सत्यमेव जयते
GOVERNMENT OF INDIA
MINISTRY OF SKILL DEVELOPMENT
& ENTREPRENEURSHIP

कौशल गुणवत्ता प्रगति

Qualification Pack

ASSISTANT MECHATRONICS SYSTEM DESIGNER

QP Code: MSME/CSC/Q3403

Version: 1.0

NSQF Level: 5

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

Contents

Qualification Pack

MSME/CSC/Q3403: ASSISTANT MECHATRONICS SYSTEM DESIGNER

Brief Job Description

Design and operate the mechatronics system. Prepare and execute logic using PLC SCADA programming. Prepare Electrical system drawing Use and control the system using pneumatics and Hydraulic Design industrial Pneumatic layout and circuit diagram Design Electro - Pneumatic layout and circuit diagram Design hydraulic system layout and circuit diagram Design hydraulic system circuit diagram Control panel design for PLC, SCADA, HMI, Motor and drive Mechatronics system design for industrial automation To get an employment in Engineering Manufacturing industries and also become an entrepreneur

Personal Attributes

Design and operate the mechatronics system.Prepare and execute logic using PLC SCADA programming. Prepare Electrical system drawing Use and control the system using pneumatics and Hydraulic Design industrial Pneumatic layout and circuit diagram Design Electro - Pneumatic layout and circuit diagram Design hydraulic system layout and circuit diagram Design hydraulic system circuit diagram Control panel design for PLC, SCADA, HMI, Motor and drive Mechatronics system design for industrial automation To get an employment in Engineering Manufacturing industries and also become an entrepreneur

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. MSME/CSC/N3042: EMPLOYABILITY SKILL
2. MSME/CSC/N3034: Develop Hydraulics & Pneumatics circuit for Mechatronics System
3. MSME/CSC/N3033: Develop Hydraulics & Pneumatics circuit for Mechatronics system
4. MSME/CSC/N3032: Develop Automation Logics using PLC
5. MSME/CSC/N3214: Demonstrate of Industrial Automation sensors
6. MSME/CSC/N3213: Demonstrate of Industrial Automation Sensors
7. MSME/CSC/N3031: Fundamentals of Mechatronics system
8. MSME/CSC/N3039: Application of Embedded Technology for Mechatronics system
9. MSME/CSC/N3038: Application of Embedded technology for Mechatronics System
10. MSME/CSC/N3037: Demonstrate of electrical Motors and drives
11. MSME/CSC/N3036: Demonstrate of electrical Motors and Drives
12. MSME/CSC/N3035: Create & Modify the Electrical circuit & mechanical drawing using CAD

software

13. MSME/CSC/N3041: Mechatronics System design
14. MSME/CSC/N3040: Application of SCADA and HMI in Mechatronics system
15. MSME/CSC/N3215: Engineering Metrology and Quality Control
16. MSME/CSC/N0505: Employability Skills

Qualification Pack (QP) Parameters

Sector	Capital Goods
Sub-Sector	Machine Tools
Occupation	Manufacturing, Designing
Country	India
NSQF Level	5
Credits	54
Aligned to NCO/ISCO/ISIC Code	7412.01(Automation Specialist)
Minimum Educational Qualification & Experience	Completed 3-year diploma (after 10th) OR Previous relevant Qualification of NSQF Level (4.5) with 1.5 years of experience OR Previous relevant Qualification of NSQF Level (4) with 3 Years of experience
Minimum Level of Education for Training in School	
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	NA
Next Review Date	08/05/2028
NSQC Approval Date	08/05/2025
Version	1.0

Reference code on NQR	QG-05-IT-04171-2025-V1-MSME
NQR Version	1.0

MSME/CSC/N3042: EMPLOYABILITY SKILL

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/02

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

PC1. Explain how to face an interview.

PC2. Explain team work, group work, team formation process

PC3. How to Minimize the team conflicts

PC4. Explain Ethics & values

PC5. • Explain the concept of entrepreneurship, and
• entrepreneurship v/s Management

PC6. • Explain the process of project report preparation for
• setting up a new business

PC7. Explain the role of various schemes and institute for selfemployment i.e MSME, DIC, NSIC, SIDBI etc,

PC8. Role of financial institution to support startup

PC9. Discuss the importance of saving money

PC10. Discuss the main types of bank accounts

PC11. Differentiate between fixed and variable costs

PC12. Describe the different types of insurance products

PC13. Discuss the main types of electronic funds transfers

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/ES/02	**100**	**-**	**-**	**-**
PC1. Explain how to face an interview.	-	-	-	-
PC2. Explain team work, group work, team formation process	-	-	-	-
PC3. How to Minimize the team conflicts	-	-	-	-
PC4. Explain Ethics & values	-	-	-	-
PC5. • Explain the concept of entrepreneurship, and • entrepreneurship v/s Management	-	-	-	-
PC6. • Explain the process of project report preparation for • setting up a new business	-	-	-	-
PC7. Explain the role of various schemes and institute for selfemployment i.e MSME, DIC, NSIC, SIDBI etc,	-	-	-	-
PC8. Role of financial institution to support startup	-	-	-	-
PC9. Discuss the importance of saving money	-	-	-	-
PC10. Discuss the main types of bank accounts	-	-	-	-
PC11. Differentiate between fixed and variable costs	-	-	-	-
PC12. Describe the different types of insurance products	-	-	-	-
PC13. Discuss the main types of electronic funds transfers	-	-	-	-
NOS Total	**100**	**-**	**-**	**-**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3042
NOS Name	EMPLOYABILITY SKILL
Sector	Capital Goods
Sub-Sector	
Occupation	Designing , Manufacturing
NSQF Level	5
Credits	2
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

MSME/CSC/N3034: Develop Hydraulics & Pneumatics circuit for Mechatronics System

Description

Understanding the basic Hydraulics & Pneumatics system components. Draws a basic pneumatic components (compressor, receiver, drain valves, check valves, pneumatic cylinders) and pneumatic circuit diagram with symbols Able to understand the working principle and symbolic representation of different energy supply elements. Understand hazards of hydraulic and pneumatic circuits and be able to work safely. Understand the concepts of Hydraulic and Pneumatic as applied to commercial and industrial control. Understand the concepts Electro-Pneumatic and Electro-Hydraulics Draw a hydraulic circuit diagram, understand the basic elements. Know the properties of the basic elements used in the hydraulic system. Explain types of hydraulic pumps, the basic functions and features

