QUALIFICATION FILE – Micro-Credentials

Building Automation Specialist

☒Public ☐ Private

☒Upskilling ☐ Dual/Flexi Qualification ☐For ToT ☐For ToA

☒General ☐Multi-skill (MS) ☐ Cross Sectoral (CS) ☒Future Skills ☐OEM

NCrF/NSQF Level: 5

Submitted By:

IASC SECTOR SKILL COUNCIL

324, US Complex, New Delhi- 110076

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Section 1: Basic Details

<table>
<tr><td>1.</td><td>Micro Credential-Qualification Name</td><td colspan="2">Building Automation Specialist</td></tr>
<tr><td>2.</td><td>Sector/s</td><td colspan="2">IASC Sector Skill Council</td></tr>
<tr><td>3.</td><td>National Qualification Register (NQR) Code & Version (Will be issued after NSQC approval.)</td><td>2022/CON/IASC/06499</td><td>4. NCrF/NSQF Level: 5</td></tr>
<tr><td>5.</td><td>Brief Description of the Micro-Credential</td><td colspan="2">This OS unit is about Building Automation Specialist, also known as Project Engineer, are responsible for the system design, installation and technical support for building automation systems involving microcontroller-based systems, such as Fire Detection & Alarm System (FAS), Access Control Systems, Biometrics (ACS) & CCTV Surveillance Systems along with a variety of sensors and actuators.</td></tr>
<tr><td>6.</td><td>Eligibility Criteria for Entry for Students/Trainee/Learner/Employee</td><td colspan="2">a. Entry Qualification & Relevant Experience
b. Age 18+

<table>
<tr><th>S. No.</th><th>Academic/Skill Qualification (with specialization- if applicable)</th><th>Relevant Experience (with specialization- if applicable)</th></tr>
<tr><td></td><td>10th +

OR
10th +

OR
Completed 1st Year or Pursuing 2nd Year of 3 Years Engineering Diploma in relevant field (after 12th or 2 years NTC after 10th)
OR
Completed 1st year or Pursuing 2nd year of BE/B-Tech in relevant field</td><td>3 Years Engineering Diploma in relevant field

2 years NTC or 2 years NAC + 1 year experience in relevant field</td></tr>
<tr><td></td><td>*Instrumentation/EEE/ECE/Mechanical/Electrical/Mechatronics</td><td></td></tr>
</table></td></tr>
<tr><td>7.</td><td>Credits Assigned to this Qualification, Subject to Assessment (as per National Credit Framework (NCrF))</td><td>19</td><td>8. Common Cost Norm Category (I/II/III) (wherever applicable): I</td></tr>
</table>

9.	**Any Licensing Requirements/ Pre-requisites for Undertaking Training** *(wherever applicable)*	NAs
10.	**Expected Outcomes of the Micro-Credential**	**Terminal learning outcomes are:** • Capture client requirements of building automation needs • Study existing facilities, if any, at the client premises and suggest appropriate technologies and systems • Perform system design - to clearly identify sub systems required for the project, such as HVAC (Heating, Ventilation and Air Conditioning) system, Fire detection and Alarm system (FAS), Access Control System, CCTV Surveillance system and other associated communication, power and cabling system. • Create specifications, drawings, and Bill of Quantities (BOQ)of the system to aid in procurement • Create wiring specifications, wiring layout and wiring plan. • Inspect the correctness of the procured systems against • Install components of HVAC system and verify correct operation. • Install components of FAS system and verify correct operation. • Install components of Access Control System and verify correct operation. • Install components of CCTV system and verify correct operation. • Integrate HVAC, FAS, Access Control and CCTV systems on Building Automation System Control Panel and verify correct operation. • Work effectively in a multidisciplinary team • Follow health and safety norms of the industry

