



Qualification Pack

SR. TECHNICIAN -MECHATRONICS

QP Code: MSME/CSC/Q3101

Version: 1.0

NSQF Level: 4.5

MSME TECHNOLOGY CENTRE ||
B-36 CHANDAKA INDUSTRIAL AREA || email:msmeexamcell@gmail.com



Qualification Pack

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MSME/CSC/Q3101: SR. TECHNICIAN -MECHATRONICS

Brief Job Description

The qualification contains different modules which are required for the job role of Sr. Technician (Mechatronics) This qualified learner shall be able to Install, operate the mechatronics system.

Personal Attributes

The qualification contains different modules which are required for the job role of Sr. Technician (Mechatronics) This qualified learner shall be able to Install, operate the mechatronics system.

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. [MSME/CSC/N3108: Develop Hydraulics & Pneumatics circuit for automation application](#)
2. [MSME/CSC/N3107: Mechatronics Technology](#)
3. [MSME/CSC/N3106: Develop Hydraulics & Pneumatics circuit for automation application](#)
4. [MSME/CSC/N3105: Develop Hydraulics & Pneumatics circuit for automation application](#)
5. [MSME/CSC/N3104: Create & Modify the Electrical circuit diagram using CAD software](#)
6. [MSME/CSC/N3103: Develop Automation Logics using PLC and SCADA](#)
7. [MSME/CSC/N3102: Develop Automation Logics using PLC and SCADA](#)
8. [MSME/CSC/N3101: Demonstrate the Application of Sensors and Actuators](#)
9. [MSME/CSC/N3109: Employability skills 03](#)

Qualification Pack (QP) Parameters

Sector	Capital Goods
Sub-Sector	Machine Tools
Occupation	Automation
Country	India



Qualification Pack

NSQF Level	4.5
Credits	20
Aligned to NCO/ISCO/ISIC Code	(Automation Specialist)
Minimum Educational Qualification & Experience	Completed 3 year diploma after 10th with NA of experience OR Pursuing 3rd year of 3-year diploma after 10th with NA of experience OR Certificate-NSQF (NSQF Level 4 in the field of CNC) with 1.5 years of experience OR 12th grade pass with 2 year NTC/ CITS/NAC with 2 Years of experience
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	NA
Minimum Job Entry Age	17 Years
Last Reviewed On	NA
Next Review Date	30/04/2027
NSQF Approval Date	30/04/2024
Version	1.0
Reference code on NQR	NCVET- QG-4.5-CG-02405-2024-V1-MSME
NQR Version	1.0



Qualification Pack

MSME/CSC/N3108: Develop Hydraulics & Pneumatics circuit for automation application

Description

After completion of course Student should be able to Understand the Mechatronics kits and its component.

Scope

The scope covers the following :

- After completion of course Student should be able to Understand the Mechatronics kits and its component.

Elements and Performance Criteria

MSME/MCCM/05 Mechatronics Technology

To be competent, the user/individual on the job must be able to:

- PC1.** • Understand the Mechatronics project kits and its components
- PC2.** • Understand the mechanical set up, electrical connection, pneumatics connection
- PC3.** Understand the trouble shooting of all the kits.
- PC4.** Discuss about input outputs of the kits.
- PC5.** Understand the interfacing of plc with robotics.
- PC6.** • Understands the working ,principle and how actually robot is working
- PC7.** Process of designing a Mechatronics process
- PC8.** Identify electrical/ hydraulics/ pneumatics components.
- PC9.** • Explain Mechatronics system and illustrate its relevance in engineering design



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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>MSME/MCCM/05 Mechatronics Technology</i>	-	100	-	-
PC1. • Understand the Mechatronics project kits and its components	-	-	-	-
PC2. • Understand the mechanical set up, electrical connection, • pneumatics connection	-	-	-	-
PC3. Understand the trouble shooting of all the kits.	-	-	-	-
PC4. Discuss about input outputs of the kits.	-	-	-	-
PC5. Understand the interfacing of plc with robotics.	-	-	-	-
PC6. • Understands the working ,principle and how actually robot is working	-	-	-	-
PC7. Process of designing a Mechatronics process	-	-	-	-
PC8. Identify electrical/ hydraulics/ pneumatics components.	-	-	-	-
PC9. • Explain Mechatronics system and illustrate its relevance in • engineering design	-	-	-	-
NOS Total	-	100	-	-



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National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3108
NOS Name	Develop Hydraulics & Pneumatics circuit for automation application
Sector	Capital Goods
Sub-Sector	
Occupation	Automation
NSQF Level	4.5
Credits	4
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024



Qualification Pack

MSME/CSC/N3107: Mechatronics Technology

Description

After completion of course Student should be able to Understand the Mechatronics kits and its component.

Scope

The scope covers the following :

- After completion of course Student should be able to Understand the Mechatronics kits and its component.

