



Qualification Pack



Assistant Tool Maker

QP Code: MSME/CSC/Q3002

Version: 1.0

NSQF Level: 4

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



Qualification Pack

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MSME/CSC/Q3002: Assistant Tool Maker

Brief Job Description

The Candidate will be able to work on conventional non conventional special purpose machines. Design and manufacture of simple press tools, jigs and fixtures. Generate CAM programs. The subjects covered in this programme are Press Tool Technology, Mould technology, CAD CAM, CNC Technology, Production technology, Metrology, Jigs and Fixtures, Material Technology and Heat Treatment, Strength of Materials, Tool design drawing, Work shop practice, Employability skills

Personal Attributes

The Candidate will be able to work on conventional non conventional special purpose machines. Design and manufacture of simple press tools, jigs and fixtures. Generate CAM programs. The subjects covered in this programme are Press Tool Technology, Mould technology, CAD CAM, CNC Technology, Production technology, Metrology, Jigs and Fixtures, Material Technology and Heat Treatment, Strength of Materials, Tool design drawing, Work shop practice, Employability skills

Applicable National Occupational Standards (NOS)

Compulsory NOS:

1. [MSME/CSC/N3061: Employability skill](#)
2. [MSME/CSC/N3058: Tool Design Drawing - 2](#)
3. [MSME/CSC/N3057: CNC Technology](#)
4. [MSME/CSC/N3056: Press Tool Technology - 2](#)
5. [MSME/CSC/N3055: Strength of Materials - 2](#)
6. [MSME/CSC/N3054: Production Technology - 4](#)
7. [MSME/CSC/N3053: Mould Technology - 1](#)
8. [MSME/CSC/N3052: Employability Skills](#)
9. [MSME/CSC/N3051: Workshop Practical](#)
10. [MSME/CSC/N3050: Tool Design Drawing - 1](#)
11. [MSME/CSC/N3049: CAD - Fusion 360 Lab](#)
12. [MSME/CSC/N3048: Strength of Materials - 1](#)
13. [MSME/CSC/N3047: Jigs and Fixtures](#)



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14. [MSME/CSC/N3046: Press Tool Technology - 1](#)
15. [MSME/CSC/N3045: Material Technology and Heat Treatment](#)
16. [MSME/CSC/N3044: Production Technology 3](#)
17. [MSME/CSC/N3043: Metrology -3](#)
18. [MSME/CSC/N3062: Workshop Practical](#)

Qualification Pack (QP) Parameters

Sector	Capital Goods
Sub-Sector	
Occupation	Designing
Country	India
NSQF Level	4
Credits	36
Aligned to NCO/ISCO/ISIC Code	2015.7222.0200, 2015.7222.9900
Minimum Educational Qualification & Experience	12th grade Pass (with Mathematics) OR 10th Class + I.T.I (After 10th Pass 2 years ITI Candidates of the following trades: Fitter, Turner, Machinist Grinder, Machinist, Mechanic Machine Tool Maintenance, Tool & Die Maker (Dies & Moulds), Tool & Die Maker (Press Tools, Jigs & Fixtures)) OR 10th grade pass (After 10th Pass completed 2 years diploma in relevant trade)
Minimum Level of Education for Training in School	10th Class
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 Years
Last Reviewed On	NA
Next Review Date	29/09/2028
NSQF Approval Date	29/09/2023



Qualification Pack

Version	1.0
Reference code on NQR	QG-04-CG-01030-2023-V1-NTTF
NQR Version	1



Qualification Pack

MSME/CSC/N3061: Employability skill

Description

Understand Entrepreneurship skills Ability to understand financial and legal aspects Understand Occupation safety, Health, and Environment related issues. Ability to use Essential skills

Scope

The scope covers the following :

- Understand Entrepreneurship
- skills
- Ability to understand financial
- and legal aspects
- Understand Occupation safety,
- Health, and Environment
- related issues.
- Ability to use Essential skills