11.	**Training Duration by Modes of Training Delivery** *(Specify **Total Duration** as per selected training delivery modes and as per requirement of the qualification)*	**☒Offline Only ☐ Online Only ☐Blended** *(Refer Blended Learning Annexure for Details)*
12.	**Assessment Criteria**	<table><tr><th>Training Delivery Mode</th><th>Theory (Hours)</th><th>Practical (Hours)</th><th>Total (Hours)</th></tr><tr><td>Classroom (offline)</td><td>102</td><td>138</td><td>270</td></tr><tr><td>Online</td><td></td><td></td><td></td></tr></table>
13.	**Is the Qualification Amenable to Persons with Disability**	**☐ Yes ☒No If *"Yes", specify the applicable type of Disability:***
14.	**How participation of women will be encouraged?**	<table><tr><th>Theory (Marks)</th><th>Practical (Marks)</th><th>Project (Marks)</th><th>Viva (Marks)</th><th>Total (Marks)</th><th>Passing %</th></tr><tr><td>395</td><td>615</td><td>-</td><td>20</td><td>1030</td><td>100</td></tr></table>
15.	**Other Indian Languages in which the Micro Credential will be implemented.**	
16.	**Is similar Micro Credential Qualification(s) available on NQR-if yes, justification for this qualification**	**☐ Yes ☒No URLs of similar Qualifications:**

17.	**Name and Contact Details Submitting/Awarding Body SPOC**	**Name: Mayank Bansal** **Email: sqa**@iascsectorskillcouncil.in **Contact No.: 7599140834** **Website: https://iascsectorskillcouncil.in**	
18.	**NSQC Approval Date:**	**19. Validity Duration:**	**20. Next Review Date:**

Section 2: Training Related

1.	**Trainer's Qualification and experience in relevant sector (in years)** *(as per requirement and NCVET guidelines)*	**Post-Graduation with relevant Field** (Instrumentation/EEE/ECE/Mechanical/Electrical/Mechatronics)
2.	**Master Trainer's Qualification and experience in relevant sector (in years)** *(as per requirement and NCVET guidelines)*	**Post-Graduation with one Year Industry related Experience** (Instrumentation/EEE/ECE/Mechanical/Electrical/Mechatronics)
3.	**Tools and Equipment Required for Training**	☐ **Yes** ☐ **No** (*If "Yes", details to be provided in Annexure)*

Section 3: Assessment Related

1.	**Assessor's Qualification and experience in relevant sector (in years)** *(as per requirement and NCVET guidelines)*	**Post-Graduation with one Year Industry related Experience** (Instrumentation/EEE/ECE/Mechanical/Electrical/Mechatronics)
2.	**Proctor's Qualification and experience in relevant sector (in years)** *(as per requirement and NCVET guidelines)*	**Post-Graduation with Two Year Industry related Experience** (Instrumentation/EEE/ECE/Mechanical/Electrical/Mechatronics)
3.	**Lead Assessor's/Proctor's Qualification and experience in relevant sector (in years)** *(as per requirement and NCVET guidelines)*	**Post-Graduation with Three Year Industry related Experience** (Instrumentation/EEE/ECE/Mechanical/Electrical/Mechatronics)

4.	**Assessment Mode** *(Specify the assessment mode)*	**Mode: ☐Online Only ☐ Offline Only ☒Blended**
5.	**Tools and Equipment Required for Assessment**	**☒Same as for training ☐ Yes ☒No** *(details to be provided in Annexure-if it is different for Assessment)*

Section 4: Evidence of Need of the Micro Credential

As per the NCVET Guidelines for evidence of need, provide the required Annexure/Supporting documents.

1.	Government /Industry initiatives/ requirement (Yes/No): YES
2.	Number of Industry validation provided: 5
3.	Estimated number of people to be trained:

Section 5: Annexure Check List

Specify Annexure Number and Name.

1.	**Annexure:** NCrF/NSQF level justification based on NCrF Level/NSQF descriptors *(Mandatory)*	Filled
2.	**Annexure:** Learning Outcomes and Assessment Criteria *(Mandatory)*	Filled
3.	**Annexure:** Assessment Strategy *(Mandatory)*	*Filled*
4.	**Annexure:** List of tools and equipment relevant for qualification *(Mandatory – Except in case of online course)*	*Filled*

5.	**Annexure:** Blended Learning *(Mandatory in case selected mode of delivery is "Blended Learning")*	*Filled*
6.	**Annexure:** Acronym and Glossary *(Optional)*	*Filled*

Annexure: 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
Professional Theoretical Knowledge/Process			
Professional and Technical Skills/ Expertise/ Professional Knowledge			
Employment Readiness & Entrepreneurship Skills & Mind-set/Professional Skill			
Broad Learning Outcomes/Core Skill			
Responsibility			

Annexure: Learning Outcomes and Assessment Criteria

Detailed learning outcomes and assessment criteria for the qualification are as follows:

S. No.	Learning Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
	Capturing the requirements of HVAC Systems by site survey	**08**	**20**	-	-
1.	Capturing work requirements of the client by site survey	2	4	-	-
2.	Developing BOQ according to the requirement of the client	2	4	-	-
3.	Creating 2D models using BAS Software	2	4	-	-
4.	Developing program on BAS Tools for HVAC	1	4	-	-
5.	Developing program on BAS Tools based on Logic gates	1	4	-	-
	Developing program related to Air Conditioning on BAS Tools	**8**	**20**	-	-
6.	Managing wiring of components in AC Drives and Soft Starters	2	4	-	-
7.	*Suggesting and takingapproval from the customer for HVAC Systems*	2	4	-	-
8.	Suggesting appropriate HVAC components to the customer according to the site	2	4	-	-
9.	Assisting the customer in choosing different types of technologies and specifications used in HVAC Systems	1	4	-	-
10.	Taking approval from the customer	1	4	-	-
	Maintaining complete documentation of the components to be installed	**8**	**15**	-	-
11.	Installing approvedHVAC components as per site requirements	2	2	-	-
12.	*Collecting and checking of components at customer premises as per checklist*	2	3	-	-
13.	Installing HVAC components including VFD at site as per the requirement	2	3	-	-
14.	Installing AHU (Air Handling Unit)	1	3	-	-
15.	Installing Chiller	1	**4**	-	-
	Installing Sensors	**6**	**20**	-	-

16.	Installing VAV (Variable Air Volume), TFA (Treated Fresh Air) etc.	1	4	-	-
17.	*Wiring Electrical and Electronics components as per the requirements*	1	4	-	-
18.	*Wiring Power Supplies, Earthing & Grounding*	1	4	-	-
19.	*Wiring and connecting Shielded & Unshielded Cables, Cable Gauges & AWG sizes*	2	4	-	
20.	*Wiring of HVAC hardware PC*	1	4		
	Testing of HVAC systems	8	20	-	-
21.	Testing of installed HVAC System	2	4	-	-
22.	Ensuring proper working of the installed HVAC System	2	4	-	-
23.	Assuring 100% satisfaction from the customer after installation	2	4	-	-
24.	Troubleshooting errors if the system is not working as per the requirements	1	4	-	-
25.	*Providing Technical Support for HVAC Systems*	1	4	-	-
	Calculating total number of HVAC controllers as per I/O summary	8	20	-	-
26.	Managing refrigeration process needed for the site by BAS controller	2	4	-	-
27.	Managing Wiring and drawings of Components used in Centralized Air- Conditioning	2	4	-	-
28.	*Providing Technical Support for HVAC functions using BAS controller*	2	4		-
29	*Calculating Heat Load*	1	4		
30	Capturing the requirements of Fire Alarm Systems by site survey	1	4		
	Capturing work requirements of the client by site survey	8	15		
31	*Developing BOQ according to the requirement of the client*	2	2		
32	*Assisting customer about different types of technologies used in FAS according to the need of site*	2	3		
33	*Ensuring that Suggesting components matches to customers requirement*	2	3		
34	*Assisting the customers about the company policies towards services and warranty*	1	3		
35	*Managing proper documentation of site survey and customers requirements proper*	1	4		