Elements and Performance Criteria

MSME/MCCM/05 Mechatronics Technology

To be competent, the user/individual on the job must be able to:

- PC1.** • Understand the Mechatronics project kits and its components
- PC2.** • Understand the mechanical set up, electrical connection, pneumatics connection
- PC3.** Understand the trouble shooting of all the kits.
- PC4.** Discuss about input outputs of the kits.
- PC5.** Understand the interfacing of plc with robotics.
- PC6.** • Understands the working ,principle and how actually robot is working
- PC7.** Process of designing a Mechatronics process
- PC8.** Identify electrical/ hydraulics/ pneumatics components.
- PC9.** • Explain Mechatronics system and illustrate its relevance in engineering design



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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>MSME/MCCM/05 Mechatronics Technology</i>	100	-	-	-
PC1. • Understand the Mechatronics project kits and its components	-	-	-	-
PC2. • Understand the mechanical set up, electrical connection, • pneumatics connection	-	-	-	-
PC3. Understand the trouble shooting of all the kits.	-	-	-	-
PC4. Discuss about input outputs of the kits.	-	-	-	-
PC5. Understand the interfacing of plc with robotics.	-	-	-	-
PC6. • Understands the working ,principle and how actually robot is working	-	-	-	-
PC7. Process of designing a Mechatronics process	-	-	-	-
PC8. Identify electrical/ hydraulics/ pneumatics components.	-	-	-	-
PC9. • Explain Mechatronics system and illustrate its relevance in • engineering design	-	-	-	-
NOS Total	100	-	-	-



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National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3107
NOS Name	Mechatronics Technology
Sector	Capital Goods
Sub-Sector	
Occupation	Automation
NSQF Level	4.5
Credits	1
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024



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MSME/CSC/N3106: Develop Hydraulics & Pneumatics circuit for automation application

Description

After completion of course Student should be able to Understanding the basic Hydraulics & Pneumatics system components.

Scope

The scope covers the following :

- After completion of course Student should be able to Understanding the basic Hydraulics & Pneumatics system components.

Elements and Performance Criteria

MSME/MCCM/04 Develop Hydraulics & Pneumatics circuit for automation application

To be competent, the user/individual on the job must be able to:

- | | |
|--------------|--|
| PC1. | <ul style="list-style-type: none">• List different energy supply elements relate to hydraulics & pneumatics. |
| PC2. | <ul style="list-style-type: none">• Identify the hydraulics & pneumatic power system elements• relate to hydraulics & pneumatics. |
| PC3. | Identify the hydraulics & pneumatic power system elements. |
| PC4. | <ul style="list-style-type: none">• Select appropriate elements / components / symbols for the• given process. |
| PC5. | Select different standard elements |
| PC6. | Recommend variation within the standards, symbols. |
| PC7. | Describe the functioning of different elements, systems |
| PC8. | Differentiate between systems. |
| PC9. | <ul style="list-style-type: none">• Perform basic mathematical calculation required for cylinder• speed. |
| PC10. | Select appropriate Hydraulic Pump. |
| PC11. | Describe the functioning of different control valves. |
| PC12. | Identify different type of control valves & accessories |
| PC13. | <ul style="list-style-type: none">• Discuss applications & advantages of hydro -pneumatic• systems |
| PC14. | <ul style="list-style-type: none">• Design the conceptual hydraulic and pneumatic circuit• diagram. |
| PC15. | Simulate the circuit diagrams. |
| PC16. | Identify different electrical, pneumatic, hydraulic elements |
| PC17. | Apply logic & creativity to design circuits. |
| PC18. | Analyze the simulation results. |
| PC19. | Communicate the simulation results |



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- PC20.** Design the programmable circuit sequence
- PC21.** Analyze stepper control outputs.
- PC22.** Explain servo controls applications.
- PC23.** Design circuits with proportional valves.
- PC24.** Design cartridge valves
- PC25.** Troubleshoot faults in system components.
- PC26.** Follow safety standards.
- PC27.** Follow safety standards.
- PC28.** Suggest remedy for the fault.



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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>MSME/MCCM/04 Develop Hydraulics & Pneumatics circuit for automation application</i>	-	100	-	-
PC1. • List different energy supply elements relate to hydraulics & • pneumatics.	-	-	-	-
PC2. • Identify the hydraulics & pneumatic power system elements • relate to hydraulics & pneumatics.	-	-	-	-
PC3. Identify the hydraulics & pneumatic power system elements.	-	-	-	-
PC4. • Select appropriate elements / components / symbols for the • given process.	-	-	-	-
PC5. Select different standard elements	-	-	-	-
PC6. Recommend variation within the standards, symbols.	-	-	-	-
PC7. Describe the functioning of different elements, systems	-	-	-	-
PC8. Differentiate between systems.	-	-	-	-
PC9. • Perform basic mathematical calculation required for cylinder • speed.	-	-	-	-
PC10. Select appropriate Hydraulic Pump.	-	-	-	-
PC11. Describe the functioning of different control valves.	-	-	-	-
PC12. Identify different type of control valves & accessories	-	-	-	-