Elements and Performance Criteria

CP01409T

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

- PC1.**
 - Knowledge on various schemes and
 - institutions promoting Entrepreneurs.
 - Ways of setting enterprise, legal
 - compliances, marketing, and budgeting
 - etc.
- PC2.**
 - Knowledge and understanding on
 - personal finance management,
 - investments, returns, basics of taxes,
 - awareness on financial frauds and
 - prevention.
- PC3.**
 - Awareness on fundamental rights under
 - the constitution and facilities available for
 - recourse in the event of breach.
- PC4.**
 - Knowledge on Occupation safety and
 - health, at workplace, Occupation
 - Hazards, Accident prevention and PPEs,
 - Environment, Pollution and protection of
 - environment, Energy conservation,
 - Global warming, Conservation of natural
 - resources, waste management and
 - disposal, Disaster Management.
- PC5.**
 - Understanding balancing Life and
 - Career, Value based decision making,
 - Types of stress and stress management.



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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
CP01409T	100	-	-	-
PC1. - Knowledge on various schemes and institutions promoting Entrepreneurs. - Ways of setting enterprise, legal compliances, marketing, and budgeting etc.	-	-	-	-
PC2. Knowledge and understanding on personal finance management, investments, returns, basics of taxes, awareness on financial frauds and prevention.	-	-	-	-
PC3. Awareness on fundamental rights under the constitution and facilities available for recourse in the event of breach.	-	-	-	-
PC4. Knowledge on Occupation safety and health, at workplace, Occupation Hazards, Accident prevention and PPEs, Environment, Pollution and protection of environment, Energy conservation, Global warming, Conservation of natural resources, waste management and disposal, Disaster Management.	-	-	-	-
PC5. Understanding balancing Life and Career, Value based decision making, Types of stress and stress management.	-	-	-	-
NOS Total	100	-	-	-



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National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3061
NOS Name	Employability skill
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3058: Tool Design Drawing - 2

Description

Designing various types of Jigs and Fixtures, Press tools and Moulds

Scope

The scope covers the following :

- Designing various types of Jigs and Fixtures, Press tools and Moulds

Elements and Performance Criteria

CP01406P

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

- PC1.** Explain basic principle to be followed in Design
- PC2.** Design Fixtures
- PC3.** Design Jigs
- PC4.** Design Guide Plate Tool
- PC5.** Design Press Tool with Die set
- PC6.** Design Progressive Tool
- PC7.** Design Compound Tool
- PC8.** Design Bending Tool
- PC9.** Design Drawing Tool
- PC10.** Design Hand Injection Mould
- PC11.** Use Autodesk Fusion 360
- PC12.** Use of different sketch commands, dimensioning and constraints in fusion 360
- PC13.** Do Assembly Modelling



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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>CP01406P</i>	-	100	-	-
PC1. Explain basic principle to be followed in Design	-	-	-	-
PC2. Design Fixtures	-	-	-	-
PC3. Design Jigs	-	-	-	-
PC4. Design Guide Plate Tool	-	-	-	-
PC5. Design Press Tool with Die set	-	-	-	-
PC6. Design Progressive Tool	-	-	-	-
PC7. Design Compound Tool	-	-	-	-
PC8. Design Bending Tool	-	-	-	-
PC9. Design Drawing Tool	-	-	-	-
PC10. Design Hand Injection Mould	-	-	-	-
PC11. Use Autodesk Fusion 360	-	-	-	-
PC12. Use of different sketch commands, dimensioning and constraints in fusion 360	-	-	-	-
PC13. Do Assembly Modelling	-	-	-	-
NOS Total	-	100	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3058
NOS Name	Tool Design Drawing - 2
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3057: CNC Technology

Description

Programming and operating and basic Maintenance of CNC machines

Scope

The scope covers the following :