	Suggesting and taking approval from the customer for Fire Alarm Systems				
	Suggesting appropriate FAS components to the customer according to the site	6	20		
36	Assisting the customers about Fire Alarm systems with their specifications	1	4		
37	Taking approval for installing FAS components from the customer	1	4		
38	Preparing and assembling FAS components as per the requirement	1	4		
39	Creating check list before going to the site for installation	2	4		
40	Maintaining complete documentation of the components to be installed	1	4		
	Installing approvedFire Alarm components as per site requirements	10	20		
41	Collecting and checking of components before moving to customer premises	2	4		
42	Assisting technicians for checking hardware components before FAS Installation	2	4		
43	Replacing FAS components if found malfunctioning	2	4		
44	Preparing Checklist and ensure the availability of every component before installation	2	4		
45	Installing FAS components at the customers site	2	4		
46	Installing fire Detection components as per site requirement	10	20		
47	Installing Heat/RoR Detectors, Smoke Detectors and Multi Criteria detectors as per requirement	2	4		
48	*Wiring Electrical andElectronicscomponents as per the requirements*	2	4		
49	Wiring Power Supplies, Earthing & Grounding	2	4		
50	Wiring and connecting Shielded & Unshielded Cables, Cable Gauges, SWG & AWG sizes	2	4		
51	Ensuring adequate length of connecting cables as per the requirements	2	4		
52	Wiring of FAS hardware	10	25		
53	Using proper terminals as prescribed for joining cables	2	5		
54	Use power cable for connecting power supply with proper rating	2	5		
55	*Testing of newsystems at customer site*	2	5		
56	Testing installed FAS components at customer premises	2	5		
57	Ensuring proper working of every component	2	5		
58	Ensuring proper working of FAS systems before leaving the site and explaining the customer how to operate the system properly	15	8		5
59	Assuring 100% satisfaction from the customer after installation	4	4		
60	Troubleshooting the errors if the system is not working as per the requirements	4			2
61	*Providing TechnicalSupport for Fire AlarmSystems at the site*	2			1
62	Providing Technical Support for Fire Detection & Alarm System as per Fire Life cycle and Class of Fire	4	4		1
63	Providing Technical Support for intelligent Fire Panels & conventional Fire Panels installed	1			1
64	Managing Detector & Device Wiring Schema	6	10	-	1
65	Integrating Fireman's Telephony & Talkback system with fire alarm	2	6		1

66	Selecting Fire Safety Strategies for prevention	2	-	-	-
67	*Capturing the requirements of Access Controls Systems by site survey*	2	4	-	
68	Capturing work requirements of the client by site survey	8	18	-	2
69	Developing BOQ according to the requirement of the client	2	6		
70	Assisting customer about different types of technologies used in Access Control Systems according to the need of site		6		1
	Ensuring that Suggesting components matches to customers requirement	2			
71	Assisting the customers about the company policies towards services and warranty	4	6		
	Managing proper documentation of site survey and customers requirements	11	14		3
72	*Suggesting and taking approval from the customer for Access Controls System*	2	4		
73	Suggesting appropriate Access Controls components to the customer according to the site	2			1
74	Assisting the customers about technologies used in Access Control systems with their specifications	2	6		1
75	Taking approval for installing Access Control Systems from the customer	1	-	-	1
76	Preparing and assembling Access Control Systems components as per the requirement	2	4	-	-
77	Creating check list before going to the site for installation	2	-	-	-
78	Maintaining complete documentation of the components to be installed	13	12		5
79	*Installing approved Access Controls components as per site requirements*	2	2		1
80	Collecting and checking of components before moving to customer premises	2	4		
81	Assisting technicians for checking hardware components before Installation	4	2		1
82	Replacing components if found malfunctioning	1	1		
83	Preparing Checklist and ensure the availability of every component before installation	1	1		1
84	Installing components at the customers site	1	1		1
85	Installing hardware such as smart hub, RFID Card, Door control unit, card readers etc.	2	1		1
86	Ensuring that components are matching with customers requirement and installed as per standard operating operation	6	8		1
87	*Wiring Electrical and Electronics components as per specifications*	2	3		1
88	Determining the type of cable requirement for different types of network type such as USB, twisted pair, etc.	2	1		
89	Ensuring adequate length of cables are available for installation	2	4		
90	Wiring of Power Supplies, Earthing & Grounding.	4	5		1
91	*Testing Access Control systems at customer premises*	2	1		1
92	*Checking voltage and resistance at all appropriate points of the system*	1	3		
93	*Correcting alignment and operation of access point hardware*	1	1		