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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. • Discuss applications & advantages of hydro - pneumatic • systems	-	-	-	-
PC14. • Design the conceptual hydraulic and pneumatic circuit • diagram.	-	-	-	-
PC15. Simulate the circuit diagrams.	-	-	-	-
PC16. Identify different electrical, pneumatic, hydraulic elements	-	-	-	-
PC17. Apply logic & creativity to design circuits.	-	-	-	-
PC18. Analyze the simulation results.	-	-	-	-
PC19. Communicate the simulation results	-	-	-	-
PC20. Design the programmable circuit sequence	-	-	-	-
PC21. Analyze stepper control outputs.	-	-	-	-
PC22. Explain servo controls applications.	-	-	-	-
PC23. Design circuits with proportional valves.	-	-	-	-
PC24. Design cartridge valves	-	-	-	-
PC25. Troubleshoot faults in system components.	-	-	-	-
PC26. Follow safety standards.	-	-	-	-
PC27. Follow safety standards.	-	-	-	-
PC28. Suggest remedy for the fault.	-	-	-	-
NOS Total	-	100	-	-



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National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3106
NOS Name	Develop Hydraulics & Pneumatics circuit for automation application
Sector	Capital Goods
Sub-Sector	
Occupation	Automation
NSQF Level	4.5
Credits	3
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024



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MSME/CSC/N3105: Develop Hydraulics & Pneumatics circuit for automation application

Description

After completion of course Student should be able to Understanding the basic Hydraulics & Pneumatics system components.

Scope

The scope covers the following :

- After completion of course Student should be able to Understanding the basic Hydraulics & Pneumatics system components.

Elements and Performance Criteria

MSME/MCCM/04 Develop Hydraulics & Pneumatics circuit for automation application

To be competent, the user/individual on the job must be able to:

- | | |
|--------------|--|
| PC1. | <ul style="list-style-type: none">• List different energy supply elements relate to hydraulics & pneumatics. |
| PC2. | <ul style="list-style-type: none">• Identify the hydraulics & pneumatic power system elements• relate to hydraulics & pneumatics. |
| PC3. | Identify the hydraulics & pneumatic power system elements. |
| PC4. | <ul style="list-style-type: none">• Select appropriate elements / components / symbols for the• given process. |
| PC5. | Select different standard elements |
| PC6. | Recommend variation within the standards, symbols. |
| PC7. | Describe the functioning of different elements, systems |
| PC8. | Differentiate between systems. |
| PC9. | <ul style="list-style-type: none">• Perform basic mathematical calculation required for cylinder• speed. |
| PC10. | Select appropriate Hydraulic Pump. |
| PC11. | Describe the functioning of different control valves. |
| PC12. | Identify different type of control valves & accessories |
| PC13. | <ul style="list-style-type: none">• Discuss applications & advantages of hydro -pneumatic• systems |
| PC14. | <ul style="list-style-type: none">• Design the conceptual hydraulic and pneumatic circuit• diagram. |
| PC15. | Simulate the circuit diagrams. |
| PC16. | Identify different electrical, pneumatic, hydraulic elements |
| PC17. | Apply logic & creativity to design circuits. |
| PC18. | Analyze the simulation results. |
| PC19. | Communicate the simulation results |



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- PC20.** Design the programmable circuit sequence
- PC21.** Analyze stepper control outputs.
- PC22.** Explain servo controls applications.
- PC23.** Design circuits with proportional valves.
- PC24.** Design cartridge valves
- PC25.** Troubleshoot faults in system components.
- PC26.** Follow safety standards.
- PC27.** Follow safety standards.
- PC28.** Suggest remedy for the fault.



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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>MSME/MCCM/04 Develop Hydraulics & Pneumatics circuit for automation application</i>	100	-	-	-
PC1. • List different energy supply elements relate to hydraulics & • pneumatics.	-	-	-	-
PC2. • Identify the hydraulics & pneumatic power system elements • relate to hydraulics & pneumatics.	-	-	-	-
PC3. Identify the hydraulics & pneumatic power system elements.	-	-	-	-
PC4. • Select appropriate elements / components / symbols for the • given process.	-	-	-	-
PC5. Select different standard elements	-	-	-	-
PC6. Recommend variation within the standards, symbols.	-	-	-	-
PC7. Describe the functioning of different elements, systems	-	-	-	-
PC8. Differentiate between systems.	-	-	-	-
PC9. • Perform basic mathematical calculation required for cylinder • speed.	-	-	-	-
PC10. Select appropriate Hydraulic Pump.	-	-	-	-
PC11. Describe the functioning of different control valves.	-	-	-	-
PC12. Identify different type of control valves & accessories	-	-	-	-