- Programming and operating and basic Maintenance of CNC machines

Elements and Performance Criteria

CP01405T

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

- PC1.** • Differentiate between NC, CNC and
• DNC
- PC2.** Classify CNC Machines based on feedback system
- PC3.** Classify CNC Machine Based on Motion Control system
- PC4.** Explain the elements and Functions of CNC Turning Center and VMC
- PC5.** Specify CNC Turning Center and VMC
- PC6.** Identify and Select Tools for CNC Lathe and CNC Milling
- PC7.** Explain materials for CNC Cutting Tools and their applications
- PC8.** Select Tools for P,M,K,N,S,H materials
- PC9.** Study and Familiarize tool catalogue
- PC10.** Do Part Programming in Fanuc/ Sinumerik Control System for Turning
- PC11.** Do Part Programming in Fanuc/ Sinumerik Control System Milling
- PC12.** Operates CNC Turning Center
- PC13.** Operate CNC VMC
- PC14.** Use CAD/CAM Software
- PC15.** Perform Basic Maintenance and Troubleshooting of CNC Machines



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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
CP01405T	96	-	-	-
PC1. • Differentiate between NC, CNC and • DNC	-	-	-	-
PC2. Classify CNC Machines based on feedback system	-	-	-	-
PC3. Classify CNC Machine Based on Motion Control system	-	-	-	-
PC4. Explain the elements and Functions of CNC Turning Center and VMC	-	-	-	-
PC5. Specify CNC Turning Center and VMC	-	-	-	-
PC6. Identify and Select Tools for CNC Lathe and CNC Milling	-	-	-	-
PC7. Explain materials for CNC Cutting Tools and their applications	-	-	-	-
PC8. Select Tools for P,M,K,N,S,H materials	-	-	-	-
PC9. Study and Familiarize tool catalogue	-	-	-	-
PC10. Do Part Programming in Fanuc/ Sinumerik Control System for Turning	-	-	-	-
PC11. Do Part Programming in Fanuc/ Sinumerik Control System Milling	-	-	-	-
PC12. Operates CNC Turning Center	-	-	-	-
PC13. Operate CNC VMC	-	-	-	-
PC14. Use CAD/CAM Software	-	-	-	-
PC15. Perform Basic Maintenance and Troubleshooting of CNC Machines	-	-	-	-
NOS Total	100	-	-	-



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National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3057
NOS Name	CNC Technology
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3056: Press Tool Technology - 2

Description

Understanding various types of Press tools, their parts, functions. Design and manufacturing of Press Tools

Scope

The scope covers the following :

- Understanding various types of Press tools, their parts, functions. Design and manufacturing of Press Tools

Elements and Performance Criteria

CP01404T

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

- PC1.** Explain Press Tool Operation
- PC2.** Describe different types of Press Tool
- PC3.** Select Stock Material for press tool operation
- PC4.** Explain shearing theory and stages of shearing
- PC5.** Explain Cutting Clearance in a Press tool
- PC6.** Effect of Excessive and Insufficient cutting clearance and misalignment of punch and die in Press Tool operation
- PC7.** Identify and appearance characteristics of the component with relation to Insufficient cutting clearance and misalignment of Punch and Die
- PC8.** State relation between piece parts size to punch and die size
- PC9.** Calculate cutting clearance
- PC10.** Describe Importance of land in a Die
- PC11.** Explain angular clearance and its importance
- PC12.** Calculate cutting force for press tool operation
- PC13.** State methods for reducing cutting force
- PC14.** Identify and explain the function of elements of guide plate tool
- PC15.** Describe working principle of progressive tool
- PC16.** Identify and explain the function of elements of progressive too
- PC17.** Describe working principle of Compound tool
- PC18.** Identify and explain the function of elements of Compound tool
- PC19.** Compare Progressive Tool and Compound tool
- PC20.** Determine Economic strip layout
- PC21.** Explain different types of Dies
- PC22.** Explain different types of Punches
- PC23.** Select Punches to suit requirements
- PC24.** Explain function of striper and gauges