94	Verifying access levels	4	5		1
95	Checking correct operation of each reader	1	1		1
96	Testing Release time for each lock using software	1	2		
97	Checking the signals if doors are held open and signaling is required	1	1		
98	Checking all the data for correct entry in the ACS software	1	1		
99	Checking alarms to display correctly	2	2		1
100	Defining level of particular object in the software	1	1		
101	*Providing Technical Support for Access Controls Systems*	1	1		1
102	Identifying the operating system and software requirement for the access control system	11	18		1
103	Providing Technical Support for Access controls devices at the customer premises	2	2		
104	Commissioning Access Controls Systems performance as per customer requirements	1	2		
105	Achieving zero errors in commissioning as per company policy	3	6		
106	Identifying problems and alert on time	3	4		
107	Fixing for any errors (if any) identified	2	4		1
108	Verifying software implementation checks of input/output I/O points (AI, AO, DI,DO)	1	1		
109	Verifying sensor calibration, control sequence logic, graphics and alarm code				
110	*Performing software functionality test*	1	1		
111	*Achieving Quality and Productivity as per company norms*				
112	Achieving 100% work schedule as planned for the week	1	3		
113	Meeting 100% daily or monthly target				
114	Achieving zero component damage	2	3		
115	Keeping work area clean and organized				
116	Identifying problems and alert in time	1	1		
117	Achieving 100% compliance with health and safety guidelines and rules				
118	*Capturing the requirements of CCTV Surveillance Systems by site survey*				
119	Capturing work requirements of the client by site survey	1	1		
120	Developing BOQ according to the requirement of the client				
121	Assisting customer about different types of technologies used in CCTV Surveillance Systems according to the need of site				
122	Ensuring that Suggesting components matches to customers requirement	3	4		
123	Assisting the customers about the company policies towards services and warranty				
124	Managing proper documentation of site survey and customer requirements				
125	*Suggesting and taking approval from the customer for CCTV System to be installed*				
126	Suggesting appropriate CCTV components to the customer according to the site	4	6		
127	Assisting the customers about technologies used in CCTV systems with their specifications				

128	Taking approval for installing CCTV Systems from the customer				
129	Preparing and assembling CCTV Systems components as per the requirement	3	5		
130	Creating check list before going to the site for installation				
131	Maintaining complete documentation of the components to be installed				
132	*Installing approved CCTV components as per site requirements*	2	2		
133	Assisting procurement of hardware required for CCTV system installation				
134	Collecting and checking of components before going to customer premises				
135	Assisting technicians for checking hardware components before Installation				
136	Replacing components if found malfunctioning	1	3		
137	Preparing Checklist and ensure the availability of every component before installation	1	3		
138	Installing CCTV components at the customers site	2	3		
139	Mounting the CCTV camera so as to cover maximum area	1	2		
140	Deciding on the height of camera installation according to the end purpose	1	2		
141	Setting up the camera such as pan, tilt, zoom unit as per customer requirements	1	2		
142	Set camera controls	1	2		
143	Connecting the power and video output cable to the camera	1	1		
144	Ensuring that all the hardware matches the customer requirement, agreed features and specifications	1	1		
145	*Wiring Electrical and Electronics components as per specifications*	**9**	**16**		
146	Determining the type of cable requirement for different types of network type such as USB, twisted pair, etc.	1	3		
147	Ensuring adequate length of cables are available for installation	2	3		
148	Wiring Power Supplies, Earthing & Grounding.	2	3		
149	Laying the cables in the building or site to connect the camera and system	1	2		
150	Using BNC connectors for joining cables and crimping them	1	2		

151	Using power cable of specified thickness to connect CCTV system with power supply	1	1		
152	Connecting all the cables from multiple cameras to the CCTV system area	1	2		
153	*Testing CCTV Components at customer premises*	**7**	**15**		
154	Checking voltage and resistance at all appropriate points of the system	1	2		
155	Correcting alignment and operation of CCTV hardware	1	2		
156	Checking correct operation of each component. Ensure that there are no malfunctioning, if yes than replace the component	1	3		
157	Checking the signals of CCTV components	1	2		
158	Checking all the data received by CCTV as per the requirement	1	2		
159	Ensuring that there are no cable joins, sharp bends during cabling	1	2		
160	Ensure 100% satisfaction from customers for all the installed components	1	2		
161	*Providing Technical Support for CCTV Systems*	**8**	**16**		
162	Providing Technical Support for CCTV devices at the customer premises	1	2		
163	Commissioning CCTV Systems performance as per customer requirements	1	2		
164	Achieving zero errors in commissioning as per company policy	1	2		
165	Identifying problems and alert on time	1	2		
166	Fixing for any errors (if any) identified	1	2		
167	Verifying software implementation checks;(AI, AO, DI,DO) I/O points	1	2		
168	Ensuring zero-material damage while handling the equipment during installation process	1	2		
169	Performing software functionality test	1	2		
170	*Achieving Quality and Productivity as per company norms*	**6**	**12**		