Scope

The scope covers the following :

- Understanding the basic Hydraulics & Pneumatics system components.
- Draws a basic pneumatic components (compressor, receiver, drain valves, check valves, pneumatic cylinders)
- and pneumatic circuit diagram with symbols
- Able to understand the working principle and symbolic representation of different energy supply elements.
- Understand hazards of hydraulic and pneumatic circuits and be able to work safely.
- Understand the concepts of Hydraulic and Pneumatic as applied to commercial and industrial control.
- Understand the concepts Electro-Pneumatic and Electro-Hydraulics
- Draw a hydraulic circuit diagram, understand the basic elements. Know the properties of the basic elements
- used in the hydraulic system.
- Explain types of hydraulic pumps, the basic functions and features

Elements and Performance Criteria

MSME/SMSD/04

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

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
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.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/SMSD/04	**-**	**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	-	-	-	-
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	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
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.	-	-	-	-
NOS Total	**-**	**100**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3034
NOS Name	Develop Hydraulics & Pneumatics circuit for Mechatronics System
Sector	Capital Goods
Sub-Sector	
Occupation	Designing , Manufacturing
NSQF Level	5
Credits	4
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

MSME/CSC/N3033: Develop Hydraulics & Pneumatics circuit for Mechatronics system

Description

Understanding the basic Hydraulics & Pneumatics system components. Draws a basic pneumatic components (compressor, receiver, drain valves, check valves, pneumatic cylinders) and pneumatic circuit diagram with symbols Able to understand the working principle and symbolic representation of different energy supply elements. Understand hazards of hydraulic and pneumatic circuits and be able to work safely. Understand the concepts of Hydraulic and Pneumatic as applied to commercial and industrial control. Understand the concepts Electro-Pneumatic and Electro-Hydraulics Draw a hydraulic circuit diagram, understand the basic elements. Know the properties of the basic elements used in the hydraulic system. Explain types of hydraulic pumps, the basic functions and features

Scope

The scope covers the following :

- Understanding the basic Hydraulics & Pneumatics system components.
- Draws a basic pneumatic components (compressor, receiver, drain valves, check valves, pneumatic cylinders)
- and pneumatic circuit diagram with symbols
- Able to understand the working principle and symbolic representation of different energy supply elements.
- Understand hazards of hydraulic and pneumatic circuits and be able to work safely.
- Understand the concepts of Hydraulic and Pneumatic as applied to commercial and industrial control.
- Understand the concepts Electro-Pneumatic and Electro-Hydraulics
- Draw a hydraulic circuit diagram, understand the basic elements. Know the properties of the basic elements
- used in the hydraulic system.
- Explain types of hydraulic pumps, the basic functions and features

Elements and Performance Criteria

MSME/SMSD/04

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

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
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.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/SMSD/04	**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	-	-	-	-
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	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
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.	-	-	-	-
NOS Total	**100**	**-**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3033
NOS Name	Develop Hydraulics & Pneumatics circuit for Mechatronics system
Sector	Capital Goods
Sub-Sector	
Occupation	Designing , Manufacturing
NSQF Level	5
Credits	4
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

MSME/CSC/N3032: Develop Automation Logics using PLC

Description

Understand the relay logic and its working detail. Understand about various types of programming languages. Describe the techniques used to write a PLC programme in software. Explain different types of PLC. Explain the hardware components of a PLC. Explain PLC programming, installation, operation and maintenance

Scope

The scope covers the following :

- Understand the relay logic and its working detail.
- Understand about various types of programming languages.
- Describe the techniques used to write a PLC programme in software.
- Explain different types of PLC.
- Explain the hardware components of a PLC.
- Explain PLC programming, installation, operation and maintenance

Elements and Performance Criteria

MSME/SMSD/03

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.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/SMSD/03	-	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	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC18. Use the different internal peripherals of PLC.	-	-	-	-
NOS Total	**-**	**100**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3032
NOS Name	Develop Automation Logics using PLC
Sector	Capital Goods
Sub-Sector	
Occupation	Designing , Manufacturing
NSQF Level	5
Credits	4
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

MSME/CSC/N3214: Demonstrate of Industrial Automation sensors

Description

Describe and explain different measurement techniques. Explain and demonstrate Mechanical Measuring instruments. Classify & describe various Electrical measuring devices. Describe applications of smart sensors in various fields.

Scope

The scope covers the following :

- Describe and explain different measurement techniques.
- Explain and demonstrate Mechanical Measuring instruments.
- Classify & describe various Electrical measuring devices.
- Describe applications of smart sensors in various fields.

Elements and Performance Criteria

MSME/SMSD/02

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

PC1. Describe measurement unit of electrical and Mechanical parameters

PC2. • Explain different types of temperature sensors RTD,
• Thermo couple, thermistor and IR thermometer

PC3. Describe units and standards

PC4. Discuss errors in measurement.

PC5. Explain characteristics of transducers.

PC6. Classify the transducers.

PC7. • Describe functioning of different temperature measuring
• instruments

PC8. Explain working of different gauges.

PC9. Explain working of different transducers

PC10. Differentiate between different transducers.

PC11. List functions of transducers.

PC12. List smart sensors

PC13. Differentiate between smart sensors and others.

PC14. Give applications of smart sensors.

PC15. List types of actuators.

PC16. Describe the function of each type of actuator

PC17. • Differentiate between mechanical, electrical and other
• actuators.

PC18. Give applications of each type of actuator.