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- PC25.** Explain function of stoppers
- PC26.** Describe different types of stoppers
- PC27.** Explain purpose of Pilots and their applications
- PC28.** Explain different types of pilots and their functions
- PC29.** Differentiate between direct piloting and indirect piloting
- PC30.** Describe function of Side Cutter and their advantage
- PC31.** Explain function and types of ejectors and shedders
- PC32.** Explain types, functions, specification, and applications of Dowel
- PC33.** Explain types, functions, specification, and applications of Fasteners for Press Tools
- PC34.** Explain Different types of shanks
- PC35.** Determine Location of Shanks
- PC36.** Describe types, parts and functions and specifications of Presses
- PC37.** Explain Strip Feeding arrangement
- PC38.** Select Press according to Requirement
- PC39.** Describe Pneumatic Dry Cushion and Hydro pneumatic Dry Cushion
- PC40.** Explain Dry sets and Select Standard Die Set
- PC41.**
 - Explain Terms associate with bending
 - process
- PC42.** Describe Parts and Functions of U bending and V Bending Tools
- PC43.** Develop Blanks for Bend Components
- PC44.** Describe Forming Operation
- PC45.** Describe Shaving Operation
- PC46.** Describe Fine Blanking Operation
- PC47.** Explain Unit Tooling
- PC48.** Describe Forging Tool
- PC49.** Describe Extrusion Tool
- PC50.**
 - Describe criteria for selection of Tool
 - material
- PC51.** Describe Tool Handling Devices



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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
CP01404T	100	-	-	-
PC1. Explain Press Tool Operation	-	-	-	-
PC2. Describe different types of Press Tool	-	-	-	-
PC3. Select Stock Material for press tool operation	-	-	-	-
PC4. Explain shearing theory and stages of shearing	-	-	-	-
PC5. Explain Cutting Clearance in a Press tool	-	-	-	-
PC6. Effect of Excessive and Insufficient cutting clearance and misalignment of punch and die in Press Tool operation	-	-	-	-
PC7. Identify and appearance characteristics of the component with relation to Insufficient cutting clearance and misalignment of Punch and Die	-	-	-	-
PC8. State relation between piece parts size to punch and die size	-	-	-	-
PC9. Calculate cutting clearance	-	-	-	-
PC10. Describe Importance of land in a Die	-	-	-	-
PC11. Explain angular clearance and its importance	-	-	-	-
PC12. Calculate cutting force for press tool operation	-	-	-	-
PC13. State methods for reducing cutting force	-	-	-	-
PC14. Identify and explain the function of elements of guide plate tool	-	-	-	-
PC15. Describe working principle of progressive tool	-	-	-	-
PC16. Identify and explain the function of elements of progressive too	-	-	-	-



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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC17. Describe working principle of Compound tool	-	-	-	-
PC18. Identify and explain the function of elements of Compound tool	-	-	-	-
PC19. Compare Progressive Tool and Compound tool	-	-	-	-
PC20. Determine Economic strip layout	-	-	-	-
PC21. Explain different types of Dies	-	-	-	-
PC22. Explain different types of Punches	-	-	-	-
PC23. Select Punches to suit requirements	-	-	-	-
PC24. Explain function of stripper and gauges	-	-	-	-
PC25. Explain function of stoppers	-	-	-	-
PC26. Describe different types of stoppers	-	-	-	-
PC27. Explain purpose of Pilots and their applications	-	-	-	-
PC28. Explain different types of pilots and their functions	-	-	-	-
PC29. Differentiate between direct piloting and indirect piloting	-	-	-	-
PC30. Describe function of Side Cutter and their advantage	-	-	-	-
PC31. Explain function and types of ejectors and shedders	-	-	-	-
PC32. Explain types, functions, specification, and applications of Dowel	-	-	-	-
PC33. Explain types, functions, specification, and applications of Fasteners for Press Tools	-	-	-	-
PC34. Explain Different types of shanks	-	-	-	-
PC35. Determine Location of Shanks	-	-	-	-



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Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC36. Describe types, parts and functions and specifications of Presses	-	-	-	-
PC37. Explain Strip Feeding arrangement	-	-	-	-
PC38. Select Press according to Requirement	-	-	-	-
PC39. Describe Pneumatic Dry Cushion and Hydro pneumatic Dry Cushion	-	-	-	-
PC40. Explain Dry sets and Select Standard Die Set	-	-	-	-
PC41. • Explain Terms associate with bending • process	-	-	-	-
PC42. Describe Parts and Functions of U bending and V Bending Tools	-	-	-	-
PC43. Develop Blanks for Bend Components	-	-	-	-
PC44. Describe Forming Operation	-	-	-	-
PC45. Describe Shaving Operation	-	-	-	-
PC46. Describe Fine Blanking Operation	-	-	-	-
PC47. Explain Unit Tooling	-	-	-	-
PC48. Describe Forging Tool	-	-	-	-
PC49. Describe Extrusion Tool	-	-	-	-
PC50. • Describe criteria for selection of Tool • material	-	-	-	-
PC51. Describe Tool Handling Devices	-	-	-	-
NOS Total	100	-	-	-