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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC13. • Discuss applications & advantages of hydro - pneumatic • systems	-	-	-	-
PC14. • Design the conceptual hydraulic and pneumatic circuit • diagram.	-	-	-	-
PC15. Simulate the circuit diagrams.	-	-	-	-
PC16. Identify different electrical, pneumatic, hydraulic elements	-	-	-	-
PC17. Apply logic & creativity to design circuits.	-	-	-	-
PC18. Analyze the simulation results.	-	-	-	-
PC19. Communicate the simulation results	-	-	-	-
PC20. Design the programmable circuit sequence	-	-	-	-
PC21. Analyze stepper control outputs.	-	-	-	-
PC22. Explain servo controls applications.	-	-	-	-
PC23. Design circuits with proportional valves.	-	-	-	-
PC24. Design cartridge valves	-	-	-	-
PC25. Troubleshoot faults in system components.	-	-	-	-
PC26. Follow safety standards.	-	-	-	-
PC27. Follow safety standards.	-	-	-	-
PC28. Suggest remedy for the fault.	-	-	-	-
NOS Total	100	-	-	-



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National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3105
NOS Name	Develop Hydraulics & Pneumatics circuit for automation application
Sector	Capital Goods
Sub-Sector	
Occupation	Automation
NSQF Level	4.5
Credits	1
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024



Qualification Pack

MSME/CSC/N3104: Create & Modify the Electrical circuit diagram using CAD software

Description

Use the fundamental features and precision drafting tools in Electrical CAD to develop accurate technical drawings

Scope

The scope covers the following :

- Use the fundamental features and precision drafting tools in Electrical CAD to develop accurate technical
- drawings

Elements and Performance Criteria

MSME/MCCM/03 Create & Modify the Electrical circuit diagram using CAD software

To be competent, the user/individual on the job must be able to:

- PC1.** Understand Procedure to be adopted for computer aided drawings
- PC2.** Describe co-ordinate system
- PC3.** Understand the applications of co-ordinate system
- PC4.** Use the AutoCAD workspace and user interface.
- PC5.** Use the AutoCAD workspace and user interface.
- PC6.** Optimize commands effectively
- PC7.** Use more advanced editing and construction techniques.
- PC8.** Add parametric constraints to objects.
- PC9.** List the steps of Computer aided electrical drawing.
- PC10.** Use the Electrical CAD workspace and user interface.
- PC11.** Use the Electrical CAD workspace and user interface
- PC12.** Draw various electrical circuits using CAD software.
- PC13.** Build intelligent ladder diagrams and panel layouts.
- PC14.**
 - Insert and edit parametric PLC modules, nonparametric PLC modules, and Stand-alone PLC I/O points



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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>MSME/MCCM/03 Create & Modify the Electrical circuit diagram using CAD software</i>	-	100	-	-
PC1. Understand Procedure to be adopted for computer aided drawings	-	-	-	-
PC2. Describe co-ordinate system	-	-	-	-
PC3. Understand the applications of co-ordinate system	-	-	-	-
PC4. Use the AutoCAD workspace and user interface.	-	-	-	-
PC5. Use the AutoCAD workspace and user interface.	-	-	-	-
PC6. Optimize commands effectively	-	-	-	-
PC7. Use more advanced editing and construction techniques.	-	-	-	-
PC8. Add parametric constraints to objects.	-	-	-	-
PC9. List the steps of Computer aided electrical drawing.	-	-	-	-
PC10. Use the Electrical CAD workspace and user interface.	-	-	-	-
PC11. Use the Electrical CAD workspace and user interface	-	-	-	-
PC12. Draw various electrical circuits using CAD software.	-	-	-	-
PC13. Build intelligent ladder diagrams and panel layouts.	-	-	-	-
PC14. • Insert and edit parametric PLC modules, nonparametric PLC • modules, and Stand-alone PLC I/O points	-	-	-	-
NOS Total	-	100	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3104
NOS Name	Create & Modify the Electrical circuit diagram using CAD software
Sector	Capital Goods
Sub-Sector	
Occupation	Automation
NSQF Level	4.5
Credits	2
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024



Qualification Pack

MSME/CSC/N3103: Develop Automation Logics using PLC and SCADA

Description

Understand the relay logic and its working detail.

Scope

The scope covers the following :

- Understand the relay logic and its working detail.