PC19. 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

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/SMSD/02	**-**	**100**	**-**	**-**
PC1. Describe measurement unit of electrical and Mechanical parameters	-	-	-	-
PC2. • Explain different types of temperature sensors RTD, • Thermo couple, thermistor and IR thermometer	-	-	-	-
PC3. Describe units and standards	-	-	-	-
PC4. Discuss errors in measurement.	-	-	-	-
PC5. Explain characteristics of transducers.	-	-	-	-
PC6. Classify the transducers.	-	-	-	-
PC7. • Describe functioning of different temperature measuring • instruments	-	-	-	-
PC8. Explain working of different gauges.	-	-	-	-
PC9. Explain working of different transducers	-	-	-	-
PC10. Differentiate between different transducers.	-	-	-	-
PC11. List functions of transducers.	-	-	-	-
PC12. List smart sensors	-	-	-	-
PC13. Differentiate between smart sensors and others.	-	-	-	-
PC14. Give applications of smart sensors.	-	-	-	-
PC15. List types of actuators.	-	-	-	-
PC16. Describe the function of each type of actuator	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC17. • Differentiate between mechanical, electrical and other • actuators.	-	-	-	-
PC18. Give applications of each type of actuator.	-	-	-	-
PC19. 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**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3214
NOS Name	Demonstrate of Industrial Automation sensors
Sector	Capital Goods
Sub-Sector	
Occupation	Designing, Manufacturing
NSQF Level	5
Credits	4
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

MSME/CSC/N3213: Demonstrate of Industrial Automation Sensors

Description

Describe and explain different measurement techniques. Explain and demonstrate Mechanical Measuring instruments. Classify & describe various Electrical measuring devices. Describe applications of smart sensors in various fields.

Scope

The scope covers the following :

- Describe and explain different measurement techniques.
- Explain and demonstrate Mechanical Measuring instruments.
- Classify & describe various Electrical measuring devices.
- Describe applications of smart sensors in various fields.

Elements and Performance Criteria

MSME/SMSD/02

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

PC1. Describe measurement unit of electrical and Mechanical parameters

PC2. • Explain different types of temperature sensors RTD,
• Thermo couple, thermistor and IR thermometer

PC3. Describe units and standards

PC4. Discuss errors in measurement.

PC5. Explain characteristics of transducers.

PC6. Classify the transducers.

PC7. • Describe functioning of different temperature measuring
• instruments

PC8. Explain working of different gauges.

PC9. Explain working of different transducers

PC10. Differentiate between different transducers.

PC11. List functions of transducers.

PC12. List smart sensors

PC13. Differentiate between smart sensors and others.

PC14. Give applications of smart sensors.

PC15. List types of actuators.

PC16. Describe the function of each type of actuator

PC17. • Differentiate between mechanical, electrical and other
• actuators.

PC18. Give applications of each type of actuator.

PC19. 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

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/SMSD/02	**100**	**-**	**-**	**-**
PC1. Describe measurement unit of electrical and Mechanical parameters	-	-	-	-
PC2. • Explain different types of temperature sensors RTD, • Thermo couple, thermistor and IR thermometer	-	-	-	-
PC3. Describe units and standards	-	-	-	-
PC4. Discuss errors in measurement.	-	-	-	-
PC5. Explain characteristics of transducers.	-	-	-	-
PC6. Classify the transducers.	-	-	-	-
PC7. • Describe functioning of different temperature measuring • instruments	-	-	-	-
PC8. Explain working of different gauges.	-	-	-	-
PC9. Explain working of different transducers	-	-	-	-
PC10. Differentiate between different transducers.	-	-	-	-
PC11. List functions of transducers.	-	-	-	-
PC12. List smart sensors	-	-	-	-
PC13. Differentiate between smart sensors and others.	-	-	-	-
PC14. Give applications of smart sensors.	-	-	-	-
PC15. List types of actuators.	-	-	-	-
PC16. Describe the function of each type of actuator	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC17. • Differentiate between mechanical, electrical and other • actuators.	-	-	-	-
PC18. Give applications of each type of actuator.	-	-	-	-
PC19. 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**	**-**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3213
NOS Name	Demonstrate of Industrial Automation Sensors
Sector	Capital Goods
Sub-Sector	
Occupation	Designing, Manufacturing
NSQF Level	5
Credits	4
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

MSME/CSC/N3031: Fundamentals of Mechatronics system

Description

Understand Mechatronics Measurement and control systems. Explain signal conditioning and data acquisition. Describe different Mechatronics system models and controls. Describe actual Mechatronics systems. Brief about Digital electronic systems

Scope

The scope covers the following :

- Understand Mechatronics Measurement and control systems.
- Explain signal conditioning and data acquisition.
- Describe different Mechatronics system models and controls.
- Describe actual Mechatronics systems.
- Brief about Digital electronic systems

Elements and Performance Criteria

MSME/SMSD/01

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

PC1. The system performs its intended tasks effectively

PC2. • All subsystems (mechanical, electrical, and software) work • seamlessly together

PC3. • Accurate measurement and control of system parameters • (e.g., position, speed, temperature).

PC4. • All subsystems (mechanical, electrical, and software) work • seamlessly together.

PC5. Optimal power consumption for the tasks performed.

PC6. • Seamless integration of hardware and software • components.

PC7. • Error tolerance and recovery mechanisms in case of • failures

PC8. • Balance between performance and • production/operational costs.

PC9. Fail-safe mechanisms to protect users and the system.

PC10. Long service life with minimal wear and tear.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/SMSD/01	**100**	**-**	**-**	**-**
PC1. The system performs its intended tasks effectively	-	-	-	-
PC2. • All subsystems (mechanical, electrical, and software) work • seamlessly together	-	-	-	-
PC3. • Accurate measurement and control of system parameters • (e.g., position, speed, temperature).	-	-	-	-
PC4. • All subsystems (mechanical, electrical, and software) work • seamlessly together.	-	-	-	-
PC5. Optimal power consumption for the tasks performed.	-	-	-	-
PC6. • Seamless integration of hardware and software • components.	-	-	-	-
PC7. • Error tolerance and recovery mechanisms in case of • failures	-	-	-	-
PC8. • Balance between performance and • production/operational costs.	-	-	-	-
PC9. Fail-safe mechanisms to protect users and the system.	-	-	-	-
PC10. Long service life with minimal wear and tear.	-	-	-	-
NOS Total	**100**	**-**	**-**	**-**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3031
NOS Name	Fundamentals of Mechatronics system
Sector	Capital Goods
Sub-Sector	
Occupation	Designing , Manufacturing
NSQF Level	5
Credits	3
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

