30			8.57
10	OJT / Project	N/A	Core	4.5	3	90			30			8.57
<b>Duration (in Hours) /Total Marks</b>					<b>18</b>	<b>540</b>			<b>350</b>			<b>100</b>

Assessment Components	NOS Included	Duration*(in mins)	Marks
Theory 1: Cloud Computing Associate Paper-1	NOS 1, NOS 2,NOS 4,NOS 5	90	100
Theory 2: Cloud Computing Associate Paper-2	NOS 3, NOS 6 , NOS 7, NOS 8	90	100
Practical Paper-1: Cloud Computing Associate	NOS 1, NOS 2, NOS 3,NOS 4 ,NOS 5, NOS 6 , NOS 7, NOS 8	180	90
Internal Assessment	NOS 9	-	30
OJT / Project	NOS 10	-	30
<b>Grand Total</b>			<b>350</b>

\*\*Assessment strategy shall be as per NIELIT Norms prevailing at times

#### Assessment - Minimum Qualifying Percentage

**Minimum Pass Percentage – The pass percentage is 50% in each assessment component (as mentioned in the above table) with the aggregate pass percentage be 50%**

#### Section 3: Training Related

1.	<b>Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)</b>	O-Level (IT)/ BCA / B.Sc(IT/CS) / Diploma in CS/IT/ allied area with 1 year of Experience in training or higher.
2.	<b>Master Trainer's Qualification and experience in the relevant sector (in years) (as per NCVET guidelines)</b>	B-LEVEL / MCA/ B.Tech in CS/IT/EC/EE/ allied areas with an experience of 2 years in training
3.	<b>Tools and Equipment Required for Training</b>	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (If "Yes", details to be provided in Annexure)
4.	<b>In Case of Revised Qualification, Details of Any Upskilling Required for Trainer</b>	NA

#### Section 4: Assessment Related

1.	<b>Assessor's Qualification and experience in relevant sector (in years) (as per NCVET</b>	B-LEVEL / MCA/ B.Tech in CS/IT/EC/EE/ allied areas with an experience of 2 years in training
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	<i>guidelines)</i>	
2.	<b>Proctor's Qualification and experience in relevant sector (in years)</b> <i>(as per NCVET guidelines)</i>	The assessor carries out theory online assessments through the remote proctoring methodology. Theory examination would be conducted online and the paper comprise of MCQ. Conduct of assessment is through trained proctors. Once the test begins, remote proctors have full access to the candidate's video feeds and computer screens. Proctors authenticate the candidate based on registration details, pre-test image captured and I- card in possession of the candidate. Proctors can chat with candidates or give warnings to candidates. Proctors can also take screenshots, terminate a specific user's test session, or re-authenticate candidates based on video feeds.
3.	<b>Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)</b> <i>(as per NCVET guidelines)</i>	An External Examiner/ Observer (Subject matter expert) are deployed including NIELIT scientific officers who are subject expert for evaluation of Practical examination/ internal assessment / Project/ Presentation/ assignment and Major Project (if applicable). Qualification is generally B.Tec
4.	<b>Assessment Mode</b> <i>(Specify the assessment mode)</i>	Online for Theory Online/Offline/Blended for Practical
5.	<b>Tools and Equipment Required for Assessment</b>	<input checked="" type="checkbox"/> Same as for training <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <i>(details to be provided in Annexure-if it is different for Assessment)</i>

**Section 5: Evidence of the need for the Qualification***Provide Annexure/Supporting documents name.*

1.	<b>Latest Skill Gap Study (not older than 2 years) (Yes/No):</b> Yes, provided in Annexure-A
2.	<b>Latest Market Research Reports or any other source (not older than 2 years) (Yes/No):</b> Yes, provided in Annexure A
3.	<b>Government /Industry initiatives/ requirement (Yes/No):</b> Yes Available in Annexure-A
4.	<b>Number of Industry validation provided:</b> 6
5.	<b>Estimated nos. of persons to be trained and employed:</b> 1000
6.	<b>Evidence of Concurrence/Consultation with Line Ministry/State Departments:</b> NIELIT is recognized as AB and AA under Government Category. NIELIT is an HRD arm of MeitY, therefore, the Line Ministry Concurrence is not required.