Elements and Performance Criteria

MSME/MCCM/02 Develop Automation Logics using PLC and SCADA

To be competent, the user/individual on the job must be able to:

- PC1.** Understand the concept of industrial automation.
- PC2.** List the advantages and disadvantages of automation.
- PC3.** Describe different control systems
- PC4.** Understand & draw various electrical symbols
- PC5.** Draw and explain one line diagram for different situations.
- PC6.** List the different field devices.
- PC7.** List the different field devices
- PC8.** Explain the working of a relay.
- PC9.** Describe the construction of a relay.
- PC10.** Explain the importance of relay.
- PC11.** Give applications of relay in industrial circuits.
- PC12.** Demonstrate the hardware configuration of PLC
- PC13.** Understand the addressing of inputs and outputs in PLC.
- PC14.** Explain the environment of PLC software.
- PC15.** Demonstrate the software installation.
- PC16.** Develop the program in the PLC with different formats.
- PC17.** Understand the output of a program.
- PC18.** Use the different internal peripherals of PLC.
- PC19.** Demonstrate the networking of the PLC.
- PC20.** Understand the need of SCADA system in automation
- PC21.** Differentiate between PLC & SCADA.
- PC22.** Describe the application of SCADA system.
- PC23.** Understand procedure of installing the SCADA software.
- PC24.** Create new application in software in SCADA.
- PC25.** Work on graphic designer window in SCADA.
- PC26.** Create and modify graphic display with animation in SCADA.



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- PC27.** • Detect the fault in the production system by using the SCADA
• software
- PC28.** • Understand the details of process tags and internal tags in
• SCADA
- PC29.** Apply the LAD programming on SCADA projects.
- PC30.** Use the property setting of tags in SCADA.
- PC31.** Apply standard and other objects for the graphic design.
- PC32.** Create a SCADA picture window related to any process
- PC33.** Develop multi screens
- PC34.** Apply LAD program to simulate the screen designed.
- PC35.** Use the different tags in a project.
- PC36.** Understand the concept of logging system in SCADA
- PC37.** Understand the principles of message system.
- PC38.** Create on line trend.
- PC39.** Develop a new system
- PC40.** Interface field devices with the SCADA system.
- PC41.** Simulate the designed SCADA system



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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>MSME/MCCM/02 Develop Automation Logics using PLC and SCADA</i>	-	100	-	-
PC1. Understand the concept of industrial automation.	-	-	-	-
PC2. List the advantages and disadvantages of automation.	-	-	-	-
PC3. Describe different control systems	-	-	-	-
PC4. Understand & draw various electrical symbols	-	-	-	-
PC5. Draw and explain one line diagram for different situations.	-	-	-	-
PC6. List the different field devices.	-	-	-	-
PC7. List the different field devices	-	-	-	-
PC8. Explain the working of a relay.	-	-	-	-
PC9. Describe the construction of a relay.	-	-	-	-
PC10. Explain the importance of relay.	-	-	-	-
PC11. Give applications of relay in industrial circuits.	-	-	-	-
PC12. Demonstrate the hardware configuration of PLC	-	-	-	-
PC13. Understand the addressing of inputs and outputs in PLC.	-	-	-	-
PC14. Explain the environment of PLC software.	-	-	-	-
PC15. Demonstrate the software installation.	-	-	-	-
PC16. Develop the program in the PLC with different formats.	-	-	-	-
PC17. Understand the output of a program.	-	-	-	-



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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC18. Use the different internal peripherals of PLC.	-	-	-	-
PC19. Demonstrate the networking of the PLC.	-	-	-	-
PC20. Understand the need of SCADA system in automation	-	-	-	-
PC21. Differentiate between PLC & SCADA.	-	-	-	-
PC22. Describe the application of SCADA system.	-	-	-	-
PC23. Understand procedure of installing the SCADA software.	-	-	-	-
PC24. Create new application in software in SCADA.	-	-	-	-
PC25. Work on graphic designer window in SCADA.	-	-	-	-
PC26. Create and modify graphic display with animation in SCADA.	-	-	-	-
PC27. • Detect the fault in the production system by using the SCADA • software	-	-	-	-
PC28. • Understand the details of process tags and internal tags in • SCADA	-	-	-	-
PC29. Apply the LAD programming on SCADA projects.	-	-	-	-
PC30. Use the property setting of tags in SCADA.	-	-	-	-
PC31. Apply standard and other objects for the graphic design.	-	-	-	-
PC32. Create a SCADA picture window related to any process	-	-	-	-
PC33. Develop multi screens	-	-	-	-



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC34. Apply LAD program to simulate the screen designed.	-	-	-	-
PC35. Use the different tags in a project.	-	-	-	-
PC36. Understand the concept of logging system in SCADA	-	-	-	-
PC37. Understand the principles of message system.	-	-	-	-
PC38. Create on line trend.	-	-	-	-
PC39. Develop a new system	-	-	-	-
PC40. Interface field devices with the SCADA system.	-	-	-	-
PC41. Simulate the designed SCADA system	-	-	-	-
NOS Total	-	100	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3103
NOS Name	Develop Automation Logics using PLC and SCADA
Sector	Capital Goods
Sub-Sector	
Occupation	Automation
NSQF Level	4.5
Credits	3
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024



Qualification Pack

MSME/CSC/N3102: Develop Automation Logics using PLC and SCADA

Description

Understand the relay logic and its working detail.