MSME/CSC/N3039: Application of Embedded Technology for Mechatronics system

Description

Understanding Embedded Systems: Explain the fundamental concepts of embedded systems, including their architecture, components, and applications. Describe the functionality and operation of microcontrollers and related hardware. Understand the principles of writing, debugging, and optimizing software for embedded systems. Understand standard communication protocols like UART, SPI, I2C, CAN, and their applications in embedded systems. Demonstrate the ability to interface hardware components with software systems. Understand architecture of PIC and ARM microcontroller. Ability to interface motors and sensors with microcontrollers. Understand the role and significance of embedded systems in mechatronics applications

Scope

The scope covers the following :

- Understanding Embedded Systems: Explain the fundamental concepts of embedded systems, including their
- architecture, components, and applications.
- Describe the functionality and operation of microcontrollers and related hardware.
- Understand the principles of writing, debugging, and optimizing software for embedded systems.
- Understand standard communication protocols like UART, SPI, I2C, CAN, and their applications in embedded
- systems.
- Demonstrate the ability to interface hardware components with software systems.
- Understand architecture of PIC and ARM microcontroller.
- Ability to interface motors and sensors with microcontrollers.
- Understand the role and significance of embedded systems in mechatronics applications

Elements and Performance Criteria

MSME/SMSD/07

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

PC1. • Identify the roles and functions of key hardware
• components in embedded systems, such as
• microcontrollers, processors, memory, sensors, and
• actuators.

PC2. • Understand microcontroller architecture and its role in
• embedded systems.

PC3. • Understand the working principles of peripheral devices
• and their integration with embedded systems

PC4. • Explain the importance of embedded software and
• firmware in controlling hardware components

PC5. • Learn the fundamentals of communication protocols like • UART, I2C, SPI, CAN, and wireless protocols (e.g., • Bluetooth, Zigbee).

PC6. • Explain how these protocols enable data exchange • between components in an embedded system

PC7. • Write, debug, and optimize embedded programs using • low-level programming languages like C

PC8. • Use development tools such as IDEs, debuggers, and • simulators to create embedded applications

PC9. • Design and implement interfaces between • microcontrollers and external peripherals such as sensors, • actuators, and displays.

PC10. • Design scalable and modular embedded systems for • complex applications

PC11. Interfacing of sensor, relay, motors to microcontroller

PC12. • Test and troubleshoot embedded systems for • performance and reliability

PC13. Write and debug embedded programs using C or Python

PC14. • Use development tools like IDEs, debuggers, and • emulators for embedded programming.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/SMSD/07	-	100	-	-
PC1. • Identify the roles and functions of key hardware • components in embedded systems, such as • microcontrollers, processors, memory, sensors, and • actuators.	-	-	-	-
PC2. • Understand microcontroller architecture and its role in • embedded systems.	-	-	-	-
PC3. • Understand the working principles of peripheral devices • and their integration with embedded systems	-	-	-	-
PC4. • Explain the importance of embedded software and • firmware in controlling hardware components	-	-	-	-
PC5. • Learn the fundamentals of communication protocols like • UART, I2C, SPI, CAN, and wireless protocols (e.g., • Bluetooth, Zigbee).	-	-	-	-
PC6. • Explain how these protocols enable data exchange • between components in an embedded system	-	-	-	-
PC7. • Write, debug, and optimize embedded programs using • low-level programming languages like C	-	-	-	-
PC8. • Use development tools such as IDEs, debuggers, and • simulators to create embedded applications	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC9. • Design and implement interfaces between • microcontrollers and external peripherals such as sensors, • actuators, and displays.	-	-	-	-
PC10. • Design scalable and modular embedded systems for • complex applications	-	-	-	-
PC11. Interfacing of sensor, relay, motors to microcontroller	-	-	-	-
PC12. • Test and troubleshoot embedded systems for • performance and reliability	-	-	-	-
PC13. Write and debug embedded programs using C or Python	-	-	-	-
PC14. • Use development tools like IDEs, debuggers, and • emulators for embedded programming.	-	-	-	-
NOS Total	**-**	**100**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3039
NOS Name	Application of Embedded Technology for Mechatronics system
Sector	Capital Goods
Sub-Sector	
Occupation	Designing , Manufacturing
NSQF Level	5
Credits	4
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

MSME/CSC/N3038: Application of Embedded technology for Mechatronics System

Description

Understanding Embedded Systems: Explain the fundamental concepts of embedded systems, including their architecture, components, and applications. Describe the functionality and operation of microcontrollers and related hardware. Understand the principles of writing, debugging, and optimizing software for embedded systems. Understand standard communication protocols like UART, SPI, I2C, CAN, and their applications in embedded systems. Demonstrate the ability to interface hardware components with software systems. Understand architecture of PIC and ARM microcontroller. Ability to interface motors and sensors with microcontrollers. Understand the role and significance of embedded systems in mechatronics applications

Scope

The scope covers the following :

- Understanding Embedded Systems: Explain the fundamental concepts of embedded systems, including their
- architecture, components, and applications.
- Describe the functionality and operation of microcontrollers and related hardware.
- Understand the principles of writing, debugging, and optimizing software for embedded systems.
- Understand standard communication protocols like UART, SPI, I2C, CAN, and their applications in embedded
- systems.
- Demonstrate the ability to interface hardware components with software systems.
- Understand architecture of PIC and ARM microcontroller.
- Ability to interface motors and sensors with microcontrollers.
- Understand the role and significance of embedded systems in mechatronics applications

Elements and Performance Criteria

MSME/SMSD/07

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

PC1. • Identify the roles and functions of key hardware
• components in embedded systems, such as
• microcontrollers, processors, memory, sensors, and
• actuators.

PC2. • Understand microcontroller architecture and its role in
• embedded systems.

PC3. • Understand the working principles of peripheral devices
• and their integration with embedded systems

PC4. • Explain the importance of embedded software and
• firmware in controlling hardware components

PC5. • Learn the fundamentals of communication protocols like
• UART, I2C, SPI, CAN, and wireless protocols (e.g.,
• Bluetooth, Zigbee).