171	Achieving 100% work schedule as planned for the week	1	2		
172	Following standard operating procedure of tools and equipment and avoid any hazard	1	2		
173	Achieving zero component damage	1	2		
174	Keeping work area clean and organized	1	2		
175	Achieving 100% compliance with health and safety guidelines and rules	1	2		
176	Ensuring installed components as per company norms and standards	1	2		
178	*Integrating HVAC Components*	**9**	**10**		
179	Installing and Controlling HVAC Components using DDC Controllers	2	2		
180	Graphically monitor, control, alarm and diagnose Building Equipment remotely	2	2		
181	Creating communication between DDC Controllers using data Bus	1	2		
182	Using BACnet, LON(Echelon) and MODBUS to communicate on data Bus	2	2		
183	Integrating installed HVAC Components with other Building Automation Systems using Software and programming on Single Control Panel	2	2		
184	*Integrating Fire Alarm Systems*	**6**	**10**		
185	Integrating different detectors such as Heat, Smoke, Flame Ionization Detectors, Beam Detectors etc. with control panel	1	2		
186	Using Conventional Systems and analogue addressable systems for fire panels	1	2		
187	Creating and testing communication between control panel and detectors	1	2		
188	Using Intelligent addressable systems as per the requirement	1	1		
189	Integrating Fire Alarm Components with central fire alarm system	1	1		
190	Integrating Fire alarm system with centralized control panel	1	2		
191	*Integrating Access Control Devices*	**15**	**25**		

192	Inter facing between different networks used in Access Controls systems	1	2		
193	Integrating tailgate detectors to remove unauthorized access	1	1		
194	Controlling and monitoring multiple doors using reader controllers	1	1		
195	Creating communication between control panel and access control servers	2	1		
196	Integrating DIU (Door interface Units)	1	3		
197	Integrating access control and intrusion detection	2	4		
198	Installing Biometric systems on application device	2	3		
199	Installing and creating communication between magnetic locks and doors	1	3		
200	Managing Smart card management systems	1	2		
201	Integrating Access Control System with Time/Attendance payroll system	1	1		
202	Managing Weigand Communication for specific interface between card and readers.	1	1		
203	Integrating Access Control devices with BAS control Panel	1	3		
204	*Integrating CCTV Surveillance Systems*	**12**	**26**		
205	Managing Iris and Auto Iris functionality of installed CCTV System	2	3		
206	Managing Automatic Shutter Speed	2	4		
207	Creating communication between CCTV Camera and DVR or NVR	1	3		
208	Managing Automatic Gain Control	1	2		
209	Managing Synchronization between installed CCTV Camera	1	1		
210	Creating communication between IP cameras and network	1	3		
211	Managing NVR and NVR Software	1	3		
212	Installing and managing Facial and number plate recognition system	1	2		

213	Integrating CCTV Surveillance System with Security system to provide centralized management of access control	1	3		
214	Integrating centralized Access Control System with Building Automation System control Panel	1	2		
215	*Controlling and Supervising Building Automation Systems using Control Panel*	4	8		
216	Testing of overall integrated Building Automation System through control panel	1	2		
217	Ensuring proper working and controlling of every installed device using control panel	1	2		
218	Assuring 100% satisfaction from the customer after installation of BAS	1	2		
219	Troubleshooting errors if the system is not working as per the requirements	1	2		
220	*Work as per the organisational team environment*	15	8		5
221	identify team objectives and goals, team members by name, their role and responsibilities, greet them appropriately and respond to their greetings	4	4		
222	comply with organisation's policies and procedures for working with team members within and outside the organisation—especially related to privacy, confidentiality and security	4			2
223	work as per the environment to build trust and mutual respect	2			1
224	participate in decision making by providing facts and figures, give / accept constructive suggestions, take initiatives to help team members arrive at workable decisions and meet the goals	4	4		1
225	accept decisions professionally and support even if they do not match suggestions and personal views	1			1
226	*Communicate effectively*	6	10		1
227	communicate professionally as per organisation's protocols, using appropriate mode of communication—verbal, written, mail, phone or text—and clearly articulate the message to ensure that the receiver understands the message	2	6		1
228	listen to team members attentively, respond promptly, seek / provide clarifications if required	2			
229	**PC8.** share important information with the team timely and refrain from overloading them with unnecessary and unsolicited information	2	4		
230	*Co-operate with team members and superiors*	8	18		1
231	perform own role, receive inputs from others and make adjustments within permissible rules as per requirement, to produce output in time for other team members to follow	2	6		
232	help team members to perform their role effectively and provide any clarifications/support they		6		1