Scope

The scope covers the following :

- Understand the relay logic and its working detail.

Elements and Performance Criteria

MSME/MCCM/02 Develop Automation Logics using PLC and SCADA

To be competent, the user/individual on the job must be able to:

- PC1.** Understand the concept of industrial automation.
- PC2.** List the advantages and disadvantages of automation.
- PC3.** Describe different control systems
- PC4.** Understand & draw various electrical symbols
- PC5.** Draw and explain one line diagram for different situations.
- PC6.** List the different field devices.
- PC7.** List the different field devices
- PC8.** Explain the working of a relay.
- PC9.** Describe the construction of a relay.
- PC10.** Explain the importance of relay.
- PC11.** Give applications of relay in industrial circuits.
- PC12.** Demonstrate the hardware configuration of PLC
- PC13.** Understand the addressing of inputs and outputs in PLC.
- PC14.** Explain the environment of PLC software.
- PC15.** Demonstrate the software installation.
- PC16.** Develop the program in the PLC with different formats.
- PC17.** Understand the output of a program.
- PC18.** Use the different internal peripherals of PLC.
- PC19.** Demonstrate the networking of the PLC.
- PC20.** Understand the need of SCADA system in automation
- PC21.** Differentiate between PLC & SCADA.
- PC22.** Describe the application of SCADA system.
- PC23.** Understand procedure of installing the SCADA software.
- PC24.** Create new application in software in SCADA.
- PC25.** Work on graphic designer window in SCADA.
- PC26.** Create and modify graphic display with animation in SCADA.



Qualification Pack

- PC27.** • Detect the fault in the production system by using the SCADA
• software
- PC28.** • Understand the details of process tags and internal tags in
• SCADA
- PC29.** Apply the LAD programming on SCADA projects.
- PC30.** Use the property setting of tags in SCADA.
- PC31.** Apply standard and other objects for the graphic design.
- PC32.** Create a SCADA picture window related to any process
- PC33.** Develop multi screens
- PC34.** Apply LAD program to simulate the screen designed.
- PC35.** Use the different tags in a project.
- PC36.** Understand the concept of logging system in SCADA
- PC37.** Understand the principles of message system.
- PC38.** Create on line trend.
- PC39.** Develop a new system
- PC40.** Interface field devices with the SCADA system.
- PC41.** Simulate the designed SCADA system



Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>MSME/MCCM/02 Develop Automation Logics using PLC and SCADA</i>	100	-	-	-
PC1. Understand the concept of industrial automation.	-	-	-	-
PC2. List the advantages and disadvantages of automation.	-	-	-	-
PC3. Describe different control systems	-	-	-	-
PC4. Understand & draw various electrical symbols	-	-	-	-
PC5. Draw and explain one line diagram for different situations.	-	-	-	-
PC6. List the different field devices.	-	-	-	-
PC7. List the different field devices	-	-	-	-
PC8. Explain the working of a relay.	-	-	-	-
PC9. Describe the construction of a relay.	-	-	-	-
PC10. Explain the importance of relay.	-	-	-	-
PC11. Give applications of relay in industrial circuits.	-	-	-	-
PC12. Demonstrate the hardware configuration of PLC	-	-	-	-
PC13. Understand the addressing of inputs and outputs in PLC.	-	-	-	-
PC14. Explain the environment of PLC software.	-	-	-	-
PC15. Demonstrate the software installation.	-	-	-	-
PC16. Develop the program in the PLC with different formats.	-	-	-	-
PC17. Understand the output of a program.	-	-	-	-



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC18. Use the different internal peripherals of PLC.	-	-	-	-
PC19. Demonstrate the networking of the PLC.	-	-	-	-
PC20. Understand the need of SCADA system in automation	-	-	-	-
PC21. Differentiate between PLC & SCADA.	-	-	-	-
PC22. Describe the application of SCADA system.	-	-	-	-
PC23. Understand procedure of installing the SCADA software.	-	-	-	-
PC24. Create new application in software in SCADA.	-	-	-	-
PC25. Work on graphic designer window in SCADA.	-	-	-	-
PC26. Create and modify graphic display with animation in SCADA.	-	-	-	-
PC27. • Detect the fault in the production system by using the SCADA • software	-	-	-	-
PC28. • Understand the details of process tags and internal tags in • SCADA	-	-	-	-
PC29. Apply the LAD programming on SCADA projects.	-	-	-	-
PC30. Use the property setting of tags in SCADA.	-	-	-	-
PC31. Apply standard and other objects for the graphic design.	-	-	-	-
PC32. Create a SCADA picture window related to any process	-	-	-	-
PC33. Develop multi screens	-	-	-	-