**Section 6: Annexure & Supporting Documents Check List***Specify Annexure Name / Supporting document file name*

1	<b>Annexure:</b> NCrf/NSQF level justification based on NCrf level/NSQF descriptors (Mandatory)	Available at Annexure-I: Evidence of Level
2	<b>Annexure:</b> List of tools and equipment relevant for qualification (Mandatory, except in case of online course)	Available at Annexure-II: Tools and Equipment
3	<b>Annexure:</b> Detailed Assessment Criteria (Mandatory)	Available at Annexure-VI: Detailed Assessment Criteria
4	<b>Annexure:</b> Assessment Strategy (Mandatory)	Available at Annexure-VII: Detailed Assessment Strategy
5	<b>Annexure:</b> Blended Learning (Mandatory, in case selected Mode of delivery is "Blended Learning")	Available at Annexure-V: Blended Learning
6	<b>Annexure:</b> Multiple Entry-Exit Details (Mandatory, in case qualification has multiple Entry-Exit)	Student can enroll in Level 4.5 as per the Eligibility Criteria mentioned above at point 9 However if he/she doesn't complete level 4.5 and drops the course after completing level 3 or level 4 he will be liable to get level 3 or 4 certificate atleast respectively
7	<b>Annexure:</b> Acronym and Glossary (Optional)	Available at Annexure-X: Acronym and Glossary
8	<b>Supporting Document:</b> Model Curriculum (Mandatory – Public view)	Available at Annexure-A: Model Curriculum
9	<b>Supporting Document:</b> Career Progression	Available at Annexure-VIII: Career Progression

	<i>(Mandatory - Public view)</i>	
1	<b>Supporting Document:</b> Occupational Map <i>(Mandatory)</i>	Available at Annexure-IX: Occupational Map
1	<b>Supporting Document:</b> Assessment SOP <i>(Mandatory)</i>	Available at Annexure-C: Examination SoP
1	<b>Any other document you wish to submit:</b>	NA

### Annexure - I: Evidence of Level

NCrF/NSQF Level Descriptors	Key requirements of the job role/ outcome of the qualification	How the job role/ outcomes relate to the NCrF/NSQF level descriptor	NCrF/NSQF Level
<b>Professional Theoretical Knowledge/Process</b>	<ol style="list-style-type: none"> <li>1. Gaining Knowledge of how to run and configure several Linux services.</li> <li>2. Classification of Transmission Media and will have in depth idea about various networking devices and Conceptualization of OSI, TCP/IP Model, and Function of layers.</li> <li>3. Differentiate and benefit of Open source Virtualization and proprietary Virtualization.</li> <li>4. Conceptualize Cloud Characteristics along with Features of Cloud Computing.</li> <li>5. Knowledge about components and Architectures of open Stack</li> <li>6. Choosing adequate cloud Infrastructure to be used for deployment.</li> <li>7. Insight into Containers Orchestration</li> <li>8. Exposure to various Cloud Security considerations.</li> </ol>	<ol style="list-style-type: none"> <li>1. Possesses specialized operational knowledge and understanding of the work.</li> <li>2. Have complete knowledge of the concept of time required for delivery; and Quality for a range of issues</li> </ol>	4.5
<b>Professional and Technical Skills/ Expertise/ Professional Knowledge</b>	<ol style="list-style-type: none"> <li>1. Students will be able to Configure Network Settings and perform user and group management in Windows as well as Linux</li> <li>2. Knowledge about various network administration software Utilities and network troubleshooting.</li> <li>3. Knowledge of Hypervisor and Installation of Virtualisation Software.</li> <li>4. Creation of Virtual Machines using Open source</li> </ol>	<ol style="list-style-type: none"> <li>1. Possesses specialized professional and technical skills; displays clarity of professional knowledge and technical skills in a broad range of activities/ tasks.</li> <li>2. Have knowledge of collecting and interpreting the available information, drawing conclusions &amp; communicating</li> </ol>	4.5