PC6. • Explain how these protocols enable data exchange
• between components in an embedded system

PC7. • Write, debug, and optimize embedded programs using
• low-level programming languages like C

PC8. • Use development tools such as IDEs, debuggers, and
• simulators to create embedded applications

PC9. • Design and implement interfaces between
• microcontrollers and external peripherals such as sensors,
• actuators, and displays.

PC10. • Design scalable and modular embedded systems for
• complex applications

PC11. Interfacing of sensor, relay, motors to microcontroller

PC12. • Test and troubleshoot embedded systems for
• performance and reliability

PC13. Write and debug embedded programs using C or Python

PC14. • Use development tools like IDEs, debuggers, and
• emulators for embedded programming.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/SMSD/07	**100**	**-**	**-**	**-**
PC1. • Identify the roles and functions of key hardware • components in embedded systems, such as • microcontrollers, processors, memory, sensors, and • actuators.	-	-	-	-
PC2. • Understand microcontroller architecture and its role in • embedded systems.	-	-	-	-
PC3. • Understand the working principles of peripheral devices • and their integration with embedded systems	-	-	-	-
PC4. • Explain the importance of embedded software and • firmware in controlling hardware components	-	-	-	-
PC5. • Learn the fundamentals of communication protocols like • UART, I2C, SPI, CAN, and wireless protocols (e.g., • Bluetooth, Zigbee).	-	-	-	-
PC6. • Explain how these protocols enable data exchange • between components in an embedded system	-	-	-	-
PC7. • Write, debug, and optimize embedded programs using • low-level programming languages like C	-	-	-	-
PC8. • Use development tools such as IDEs, debuggers, and • simulators to create embedded applications	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC9. • Design and implement interfaces between • microcontrollers and external peripherals such as sensors, • actuators, and displays.	-	-	-	-
PC10. • Design scalable and modular embedded systems for • complex applications	-	-	-	-
PC11. Interfacing of sensor, relay, motors to microcontroller	-	-	-	-
PC12. • Test and troubleshoot embedded systems for • performance and reliability	-	-	-	-
PC13. Write and debug embedded programs using C or Python	-	-	-	-
PC14. • Use development tools like IDEs, debuggers, and • emulators for embedded programming.	-	-	-	-
NOS Total	**100**	**-**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3038
NOS Name	Application of Embedded technology for Mechatronics System
Sector	Capital Goods
Sub-Sector	
Occupation	Designing , Manufacturing
NSQF Level	5
Credits	4
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

MSME/CSC/N3037: Demonstrate of electrical Motors and drives

Description

Explain the working principles and construction of various electric motors, including DC motors, AC motors, synchronous motors, and induction motors. Understand the electromagnetic principles underlying motor operation. Describe the role of electric drives in controlling motor speed, torque, and position. Explain the components of drive systems, including controllers, power electronics, and feedback mechanisms. Understand the principles of motor control techniques, such as scalar control, vector control, and direct torque control. Explain the differences between open-loop and closed-loop control systems in motor drives

Scope

The scope covers the following :

- Explain the working principles and construction of various electric motors, including DC motors, AC motors,
- synchronous motors, and induction motors.
- Understand the electromagnetic principles underlying motor operation.
- Describe the role of electric drives in controlling motor speed, torque, and position.
- Explain the components of drive systems, including controllers, power electronics, and feedback
- mechanisms.
- Understand the principles of motor control techniques, such as scalar control, vector control, and direct
- torque control.
- Explain the differences between open-loop and closed-loop control systems in motor drives

Elements and Performance Criteria

MSME/SMSD/06

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

PC1. • Explain the working principles of different types of • electric motors (e.g., DC motors, AC motors, synchronous • motors, and induction motors).

PC2. • Describe the construction and operating characteristics • of various electric motors.

PC3. • Choose suitable electric motors and drives for specific • applications based on load requirements, speed, and • torque characteristics.

PC4. • Explain the importance of efficiency, power factor, and • thermal management in motor and drive systems.

PC5. • Analyze the performance characteristics of motors under • different operating conditions.

PC6. List types of motor

PC7. • 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

PC8. Describe the function of each type of motor.

PC9. • Describe different motor control techniques, such as
• scalar control, vector control, and direct torque control
• (DTC).

PC10. • Understand open-loop and closed-loop control systems
• in motor drives.

PC11. • Understand the role and types of electric drives in
• controlling motor speed, torque, and position

PC12. • Explain the components of drive systems, including
• controllers, converters, and power electronics

PC13. • Evaluate motor-drive combinations for optimal
• performance and energy efficiency.

PC14. • Design and implement basic motor control circuits using
• power electronics components

PC15. • Integrate electric motors and drives into systems
• requiring precise motion control.

PC16. • Familiarize yourself with international standards for
• electric motors and drives, such as IEC and NEMA.

PC17. • Apply safety practices when working with high-power
• motors and drive systems.

PC18. • Identify and reduce energy losses in motor-drive
• systems.

PC19. • Implement energy-efficient drive systems for industrial
• and commercial applications.