	need, including tools /equipment / common resources as well as resolve any contentious issues amicably, involving the team lead or the supervisor if needed				
233	let team members know in good time if commitments cannot be carried out, explaining the reasons, and provide alternate solutions, if any; let the team lead know about this	2			
234	act in the interest of the team and the organisation, take initiative to correct the wrong, seek help or escalate if needed to ensure that things do not 'fall through the gap' and team goals are achieved	4	6		
235	*Respect customs / preferences and gender / ability differences*	11	14		3
236	follow organisation's policies and statutory guidelines w.r.t seeking information about others' customs / preferences, making references or comments on social customs / preferences, and refrain from hurting sentiments	2	4		
237	accommodate team members' preferences to the extent feasible, and in case they come in the way of fulfilling team goals, discuss with the supervisor/ team leader	2			1
238	ensure personal behaviour, conduct and communication styles, taking gender and disability of the person into consideration	2	6		1
239	list the different types of disabilities with their respective issues and ways to help them overcome challenges	1			1
240	use inclusive language, verbal as well as non- verbal, irrespective of the disability and the gender of the person	2	4		
241	ensure equal treatment for all clients, colleagues and co-workers while respecting their personal space	2			
242	*Adhere to standard safety procedures of the company*	13	12		5
243	comply with general safety procedures and those for handling an equipment, hazardous material or tool, followed in the company	2	2		1
244	remove finger rings or any other metal objects likely to interfere with the work before working on the unit	2	4		
245	use of safety materials such as goggles, gloves, ear plugs, caps, ESD pins, covers, shoes, etc.	4	2		1
246	escalate the issue about hazardous materials or things found in the premises or any breach of safety procedure in the company	1	1		
247	ensure zero accidents at work	1	1		1
248	avoid damage of components due to negligence in ESD procedures or any other loss due to safety negligence	1	1		1
249	participate regularly in fire drills or other safety related workshops organised by the company	2	1		1
250	*Maintain good health and posture*	6	8		1
251	maintain appropriate posture, especially in long hours of sitting or standing position and in handling heavy materials	2	3		1

252	participate in company organised health sessions such as yoga, physiotherapy or games	2	1		
253	handle heavy and hazardous materials with care, while maintaining appropriate posture, using suitable tools and handling equipment such as trolleys, jacks and ladders	2	4		
254	*Effective waste management/recycling practices*	4	5		1
255	identify recyclable and non-recyclable, and hazardous waste generated to be segregated accordingly	2	1		1
256	dispose non-recyclable waste and hazardous waste as per recommended processes	1	3		
257	deposit recyclable and reusable material at identified location	1	1		
258	*Adopt learning and self-direction*	4	5		1
259	understand importance of skill advancement and develop mastery	1	1		1
260	adapt product / service to meet success criteria	1	2		
261	understand accountability for timely completion of tasks	1	1		
262	manage to express emotions in appropriate ways at workplace and understand the cause for the emotions	1	1		
263	*Develop system thinking in problem solving*	2	2		1
264	analyse the problem accurately and communicate different possible solutions to the problem	1	1		
265	manage to estimate the cause of the problem and validate	1	1		1
266	*Material/Resources conservation practices*	11	18		1
267	identify ways to optimize usage of material including water and electricity / energy in various tasks/activities/processes	2	2		
268	check for spills/leakages in various tasks/activities/processes and plug them or escalate to appropriate authority	1	2		
269	carry out routine cleaning of tools, machines and equipment	3	6		
270	check if the equipment/machine is functioning normally before commencing work and rectify wherever required and report malfunctioning (fumes/sparks/emission/vibration/noise) or any lapse in maintenance of equipment	3	4		
271	ensure electrical equipment and appliances are properly connected and turned off when not in use	2	4		1
Total Marks					

Annexure: Assessment Strategy

Assessment Guidelines

1. Criteria for assessment for the Qualification Pack will be created by IASC.

2. Performance Criteria (PC) have been assigned marks proportional to its importance in NOS. SSC will also lay down proportion of marks for Theory and Skills Practical for each PC.

3. The assessment for the theory part will/may be based on knowledge bank of questions approved IASC.

4. Assessment will be conducted for all compulsory NOS, and where applicable, on the selected elective/option NOS/set of NOS.