	virtualization tools 5. Depth coverage of Cloud Platform ranging from its benefits to its implementation and its scope and its pros and cons. 6. Creation and Configuration of Cloud deployment using OpenStack, ESXi and Google App Engine. 7. Creation and configuration of Containers in Dockers 8. Concepts based on cloud Security	the same	
<b>Employment Readiness &amp; Entrepreneurship Skills &amp; Mind-set/Professional Skill</b>	1. Introduction to Employability Skills 2. Career Development & Goal Setting 3. Becoming a Professional in the 21st Century 4. Constitutional values - Citizenship 5. Basic English Skills 6. Communication Skills 7. Essential Digital Skills 8. Financial and Legal Literacy 9. Customer Service 10. Entrepreneurship 11. Diversity & Inclusion 12. Getting Ready for Apprenticeship & Jobs	1. Can explain Entrepreneurial Mindset and describe the importance of it in the context of opportunity curation for future jobs. 2. Can comfortably use most of the basic software with proficiency. 3. Have the ability to relate to the 5 pillars of Social Emotional Skills and describe the similarities between SES and Emotional Intelligence.	4.5
<b>Broad Learning Outcomes/Core Skill</b>	1. Able to troubleshoot in case of facing problems in the Operating system and Networking. 2. Conceptualize Cloud Computing Concepts and would be able to differentiate Cloud computing vs. Cluster computing vs. Grid computing 3. Able to perform operations on Software as a service platforms 4. Able to set up Linux services. 5. Cloud Deployment using Open source cloud computing infrastructure software 6. Able to handle dockers and container and get to know about docker orchestration. 7. Concept pertaining to data , storage and infrastructure security in Cloud Computing	1. Students will be able to use, create, and configure virtualization solutions. 2. Implementation of web, mail, DNS, and proxy Linux Services. 3. Student will be able to create cloud Infrastructure using Openstack 4. Have knowledge of the Cloud computing Project Cycle and apply Cloud Computing technology to improve solutions. 5. Handling docker and containers	4.5

<b>Responsibility</b>	1. Creating Virtual Machin using Virtual Machine Manager 2. Installation and Configuration of Linux Services 3. Implement Cloud Computing Solutions using Openstack 4. Realization of Projects in Cloud Computing domains	1. Takes complete responsibility for delivery and quality of own.	4.5
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### Annexure - II: Tools and Equipment (Lab Set-Up)

Batch Size:\_ 30

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	Classroom	1 (30 Sq.m)	30
2	Student Chair	30	30
3	Student Table	30	30
4	Desktop computer with accessories	32 GB RAM with Camera, Headphone and Installed with Linux, Windows, Windows Server 2019, VirtualBox, OpenStack, Hyper-V, Xen Server, EXsi, Squid,	30
5	Laserjet printer	1 Nos.	A4
6	Server	Xeron Processor dual core processor with 128 gb ram and 4 TB Hardisk	1

Classroom Aids

The aids required to conduct sessions in the classroom are:

1. LCD Projector
2. Pin-up Board
3. WhiteBoard

### Annexure III: Industry Validations Summary

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID
1	Essential InfoSec Private Limited	Mr.Pawan Srivastava	Director	1st Floor, Plot No 16, Near State Bank of India, Sultanpur, New Delhi-110030	7985534793	<a href="mailto:pawan@essentialinfosec.com">pawan@essentialinfosec.com</a>
2	Fore Solution (P) Ltd	Manu Mehta	Director	Fore Solution (P) Ltd SCO: 365-66, First Floor, Sector 35, Chandigarh, 160022	9814010307	<a href="mailto:manu@foresolution.net">manu@foresolution.net</a>
3	OST Electronics Pvt Ltd.	Amarjit Singh	Manager - Tech Support	Sco 212, Sector 36-D, Sector 36, Chandigarh, 160036	9815936460	<a href="mailto:amarjit.singh@ostindia.com">amarjit.singh@ostindia.com</a>
4	Spectra Computech Pvt. Ltd.	N.P Singh	Manager Marketing	4th Floor, Godrej Eternia Building Plot No. 70, Industrial Area Phase I, Chandigarh, 160002	9876023966	<a href="mailto:npsingh@spectracomputech.com">npsingh@spectracomputech.com</a>
5	Nice Pvt. ITI	Motilal Ohdar	Director	Moti House, Prince Chowk, Simdega, Jharkhand-835223	79924889955	<a href="mailto:vtpnice13@gmail.com">vtpnice13@gmail.com</a>
6	United Computer	Subhasis Choudhury	Chief Executive	Chotonilpur (pirtala), P.O. Sripally, Burdwan-713103	9641820965	<a href="mailto:united-computer97@rediffmail.com">united-computer97@rediffmail.com</a>