PC20. • Diagnose and resolve issues in motor-drive systems using
• diagnostic tools and techniques.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/SMSD/06	-	100	-	-
PC1. • Explain the working principles of different types of • electric motors (e.g., DC motors, AC motors, synchronous • motors, and induction motors).	-	-	-	-
PC2. • Describe the construction and operating characteristics • of various electric motors.	-	-	-	-
PC3. • Choose suitable electric motors and drives for specific • applications based on load requirements, speed, and • torque characteristics.	-	-	-	-
PC4. • Explain the importance of efficiency, power factor, and • thermal management in motor and drive systems.	-	-	-	-
PC5. • Analyze the performance characteristics of motors under • different operating conditions.	-	-	-	-
PC6. List types of motor	-	-	-	-
PC7. • 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	-	-	-	-
PC8. Describe the function of each type of motor.	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC9. • Describe different motor control techniques, such as • scalar control, vector control, and direct torque control • (DTC).	-	-	-	-
PC10. • Understand open-loop and closed-loop control systems • in motor drives.	-	-	-	-
PC11. • Understand the role and types of electric drives in • controlling motor speed, torque, and position	-	-	-	-
PC12. • Explain the components of drive systems, including • controllers, converters, and power electronics	-	-	-	-
PC13. • Evaluate motor-drive combinations for optimal • performance and energy efficiency.	-	-	-	-
PC14. • Design and implement basic motor control circuits using • power electronics components	-	-	-	-
PC15. • Integrate electric motors and drives into systems • requiring precise motion control.	-	-	-	-
PC16. • Familiarize yourself with international standards for • electric motors and drives, such as IEC and NEMA.	-	-	-	-
PC17. • Apply safety practices when working with high-power • motors and drive systems.	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC18. • Identify and reduce energy losses in motor-drive • systems.	-	-	-	-
PC19. • Implement energy-efficient drive systems for industrial • and commercial applications.	-	-	-	-
PC20. • Diagnose and resolve issues in motor-drive systems using • diagnostic tools and techniques.	-	-	-	-
NOS Total	**-**	**100**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3037
NOS Name	Demonstrate of electrical Motors and drives
Sector	Capital Goods
Sub-Sector	
Occupation	Designing , Manufacturing
NSQF Level	5
Credits	3
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

MSME/CSC/N3036: Demonstrate of electrical Motors and Drives

Description

Explain the working principles and construction of various electric motors, including DC motors, AC motors, synchronous motors, and induction motors. Understand the electromagnetic principles underlying motor operation. Describe the role of electric drives in controlling motor speed, torque, and position. Explain the components of drive systems, including controllers, power electronics, and feedback mechanisms. Understand the principles of motor control techniques, such as scalar control, vector control, and direct torque control. Explain the differences between open-loop and closed-loop control systems in motor drives

Scope

The scope covers the following :

- Explain the working principles and construction of various electric motors, including DC motors, AC motors,
- synchronous motors, and induction motors.
- Understand the electromagnetic principles underlying motor operation.
- Describe the role of electric drives in controlling motor speed, torque, and position.
- Explain the components of drive systems, including controllers, power electronics, and feedback
- mechanisms.
- Understand the principles of motor control techniques, such as scalar control, vector control, and direct
- torque control.
- Explain the differences between open-loop and closed-loop control systems in motor drives

Elements and Performance Criteria

MSME/SMSD/06

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

PC1. • Explain the working principles of different types of • electric motors (e.g., DC motors, AC motors, synchronous • motors, and induction motors).

PC2. • Describe the construction and operating characteristics • of various electric motors.

PC3. • Choose suitable electric motors and drives for specific • applications based on load requirements, speed, and • torque characteristics.

PC4. • Explain the importance of efficiency, power factor, and • thermal management in motor and drive systems.

PC5. • Analyze the performance characteristics of motors under • different operating conditions.

PC6. List types of motor

PC7. • 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

PC8. Describe the function of each type of motor.

PC9. • Describe different motor control techniques, such as
• scalar control, vector control, and direct torque control
• (DTC).

PC10. • Understand open-loop and closed-loop control systems
• in motor drives.

PC11. • Understand the role and types of electric drives in
• controlling motor speed, torque, and position

PC12. • Explain the components of drive systems, including
• controllers, converters, and power electronics

PC13. • Evaluate motor-drive combinations for optimal
• performance and energy efficiency.

PC14. • Design and implement basic motor control circuits using
• power electronics components

PC15. • Integrate electric motors and drives into systems
• requiring precise motion control.

PC16. • Familiarize yourself with international standards for
• electric motors and drives, such as IEC and NEMA.

PC17. • Apply safety practices when working with high-power
• motors and drive systems.

PC18. • Identify and reduce energy losses in motor-drive
• systems.

PC19. • Implement energy-efficient drive systems for industrial
• and commercial applications.

PC20. • Diagnose and resolve issues in motor-drive systems using
• diagnostic tools and techniques.

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/SMSD/06	**99**	**-**	**-**	**-**
PC1. • Explain the working principles of different types of • electric motors (e.g., DC motors, AC motors, synchronous • motors, and induction motors).	-	-	-	-
PC2. • Describe the construction and operating characteristics • of various electric motors.	-	-	-	-
PC3. • Choose suitable electric motors and drives for specific • applications based on load requirements, speed, and • torque characteristics.	-	-	-	-
PC4. • Explain the importance of efficiency, power factor, and • thermal management in motor and drive systems.	-	-	-	-
PC5. • Analyze the performance characteristics of motors under • different operating conditions.	-	-	-	-
PC6. List types of motor	-	-	-	-
PC7. • 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	-	-	-	-
PC8. Describe the function of each type of motor.	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC9. • Describe different motor control techniques, such as • scalar control, vector control, and direct torque control • (DTC).	-	-	-	-
PC10. • Understand open-loop and closed-loop control systems • in motor drives.	-	-	-	-
PC11. • Understand the role and types of electric drives in • controlling motor speed, torque, and position	-	-	-	-
PC12. • Explain the components of drive systems, including • controllers, converters, and power electronics	-	-	-	-
PC13. • Evaluate motor-drive combinations for optimal • performance and energy efficiency.	-	-	-	-
PC14. • Design and implement basic motor control circuits using • power electronics components	-	-	-	-
PC15. • Integrate electric motors and drives into systems • requiring precise motion control.	-	-	-	-
PC16. • Familiarize yourself with international standards for • electric motors and drives, such as IEC and NEMA.	-	-	-	-
PC17. • Apply safety practices when working with high-power • motors and drive systems.	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC18. • Identify and reduce energy losses in motor-drive • systems.	-	-	-	-
PC19. • Implement energy-efficient drive systems for industrial • and commercial applications.	-	-	-	-
PC20. • Diagnose and resolve issues in motor-drive systems using • diagnostic tools and techniques.	-	-	-	-
NOS Total	**100**	**-**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3036
NOS Name	Demonstrate of electrical Motors and Drives
Sector	Capital Goods
Sub-Sector	
Occupation	Designing , Manufacturing
NSQF Level	5
Credits	3
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