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National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3056
NOS Name	Press Tool Technology - 2
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



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MSME/CSC/N3055: Strength of Materials - 2

Description

Understanding the behaviour of materials on application of force and determining their parameters

Scope

The scope covers the following :

- Understanding the behaviour of materials on application of force and determining their parameters

Elements and Performance Criteria

CP01403T

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

- PC1.** Explain the Stress, Strain, and its relationship
- PC2.** Describe the Hook's Law, Poisson's Ratio, Bulk Modulus, Lateral Strain, and Volumetric Strain, Shear Modulus
- PC3.** Explain shear stress, Shear strain and its application
- PC4.** Describe Thermal stress and strains.
- PC5.** Define Struts and Columns. Able to understand Different end condition, Buckling load
- PC6.** Explain the bending stress and its equation
- PC7.** Define Moment of inertia, Centre of gravity, Moment of force and centroid.
- PC8.** Explain beams and its type's. Load acting on the beams
- PC9.** Explain shaft
- PC10.** Explain Torsional stress, torsional rigidity, Polar moment of inertia, Power transmitted by shaft
- PC11.** Define spring and its spring
- PC12.** Explain purpose of spring and its application
- PC13.** Explain spring equation



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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>CP01403T</i>	100	-	-	-
PC1. Explain the Stress, Strain, and its relationship	-	-	-	-
PC2. Describe the Hook's Law, Poisson's Ratio, Bulk Modulus, Lateral Strain, and Volumetric Strain, Shear Modulus	-	-	-	-
PC3. Explain shear stress, Shear strain and its application	-	-	-	-
PC4. Describe Thermal stress and strains.	-	-	-	-
PC5. Define Struts and Columns. Able to understand Different end condition, Buckling load	-	-	-	-
PC6. Explain the bending stress and its equation	-	-	-	-
PC7. Define Moment of inertia, Centre of gravity, Moment of force and centroid.	-	-	-	-
PC8. Explain beams and its type's. Load acting on the beams	-	-	-	-
PC9. Explain shaft	-	-	-	-
PC10. Explain Torsional stress, torsional rigidity, Polar moment of inertia, Power transmitted by shaft	-	-	-	-
PC11. Define spring and its spring	-	-	-	-
PC12. Explain purpose of spring and its application	-	-	-	-
PC13. Explain spring equation	-	-	-	-
NOS Total	100	-	-	-



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National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3055
NOS Name	Strength of Materials - 2
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



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MSME/CSC/N3054: Production Technology - 4

Description

Understanding the operations of various Conventional, Nonconventional and Special purpose machines

Scope

The scope covers the following :

- Understanding the operations of various Conventional, Nonconventional and Special purpose machines

Elements and Performance Criteria

CP01402T

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

- PC1.** Explain different milling processes
- PC2.** Identify and Specify milling cutters
- PC3.** Identify nomenclature of milling cutter
- PC4.**
 - Explain feed and depth of cut in milling
 - operations
- PC5.** Mill parts as per drawings
- PC6.**
 - Explain different surface grinding
 - operations
- PC7.**
 - Describe work holding methods in
 - surface grinder
- PC8.**
 - Select grinding wheels as per
 - operations
- PC9.**
 - Dress, True, Balance and Mount
 - Grinding Wheels
- PC10.**
 - Perform different surface grinding
 - operations
- PC11.**
 - Do Surface Grinding of jobs as per
 - drawing
- PC12.**
 - Classify types of Cylindrical Grinding
 - machine
- PC13.** Specify Cylindrical Grinder
- PC14.**
 - Explain different cylindrical grinding
 - operations
- PC15.**
 - Describe work holding methods in
 - cylindrical grinder
- PC16.**
 - Perform different cylindrical grinding
 - operations
- PC17.**
 - Do cylindrical Grinding of jobs as per
 - drawing