**Annexure IV: Training & Employment Details****Training and Employment Projections:**

Year	Total Candidates		Women		People with Disability	
	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities	Estimated Training #	Estimated Employment Opportunities
2023	1000	100	200	100	10	2
2024	1000	100	200	100	10	2
2025	1000	100	200	100	10	2

*Data to be provided year-wise for next 3 years***Annexure V: Blended Learning****Blended Learning Estimated Ratio & Recommended Tools:**

S. No.	Select the Components of the Qualification	List Recommended Tools – for all Selected Components	Offline : Online Ratio
1	Theory/ Lectures - Imparting theoretical and conceptual knowledge	Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	60:40
2	Imparting Soft Skills, Life Skills, and Employability Skills /Mentorship to Learners	Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	60:40
3	Showing Practical Demonstrations to the learners	Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	60:40
4	Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training	NA	100:0
5	Tutorials/ Assignments/ Drill/ Practice	Online interaction platforms like JitSi Meet, Bharat VC, Google Meet, MS Teams, etc.	50:50

6	Proctored Monitoring/ Assessment/ Evaluation/ Examinations	NIELIT Remote Proctored Software	Online: 100% Theory Offline: 100% Practical
7	<input type="checkbox"/> On the Job Training (OJT)/ Project Work Internship/ Apprenticeship Training	Simulated Platform	Either 100% online on virtual environment Or 100% offline in the Industry.

### Annexure-VI: Detailed Assessment Criteria

Detailed assessment criteria for each NOS/Module are as follows:

NOS/Module Name	Assessment Criteria for Performance Criteria/Learning Outcomes	Theory Marks	Practical Marks
NOS 1: Conceptualize Operating Systems (Windows and Linux)	<ol style="list-style-type: none"> <li>1. Configure Network Settings and perform user and group management.</li> <li>2. Knowledge of the various management service roles and get acquainted with the concept of remote desktop management</li> <li>3. Installation of Windows and Linux Operating System</li> <li>4. Creation of disk partitions and configure Active directory.</li> <li>5. Conceptualization of s of Group policy, work in owner Shell and run various Windows commands</li> <li>6. Basic Commands in Linux and implement administrator tasks with sudo.</li> <li>7. Acquire skills pertaining to group user management, Piping and Greping and also mounting of disk.</li> </ol>	33.33	13.84
NOS 2: Introduction to Network Management	<ol style="list-style-type: none"> <li>1. Overview of OSI, TCP/IP Model and Function of layers, learn about various types of networks.</li> <li>2. Knowledge about the Benefits of Network, Components of Computer Networks and also have an insight into various topologies used in networking.</li> <li>3. Explain various Transmission modes, Ethernet and the Classification of Transmission Media.</li> <li>4. In-depth idea about various networking devices like Repeaters, Hubs, Bridges, Switches and routers</li> <li>5. Introduction to TCP/IP Protocol Model in Depth, Port Numbers, Common TCP&amp; UDP Ports and also some important TCP/IP protocols.</li> <li>6. IP addressing, Classes, IP Addressing Scheme, Subnetting Basics along with How</li> </ol>	33.33	13.84