5. Assessment Agencies will create Assessor Guides comprising of Theory and Practical Assessment Set and Guidelines for each examination/training centre (as per assessment criteria below). The same will be approved by IASC for adequacy.

6. To successfully attain Certification on the Qualification Pack, the trainee must score a minimum of 70% in each Core NOS and minimum of 70% in all non-core NOS. In addition, a candidate needs to attain a minimum overall pass percentage of 70% for certification.

7. In case of unsuccessful completion, the trainee may seek reassessment on the Qualification Pack.

Annexure: Tools and Equipment

List of Tools and Equipment

Batch Size: 30 Candidate

S. No.	Tool / Equipment Name	Specification	Quantity for specified Batch size
1	CAD Software	As per requirement	As per requirement
2	3D scanner, 3D Printers, and their strategy-making software	As per requirement	As per requirement
3	measuring tools	As per requirement	As per requirement
4	sand blasting machine	As per requirement	As per requirement
5	Inert gas muffle furnace	As per requirement	As per requirement
6	Inert gas or nitrogen gas	As per requirement	As per requirement

7	safety equipment & tools	As per requirement	As per requirement
8	Laser Cutting Machine	As per requirement	As per requirement

Classroom Aids:

The aids required to conduct sessions in the classroom are:

1. Whiteboard, marker pen, projector, standard checklists and schedules
2. Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator's Guide, Participant's Handbook.

Annexure: Industry Validations Summary

S. No	Organization Name	Representative Name	Designation	Contact Address	Contact Phone No	E-mail ID	LinkedIn Profile *(if available)*
1	Servilink	Pratik Patel	Business Development Manager	Servilink Systems Ltd,3rd Floor Concord Building, 201, RC Dutt Rd, opposite Alkapuri Petrol Pump, Aradhana Society, Alkapuri, Vadodara, Gujarat 390007, India	70690 49716	servitech.ssl@servilinksystems.com	
2	TANSAM	Sukhpreet Singh	CEO	Tamil nadu Smart and Advanced Manufacturing Centre, C block, Tidel Park, Taramani, Chennai	9779777057	sukhpreet@tansam.org	
3	TAC Automation	Asif Khan	VP- Sales & Operations	TAC Automation Pvt Ltd- A 20 Phase 2, Noida 201305	8373912163	asif@cloudgem.co.in	
4	IJIRA	Dr. Pradip Chakarvarti	HOD-HRD-IJIRA	17, Taratala Rd, CPT Colony, Taratala, Kolkata, West Bengal 700088	7003997232	pradip@ijira.org.in	

5	AKGEC Skill Foundation	Prof. SOM Ashutosh	GM	27th KM Milestone, Delhi - Meerut Expy, Ghaziabad, Uttar Pradesh 201015	7669094516	ashutoshsom@akgec.ac.in	

Annexure: Training Details

Training Projections:

Year	Estimated Training # of Total Candidates	Estimated training # of Women	Estimated training # of People with Disability
1	500	100	
2	600	150	
3	700	150	

Data to be provided year-wise for next 3 years.

Annexure: Blended Learning

Blended Learning Estimated Ratio & Recommended Tools:

Refer NCVET "Guidelines for Blended Learning for Vocational Education, Training & Skilling" available on:
https://ncvet.gov.in/sites/default/files/Guidelines%20for%20Blended%20Learning%20for%20Vocational%20Education,%20Training%20&%20Skilling.pdf

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		
2	☐ Imparting Soft Skills, Life Skills and Employability Skills /Mentorship to Learners		
3	☐ Showing Practical Demonstrations to the learners		
4	☐ Imparting Practical Hands-on Skills/ Lab Work/ workshop/ shop floor training		
5	☐ Tutorials/ Assignments/ Drill/ Practice		
6	☐ Proctored Monitoring/ Assessment/ Evaluation/ Examinations		
7	☐ On the Job Training (OJT)/ Project Work Internship		

Annexure: Acronym and Glossary

Acronym

Acronym	Description
AA	Assessment Agency
AB	Awarding Body
ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations
NCrF	National Credit Framework
NQR	National Qualification Register
NSQF	National Skills Qualifications Framework
OJT	On the Job Training

Glossary

Term	Description
Qualification	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
Qualification File	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.
Sector	A grouping of professional activities based on their main economic function, product, service or technology.