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- PC18.** Specify Tool and Cutter Grinder
- PC19.** • Describe work holding methods in Tool
• and Cutter Grinder
- PC20.** • Select grinding wheels as per
• operations
- PC21.** • Regrind Single Point tool milling cutter,
• reamers, broaches, etc.
- PC22.** Explain Broaching process
- PC23.** • Explain Different types of Broaching
• machine
- PC24.** Explain Jig boring Operation
- PC25.** Explain Jig grinding Operation
- PC26.** Explain Honing Operation
- PC27.** Explain Lapping Operation
- PC28.** • Explain Welding, soldering, brazing,
• riveting and their applications and
• advantages
- PC29.** Specify Spark Erosion Machine
- PC30.** • Explain working of spark erosion
• machine
- PC31.** • Describe different types and materials
• for electrode
- PC32.** Design electrodes
- PC33.** Operate Spark Erosion Machine
- PC34.** • Able to set Spark EDM with Cutting
• Parameters
- PC35.** Specify Wire EDM
- PC36.** Explain working of Wire EDM
- PC37.** • Describe and specify different types
• and materials for Wire
- PC38.** • Select wires appropriate for the
• operations
- PC39.** Operate Wire EDM
- PC40.** Able to set Wire EDM with Cutting Parameters
- PC41.** • Explain the Process of Sandcasting,
• Investment Casting, Centrifugal casting
• and Die casting
- PC42.** • Explain applications, advantages and
• disadvantages of Sandcasting,
• Investment Casting, Centrifugal casting
• and Die casting
- PC43.** • Differentiate between hot working and
• cold working of metals
- PC44.** • Describe merits and demerits of hot
• working and cold working



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- PC45.** • Describe the following hot working
• process Rolling, Forging, Piercing,
• Drawing, Spinning and Extrusion
- PC46.** Describe the following cold working process cold drawing, cold rolling, bending, squeezing, peening and spinning
- PC47.** Describe the process of Powder Metallurgy
- PC48.** Explain the characters of Powders
- PC49.** Explain the different steps in manufacturing parts by Powder Metallurgy
- PC50.** Explain Process and Operations of the following non-conventional machining Operations
Chemical machining, Ultrasonic machining, Abrasive jet machining, Laser beam machining,
Electron beam machining, Plasma arc machining, Ion beam machining.
- PC51.** Describe Preventive breakdown Maintenance



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Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
CP01402T	100	-	-	-
PC1. Explain different milling processes	-	-	-	-
PC2. Identify and Specify milling cutters	-	-	-	-
PC3. Identify nomenclature of milling cutter	-	-	-	-
PC4. • Explain feed and depth of cut in milling • operations	-	-	-	-
PC5. Mill parts as per drawings	-	-	-	-
PC6. • Explain different surface grinding • operations	-	-	-	-
PC7. • Describe work holding methods in • surface grinder	-	-	-	-
PC8. • Select grinding wheels as per • operations	-	-	-	-
PC9. • Dress, True, Balance and Mount • Grinding Wheels	-	-	-	-
PC10. • Perform different surface grinding • operations	-	-	-	-
PC11. • Do Surface Grinding of jobs as per • drawing	-	-	-	-
PC12. • Classify types of Cylindrical Grinding • machine	-	-	-	-
PC13. Specify Cylindrical Grinder	-	-	-	-
PC14. • Explain different cylindrical grinding • operations	-	-	-	-