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC34. Apply LAD program to simulate the screen designed.	-	-	-	-
PC35. Use the different tags in a project.	-	-	-	-
PC36. Understand the concept of logging system in SCADA	-	-	-	-
PC37. Understand the principles of message system.	-	-	-	-
PC38. Create on line trend.	-	-	-	-
PC39. Develop a new system	-	-	-	-
PC40. Interface field devices with the SCADA system.	-	-	-	-
PC41. Simulate the designed SCADA system	-	-	-	-
NOS Total	100	-	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3102
NOS Name	Develop Automation Logics using PLC and SCADA
Sector	Capital Goods
Sub-Sector	
Occupation	Automation
NSQF Level	4.5
Credits	1
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024



Qualification Pack

MSME/CSC/N3101: Demonstrate the Application of Sensors and Actuators

Description

After completion of course Student should be able to Describe and explain different measurement techniques.

Scope

The scope covers the following :

- After completion of course Student should be able to Describe and explain different measurement techniques.

Elements and Performance Criteria

MSME/MCCM/01 Demonstrate the Application of Sensors and Actuators

To be competent, the user/individual on the job must be able to:

- PC1.** Describe units and standards
- PC2.** Discuss errors in measurement.
- PC3.** Explain characteristics of transducers.
- PC4.** Classify the transducers.
- PC5.**
 - Describe functioning of different temperature measuring instruments.
- PC6.** Explain working of different gauges.
- PC7.** Explain working of different transducers.
- PC8.** Differentiate between different transducers.
- PC9.** List functions of transducers.
- PC10.** List smart sensors
- PC11.** Differentiate between smart sensors and others.
- PC12.** Give applications of smart sensors
- PC13.** List types of actuators.
- PC14.** Describe the function of each type of actuator
- PC15.**
 - Differentiate between mechanical, electrical and other actuators.
- PC16.** Give applications of each type of actuator.
- PC17.**
 - Demonstrate operation of different motors such as PMDC
 - Motor, Stepper motor, three phase squirrel cage induction motor, three phase permanent magnet synchronous motor,
 - servo motor



Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>MSME/MCCM/01 Demonstrate the Application of Sensors and Actuators</i>	100	-	-	-
PC1. Describe units and standards	-	-	-	-
PC2. Discuss errors in measurement.	-	-	-	-
PC3. Explain characteristics of transducers.	-	-	-	-
PC4. Classify the transducers.	-	-	-	-
PC5. • Describe functioning of different temperature measuring • instruments.	-	-	-	-
PC6. Explain working of different gauges.	-	-	-	-
PC7. Explain working of different transducers.	-	-	-	-
PC8. Differentiate between different transducers.	-	-	-	-
PC9. List functions of transducers.	-	-	-	-
PC10. List smart sensors	-	-	-	-
PC11. Differentiate between smart sensors and others.	-	-	-	-
PC12. Give applications of smart sensors	-	-	-	-
PC13. List types of actuators.	-	-	-	-
PC14. Describe the function of each type of actuator	-	-	-	-
PC15. • Differentiate between mechanical, electrical and other • actuators.	-	-	-	-
PC16. Give applications of each type of actuator.	-	-	-	-



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC17. • Demonstrate operation of different motors such as PMDC • Motor, Stepper motor, three phase squirrel cage induction • motor, three phase permanent magnet synchronous motor, • servo motor	-	-	-	-
NOS Total	100	-	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3101
NOS Name	Demonstrate the Application of Sensors and Actuators
Sector	Capital Goods
Sub-Sector	
Occupation	Automation
NSQF Level	4.5
Credits	3
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024



Qualification Pack

MSME/CSC/N3109: Employability skills 03

Description

This unit is about employability skills, Constitutional values, becoming a professional in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion, English and communication skills, customer service, entrepreneurship, and apprenticeship, getting ready for jobs and career development.

Scope

The scope covers the following :

- This unit is about employability skills, Constitutional values, becoming a professional
- in the 21st Century, digital, financial, and legal literacy, diversity and Inclusion,
- English and communication skills, customer service, entrepreneurship, and
- apprenticeship, getting ready for jobs and career development.