Qualification Pack

MSME/CSC/N3035: Create & Modify the Electrical circuit & mechanical drawing using CAD software

Description

Use the fundamental features and precision drafting tools in Electrical CAD to develop accurate technical drawings. Present drawings in a detailed and visually impressive manner. Generate and update customizable reports, and use folders to organize drawings. Customize the application to meet your specific design in Electrical CAD. Interpret drawings, draw interferences and workout other technical details

Scope

The scope covers the following :

- Use the fundamental features and precision drafting tools in Electrical CAD to develop accurate technical
- drawings.
- Present drawings in a detailed and visually impressive manner. Generate and update customizable reports, and use folders to organize drawings.
- Customize the application to meet your specific design in Electrical CAD.
- Interpret drawings, draw interferences and workout other technical details

Elements and Performance Criteria

MSME/SMSD/05

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

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/SMSD/05	-	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	-	-	-	-
NOS Total	-	100	-	-

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3035
NOS Name	Create & Modify the Electrical circuit & mechanical drawing using CAD software
Sector	Capital Goods
Sub-Sector	
Occupation	Designing , Manufacturing
NSQF Level	5
Credits	3
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

Qualification Pack

MSME/CSC/N3041: Mechatronics System design

Description

Understand the Mechatronics kits and its components. Understand the interfacing of PLC with robotics. Understand the trouble shooting of all the kits. Discuss about input outputs of the kits. Understand the mechanical set up, electrical connection , pneumatics connection

Scope

The scope covers the following :

- Understand the Mechatronics kits and its components.
- Understand the interfacing of PLC with robotics.
- Understand the trouble shooting of all the kits.
- Discuss about input outputs of the kits.
- Understand the mechanical set up, electrical connection , pneumatics connection

Elements and Performance Criteria

MSME/SMSD/10

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

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/SMSD/10	-	97	-	-
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	-	-

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3041
NOS Name	Mechatronics System design
Sector	Capital Goods
Sub-Sector	
Occupation	Designing , Manufacturing
NSQF Level	5
Credits	5
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

Qualification Pack

MSME/CSC/N3040: Application of SCADA and HMI in Mechatronics system

Description

Understand functional relationships in mechatronic systems. Understand energy flow in electrical, pneumatic and hydraulic sub-systems. Plan and organize work flow Commission, troubleshoot and repair mechatronic systems

Scope

The scope covers the following :

- Understand functional relationships in mechatronic systems.
- Understand energy flow in electrical, pneumatic and hydraulic sub-systems.
- Plan and organize work flow
- Commission, troubleshoot and repair mechatronic systems

Elements and Performance Criteria

MSME/SMSD/09

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

PC1. Understand the need of SCADA system in automation.

PC2. Differentiate between PLC & SCADA.

PC3. Describe the application of the SCADA system.

PC4. Understand procedure of installing the SCADA software.

PC5. Create new application in software in SCADA.

PC6. Work on graphic designer window in SCADA.

PC7. • Create and modify graphic display with animation in
• SCADA

PC8. • Detect the fault in the production system by using the
• SCADA software

PC9. • Understand the details of process tags and internal tags
• in SCADA

PC10. Apply the LAD programming on SCADA projects

PC11. Use the property setting of tags in SCADA.

PC12. Apply standard and other objects for the graphic design

PC13. Create a SCADA picture window related to any process

PC14. Develop multi screens.

PC15. Apply LAD program to simulate the screen designed.

PC16. Use the different tags in a project.

PC17. Understand the concept of logging system in SCADA.

PC18. Understand the principles of message system.

PC19. Create on line trend.

PC20. Develop a new system.

PC21. Interface field devices with the SCADA system.

PC22. Simulate the designed SCADA system

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/SMSD/09	**-**	**100**	**-**	**-**
PC1. Understand the need of SCADA system in automation.	-	-	-	-
PC2. Differentiate between PLC & SCADA.	-	-	-	-
PC3. Describe the application of the SCADA system.	-	-	-	-
PC4. Understand procedure of installing the SCADA software.	-	-	-	-
PC5. Create new application in software in SCADA.	-	-	-	-
PC6. Work on graphic designer window in SCADA.	-	-	-	-
PC7. • Create and modify graphic display with animation in • SCADA	-	-	-	-
PC8. • Detect the fault in the production system by using the • SCADA software	-	-	-	-
PC9. • Understand the details of process tags and internal tags • in SCADA	-	-	-	-
PC10. Apply the LAD programming on SCADA projects	-	-	-	-
PC11. Use the property setting of tags in SCADA.	-	-	-	-
PC12. Apply standard and other objects for the graphic design	-	-	-	-
PC13. Create a SCADA picture window related to any process	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC14. Develop multi screens.	-	-	-	-
PC15. Apply LAD program to simulate the screen designed.	-	-	-	-
PC16. Use the different tags in a project.	-	-	-	-
PC17. Understand the concept of logging system in SCADA.	-	-	-	-
PC18. Understand the principles of message system.	-	-	-	-
PC19. Create on line trend.	-	-	-	-
PC20. Develop a new system.	-	-	-	-
PC21. Interface field devices with the SCADA system.	-	-	-	-
PC22. Simulate the designed SCADA system	-	-	-	-
NOS Total	**-**	**100**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3040
NOS Name	Application of SCADA and HMI in Mechatronics system
Sector	Capital Goods
Sub-Sector	
Occupation	Designing , Manufacturing
NSQF Level	5
Credits	3
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

MSME/CSC/N3215: Engineering Metrology and Quality Control

Description

Understand Various Principles of Measurements. Identify various Length Standards & Knowledge of Limits, Fits Tolerances. Explain and demonstrate various gauges like NPL gauge Understand, define ,explain and review Taylor s principles of gauge design and Fixed Indicating Gauges Classify & describe various measuring machines like Floating carriage diameter measuring mc etc. Predict and examine various modes and types of errors and also the demonstration of devices used for measurement. Evaluate and do analysis of parameters of screw threads Determine and describe various methods of measurements of gear terminology

Scope

The scope covers the following :

- Understand Various Principles of Measurements.
- Identify various Length Standards & Knowledge of Limits, Fits Tolerances.
- Explain and demonstrate various gauges like NPL gauge
- Understand, define ,explain and review Taylor s principles of gauge design and Fixed Indicating Gauges
- Classify & describe various measuring machines like Floating carriage diameter measuring mc etc.
- Predict and examine various modes and types of errors and also the demonstration of devices used for
- measurement.
- Evaluate and do analysis of parameters of screw threads
- Determine and describe various methods of measurements of gear terminology

Elements and Performance Criteria

MSME/SMSD/08

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

PC1. • Define engineering metrology and explain its importance • in manufacturing and quality control

PC2. • Identify and describe the fundamental principles of • measurement and dimensional analysis.