	<p>to Create Subnets, Subnet Masks, Subnetting Class C Addresses, Subnetting Class B Addresses and VLSM.</p> <p>7. Configure ip addresses in Windows and Linux and also have a proper introduction to RIR, registries and IANA along with attaining knowledge about TCP/IP Troubleshooting utilities, Troubleshooting IP Addressing</p>		
NOS 3: Implementing Virtualization and Basics of Cloud Computing	<p>1. Differentiating between Open source Virtualization and proprietary Virtualization.</p> <p>2. Installation and use Open source virtualization tools - KVM, Hyper-V and Xen</p> <p>3. Creation of Virtual Machine using Virtualization Tools</p> <p>4. Cloud Computing Concepts and would be able to differentiate Cloud computing vs. Cluster computing vs. Grid computing.</p> <p>5. Conceptualize Cloud Characteristics and Working of Cloud Computing along with Features Of Cloud Computing</p> <p>6. Knowledge pertaining to Types of Cloud</p> <p>7. Enlightened about the Benefits of Cloud Computing and Applications of Cloud Computing In industries,</p> <p>8. In-depth coverage of Cloud Platform ranging from its benefits to its implementation and its scope and its pros and cons</p>	57.14	27.69
NOS4: Conceptualizing Advance Linux	<p>1. In-depth knowledge of advanced Utilities and Services in Linux</p> <p>2. Setting up of different services of Linux like DNS Server, Web Server, Mail Server, File Server, and Squid Proxy Server.</p>	16.66	6.92
NOS 5: Managing Cloud Architecture with Open Stack	<p>1. Basic components and Architectures of open Stack along with Installation of Open stack</p> <p>2. Configure and manage Open Stack Client and Horizon dashboard.</p> <p>3. Configure and manage OpenStack Identity Management</p> <p>4. Configure and manage Image management.</p> <p>5. Configure and manage Compute Service</p>	16.66	6.92
NOS 6: Emphasizing Cloud Computing Services	<p>1. SaaS Cloud Deployment with Open Source Tools</p> <p>2. Introduction to PaaS Cloud and SaaS Cloud Deployment with Google App Engine</p> <p>3. Knowledge of IaaS Cloud, install and configure ESXi Server along with setting up of a Private Cloud With Vsphere</p>	14.28	6.92
NOS 7: Conceptualize Docker and Containers	<p>1. Create and Configure Containers and Dockers.</p> <p>2. Introduction to Docker imaging and configuring the same.</p> <p>3. In-depth insight into the configuration of Containers Orchestration.</p> <p>4. Adequate exposure to networking concepts used in Dockers</p>	14.28	6.92
NOS 8: Conceptualize Cloud Security	<p>1. Concepts pertaining to Basic Cloud Security and Cloud Infrastructure Security</p> <p>2. Insight into data Security and Storage</p> <p>3. Exposure to various Cloud Security considerations</p>	14.28	6.92
NOS 9: Employability Skills	Explanation of the following:	30	

	<ol style="list-style-type: none"> <li>1. Need for employability skills</li> <li>2. Various constitutional and personal values.</li> <li>3. Different environmentally sustainable practices and their importance</li> <li>4. 21st-century skills and their importance</li> <li>5. How to use the basic spoken English language</li> <li>6. Do's and don'ts of effective communication</li> <li>7. Inclusivity and its importance</li> <li>8. Different types of disabilities and appropriate communication and behaviour towards PwD</li> <li>9. Different types of financial products and services</li> <li>10. How to compute income and expenses</li> <li>11. Importance of maintaining safety and security in financial transactions</li> <li>12. Different legal rights and laws</li> <li>13. How to operate digital devices and applications safely and securely</li> <li>14. Ways to identify business opportunities</li> <li>15. Types of customers and their needs</li> <li>16. How to apply for a job and prepare for an interview</li> <li>17. Apprenticeship scheme and the process of registering on apprenticeship portal</li> </ol>	
NOS 8: OJT/Project	1. Demonstration of Cloud Computing Project	30
<b>Grand Total</b>		<b>350</b>

### Annexure VII: Assessment Strategy

Assessment of the qualification evaluates candidates to ascertain that they can integrate knowledge, skills and values for carrying out relevant tasks as per the defined learning outcomes and assessment criteria.

The underlying principle of assessment is fairness and transparency. The evidence of the outcomes and assessment criteria. Competence acquired by the candidate can be obtained by conducting Theory (Online), Practical assessment, internal assessment, Project/Presentation/ Assignment, Major Project. The emphasis is on the practical demonstration of skills & knowledge gained by the candidate through the training. Each OUTCOME is assessed & marked separately. A candidate is required to pass all OUTCOMES individually based on the passing criteria.

#### About Examination Pattern:

1. The question papers for the theory and practical exams are set by the Examination wing (assessor) of NIELIT HQS.
2. The assessor assigns roll number.

3. The assessor carries out theory online assessments through remote proctoring methodology. Theory examination would be conducted online and the paper comprise of MCQ. Conduct of assessment are through trained proctors. Once the test begins, remote proctors have full access to candidate's video feeds and computer screens. Proctors authenticate the candidate based on registration details, pre-test image captured and I-card in possession of the candidate. Proctors can chat with candidates or give warnings to candidates. Proctors can also take screenshots, terminate a specific user's test session, or re-authenticate candidates based on video feeds.