Elements and Performance Criteria

MSME/ES/01 Employability skills

To be competent, the user/individual on the job must be able to:

- PC1.** Explain the major applications of MS Office
- PC2.** Explain the different types of e-commerce
- PC3.** List the benefits of e-commerce for retailers and customers
- PC4.** Discuss how the Digital India campaign will help boost ecommerce in India
- PC5.** Write applications pertaining to various matters
- PC6.**
 - Explain power of positive attitude and Importance of commitment
- PC7.**
 - Explain motivation and the Ways to motivate oneself and
 - Personal goal setting
- PC8.** Explain the Effective & Level of Communication
- PC9.**
 - Explain communication and Significance of technical communication?
- PC10.** Explain the methods of listening Skills.
- PC11.** Explain the differences between bio-data, CV and Resume.
- PC12.** Explain verbal and non-verbal Communication
- PC13.** Explain how to face an interview.
- PC14.** Explain team work, group work, team formation process
- PC15.** How to Minimize the team conflicts
- PC16.** Explain Ethics & values
- PC17.**
 - Explain the concept of entrepreneurship, and entrepreneurship v/s Management
- PC18.**
 - Explain the process of project report preparation for setting up a new business



Qualification Pack

- PC19.** Explain the role of various schemes and institute for selfemployment i.e MSME, DIC, NSIC, SIDBI etc,
- PC20.** Role of financial institution to support startup
- PC21.** Discuss the importance of saving money
- PC22.** Discuss the main types of bank accounts
- PC23.** Differentiate between fixed and variable costs
- PC24.** Describe the different types of insurance products
- PC25.** Discuss the main types of electronic funds transfers



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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>MSME/ES/01 Employability skills</i>	100	-	-	-
PC1. Explain the major applications of MS Office	-	-	-	-
PC2. Explain the different types of e-commerce	-	-	-	-
PC3. List the benefits of e-commerce for retailers and customers	-	-	-	-
PC4. Discuss how the Digital India campaign will help boost ecommerce in India	-	-	-	-
PC5. Write applications pertaining to various matters	-	-	-	-
PC6. • Explain power of positive attitude and Importance of • commitment	-	-	-	-
PC7. • Explain motivation and the Ways to motivate oneself and • Personal goal setting	-	-	-	-
PC8. Explain the Effective & Level of Communication	-	-	-	-
PC9. • Explain communication and Significance of technical • communication?	-	-	-	-
PC10. Explain the methods of listening Skills.	-	-	-	-
PC11. Explain the differences between bio-data, CV and Resume.	-	-	-	-
PC12. Explain verbal and non-verbal Communication	-	-	-	-
PC13. Explain how to face an interview.	-	-	-	-
PC14. Explain team work, group work, team formation process	-	-	-	-



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC15. How to Minimize the team conflicts	-	-	-	-
PC16. Explain Ethics & values	-	-	-	-
PC17. - Explain the concept of entrepreneurship, and entrepreneurship - v/s Management	-	-	-	-
PC18. - Explain the process of project report preparation for setting up - a new business	-	-	-	-
PC19. Explain the role of various schemes and institute for selfemployment i.e MSME, DIC, NSIC, SIDBI etc,	-	-	-	-
PC20. Role of financial institution to support startup	-	-	-	-
PC21. Discuss the importance of saving money	-	-	-	-
PC22. Discuss the main types of bank accounts	-	-	-	-
PC23. Differentiate between fixed and variable costs	-	-	-	-
PC24. Describe the different types of insurance products	-	-	-	-
PC25. Discuss the main types of electronic funds transfers	-	-	-	-
NOS Total	100	-	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3109
NOS Name	Employability skills 03
Sector	Capital Goods
Sub-Sector	
Occupation	Automation
NSQF Level	4.5
Credits	2
Version	1.0
Last Reviewed Date	30/04/2024
Next Review Date	30/04/2027
NSQC Clearance Date	30/04/2024

Assessment Guidelines and Assessment Weightage

Assessment Guidelines

As per QP

Minimum Aggregate Passing % at QP Level : 40

(Please note: Every Trainee should score a minimum aggregate passing percentage as specified above, to successfully clear the Qualification Pack assessment.)

Assessment Weightage

Compulsory NOS



Qualification Pack

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MSME/CSC/N3108.Develop Hydraulics & Pneumatics circuit for automation application	-	100	-	-	100	20
MSME/CSC/N3107.Mechatronics Technology	100	-	-	-	100	10
MSME/CSC/N3106.Develop Hydraulics & Pneumatics circuit for automation application	-	100	-	-	100	10
MSME/CSC/N3105.Develop Hydraulics & Pneumatics circuit for automation application	100	-	-	-	100	10
MSME/CSC/N3104.Create & Modify the Electrical circuit diagram using CAD software	-	100	-	-	100	10
MSME/CSC/N3103.Develop Automation Logics using PLC and SCADA	-	100	-	-	100	10
MSME/CSC/N3102.Develop Automation Logics using PLC and SCADA	100	-	-	-	100	10
MSME/CSC/N3101.Demonstrate the Application of Sensors and Actuators	100	-	-	-	100	10
MSME/CSC/N3109.Employability skills 03	100	-	-	-	100	10
Total	500	400	-	-	900	100



Qualification Pack

Acronyms

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training



Qualification Pack

Glossary

Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context.
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.



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Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.