PC3. • Understand the role of advanced measurement • techniques such as laser-based systems and optical • metrology

PC4. • Understand the process of calibration and its role in • ensuring measurement accuracy.

PC5. • Use various measuring instruments to measure • dimensions, surface finish, and tolerances.

PC6. • Design and implement quality control processes in a • manufacturing environment.

PC7. • Integrate metrology principles into the design, production, • and inspection stages of manufacturing.

PC8. • Develop inspection plans and procedures for ensuring
• product quality.

PC9. • Familiarize yourself with international standards like ISO,
• ASME, and ANSI for quality and measurement systems.

PC10. • Evaluate and optimize manufacturing processes to
• improve quality and reduce waste.

PC11. Diagnose and troubleshoot measurement and qualityrelated issues in engineering systems.

PC12. • Understand and apply the principles of continuous
• improvement (Kaizen) in quality management.

PC13. • Apply statistical tools such as control charts, histograms,
• and process capability analysis

PC14. • Conduct experiments to evaluate the accuracy and
• precision of measurements.

PC15. • Implement corrective actions based on quality control
• feedback

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/SMSD/08	**100**	**-**	**-**	**-**
PC1. • Define engineering metrology and explain its importance • in manufacturing and quality control	-	-	-	-
PC2. • Identify and describe the fundamental principles of • measurement and dimensional analysis.	-	-	-	-
PC3. • Understand the role of advanced measurement • techniques such as laser-based systems and optical • metrology	-	-	-	-
PC4. • Understand the process of calibration and its role in • ensuring measurement accuracy.	-	-	-	-
PC5. • Use various measuring instruments to measure • dimensions, surface finish, and tolerances.	-	-	-	-
PC6. • Design and implement quality control processes in a • manufacturing environment.	-	-	-	-
PC7. • Integrate metrology principles into the design, production, • and inspection stages of manufacturing.	-	-	-	-
PC8. • Develop inspection plans and procedures for ensuring • product quality.	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC9. • Familiarize yourself with international standards like ISO, • ASME, and ANSI for quality and measurement systems.	-	-	-	-
PC10. • Evaluate and optimize manufacturing processes to • improve quality and reduce waste.	-	-	-	-
PC11. Diagnose and troubleshoot measurement and qualityrelated issues in engineering systems.	-	-	-	-
PC12. • Understand and apply the principles of continuous • improvement (Kaizen) in quality management.	-	-	-	-
PC13. • Apply statistical tools such as control charts, histograms, • and process capability analysis	-	-	-	-
PC14. • Conduct experiments to evaluate the accuracy and • precision of measurements.	-	-	-	-
PC15. • Implement corrective actions based on quality control • feedback	-	-	-	-
NOS Total	**100**	**-**	**-**	**-**

Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3215
NOS Name	Engineering Metrology and Quality Control
Sector	Capital Goods
Sub-Sector	
Occupation	Designing, Manufacturing
NSQF Level	5
Credits	3
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

MSME/CSC/N0505: Employability Skills

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 getting ready for jobs and apprenticeship.

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 getting ready for jobs and apprenticeship.

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 e-commerce 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

PC19. • Explain the role of various schemes and institute for self- employment
• 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

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
MSME/ES/01 Employability skills	**97**	**-**	**-**	**-**
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 e-commerce 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	-	-	-	-

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
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 self- employment • 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**	**-**	**-**	**-**

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N0505
NOS Name	Employability Skills
Sector	Capital Goods
Sub-Sector	
Occupation	MACHINE OPERATION 01
NSQF Level	3
Credits	1
Version	1.0
Last Reviewed Date	08/05/2025
Next Review Date	08/05/2028
NSQC Clearance Date	08/05/2025

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

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MSME/CSC/N3042.EMPLOYABILITY SKILL	100	-	-	-	100	6
MSME/CSC/N3034.Develop Hydraulics & Pneumatics circuit for Mechatronics System	-	100	-	-	100	6
MSME/CSC/N3033.Develop Hydraulics & Pneumatics circuit for Mechatronics system	100	-	-	-	100	6
MSME/CSC/N3032.Develop Automation Logics using PLC	-	100	-	-	100	6
MSME/CSC/N3214.Demonstrate of Industrial Automation sensors	-	100	-	-	100	6
MSME/CSC/N3213.Demonstrate of Industrial Automation Sensors	100	-	-	-	100	6
MSME/CSC/N3031.Fundamentals of Mechatronics system	100	-	-	-	100	6
MSME/CSC/N3039.Application of Embedded Technology for Mechatronics system	-	100	-	-	100	6
MSME/CSC/N3038.Application of Embedded technology for Mechatronics System	100	-	-	-	100	6
MSME/CSC/N3037.Demonstrate of electrical Motors and drives	-	100	-	-	100	6
MSME/CSC/N3036.Demonstrate of electrical Motors and Drives	100	-	-	-	100	6
MSME/CSC/N3035.Create & Modify the Electrical circuit & mechanical drawing using CAD software	-	100	-	-	100	6
MSME/CSC/N3041.Mechatronics System design	-	100	-	-	100	6
MSME/CSC/N3040.Application of SCADA and HMI in Mechatronics system	-	100	-	-	100	6

Qualification Pack

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MSME/CSC/N3215.Engineering Metrology and Quality Control	100	-	-	-	100	8
MSME/CSC/N0505.Employability Skills	100	-	-	-	100	8
Total	**800**	**800**	**-**	**-**	**1600**	**100**

Acronyms

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

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.

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.