4. An External Examiner/ Observer may be deployed including NIELIT officials for evaluation of Practical examination/ internal assessment / Project/ Presentation/. Major Project (if applicable) would be evaluated preferably by external/ subject expert including NIELIT officials.

5. Pass percentage would be 50% marks in each component.

6. Candidates may apply for re-examination within the validity of registration (only in the assessment component in which the candidate failed).

7. For re-examination prescribed examination fee is required to be paid by the candidate only for the assessment component in which the candidate wants to reappear.

8. There would be no exemption for any paper/module for candidates having similar qualifications or skills.

9. The examination will be conducted in English language only.

Quality assurance activities: A pool of questions is created by a subject matter expert and moderated by other SME. Test rules are set beforehand. Random set of questions which are according to syllabus appears which may differ from candidate to candidate. Confidentiality and impartiality are maintained during all the examination and evaluation processes.

#### **Annexure-VIII: Career Progression:**

##### **Academic:**

##### **Horizontal:**

Level 4.5: Courses in Cloud Computing: None

##### **Vertical:**

Level 5: Courses in Cloud Computing: Certified Cloud Computing Engineer, Cloud Administrator

Level 6: Courses in Cloud Computing: Certified Cloud Computing and Virtualization Expert, Cloud Administrator, Cloud Architect, Cloud Consultant,

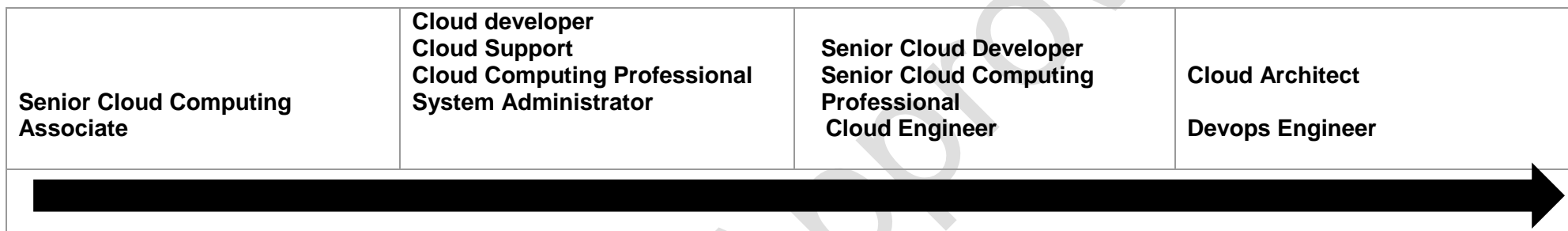
Level 7: Courses in Cloud Computing: Cloud Architect, Cloud Consultant,

Level 8: Courses in Cloud Computing: Post Graduate Diploma in Cloud Computing, Cloud Computing

**Professional:**

Cloud Computing Assistant-> Junior Cloud Computing Associate-> Senior Cloud Computing Associate

**Annexure-IX: Occupational Map**



**Annexure- X: Acronym and Glossary**

Acronym	Description
<b>AA</b>	Assessment Agency
<b>AB</b>	Awarding Body
<b>ISCO</b>	International Standard Classification of Occupations
<b>NCO</b>	National Classification of Occupations
<b>NCrF</b>	National Credit Framework
<b>NOS</b>	National Occupational Standard(s)
<b>NQR</b>	National Qualification Register
<b>NSQF</b>	National Skills Qualifications Framework
<b>OJT</b>	On the Job Training

## Glossary

Term	Description
<b>National Occupational Standards (NOS)</b>	NOS define the measurable performance outcomes required from an individual engaged in a particular task. They list down what an individual performing that task should know and also do.
<b>Qualification</b>	A formal outcome of an assessment and validation process which is obtained when a competent body determines that an individual has achieved learning outcomes to given standards
<b>Qualification File</b>	A Qualification File is a template designed to capture necessary information of a Qualification from the perspective of NSQF compliance. The Qualification File will be normally submitted by the awarding body for the qualification.
<b>Sector</b>	A grouping of professional activities on the basis of their main economic function, product, service or technology.
<b>Long Term Training</b>	Long-term skilling means any vocational training program undertaken for a year and above. <a href="https://ncvet.gov.in/sites/default/files/NCVET.pdf">https://ncvet.gov.in/sites/default/files/NCVET.pdf</a>