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC15. • Describe work holding methods in • cylindrical grinder	-	-	-	-
PC16. • Perform different cylindrical grinding • operations	-	-	-	-
PC17. • Do cylindrical Grinding of jobs as per • drawing	-	-	-	-
PC18. Specify Tool and Cutter Grinder	-	-	-	-
PC19. • Describe work holding methods in Tool • and Cutter Grinder	-	-	-	-
PC20. • Select grinding wheels as per • operations	-	-	-	-
PC21. • Regrind Single Point tool milling cutter, • reamers, broaches, etc.	-	-	-	-
PC22. Explain Broaching process	-	-	-	-
PC23. • Explain Different types of Broaching • machine	-	-	-	-
PC24. Explain Jig boring Operation	-	-	-	-
PC25. Explain Jig grinding Operation	-	-	-	-
PC26. Explain Honing Operation	-	-	-	-
PC27. Explain Lapping Operation	-	-	-	-
PC28. • Explain Welding, soldering, brazing, • riveting and their applications and • advantages	-	-	-	-
PC29. Specify Spark Erosion Machine	-	-	-	-
PC30. • Explain working of spark erosion • machine	-	-	-	-



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC31. • Describe different types and materials • for electrode	-	-	-	-
PC32. Design electrodes	-	-	-	-
PC33. Operate Spark Erosion Machine	-	-	-	-
PC34. • Able to set Spark EDM with Cutting • Parameters	-	-	-	-
PC35. Specify Wire EDM	-	-	-	-
PC36. Explain working of Wire EDM	-	-	-	-
PC37. • Describe and specify different types • and materials for Wire	-	-	-	-
PC38. • Select wires appropriate for the • operations	-	-	-	-
PC39. Operate Wire EDM	-	-	-	-
PC40. Able to set Wire EDM with Cutting Parameters	-	-	-	-
PC41. • Explain the Process of Sandcasting, • Investment Casting, Centrifugal casting • and Die casting	-	-	-	-
PC42. • Explain applications, advantages and • disadvantages of Sandcasting, • Investment Casting, Centrifugal casting • and Die casting	-	-	-	-
PC43. • Differentiate between hot working and • cold working of metals	-	-	-	-
PC44. • Describe merits and demerits of hot • working and cold working	-	-	-	-



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC45. Describe the following hot working process Rolling, Forging, Piercing, Drawing, Spinning and Extrusion	-	-	-	-
PC46. Describe the following cold working process cold drawing, cold rolling, bending, squeezing, peening and spinning	-	-	-	-
PC47. Describe the process of Powder Metallurgy	-	-	-	-
PC48. Explain the characters of Powders	-	-	-	-
PC49. Explain the different steps in manufacturing parts by Powder Metallurgy	-	-	-	-
PC50. Explain Process and Operations of the following non-conventional machining Operations Chemical machining, Ultrasonic machining, Abrasive jet machining, Laser beam machining, Electron beam machining, Plasma arc machining, Ion beam machining.	-	-	-	-
PC51. Describe Preventive breakdown Maintenance	-	-	-	-
NOS Total	100	-	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3054
NOS Name	Production Technology - 4
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3053: Mould Technology - 1

Description

Understanding the types of Polymers and different Moulding process

Scope

The scope covers the following :

- Understanding the types of
- Polymers and different
- Moulding process

Elements and Performance Criteria

CP01401T

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

- | | |
|--------------|---|
| PC1. | Explain Polymerization |
| PC2. | <ul style="list-style-type: none">• Explain types, properties, and• applications of thermo plastics and• thermoset plastics |
| PC3. | <ul style="list-style-type: none">• Describe Fillers and Additive used in• Plastics |
| PC4. | Identify Plastics by simple test |
| PC5. | <ul style="list-style-type: none">• Describe different types of Injection• Moulding machines |
| PC6. | Specify Injection Moulding machine |
| PC7. | <ul style="list-style-type: none">• Identify and explain the function of• elements of Injection Moulding machine |
| PC8. | Calculate Number of Cavities |
| PC9. | Determine Parting Surface |
| PC10. | Explain Feed System, Ejection System |
| PC11. | Determine Core and Cavity Dimensions |
| PC12. | <ul style="list-style-type: none">• Explain Temperature Controlling of• Moulds |
| PC13. | Prepare Mould Cycle Diagram |
| PC14. | Explain Mould with Split Cavities |
| PC15. | <ul style="list-style-type: none">• Explain Mould with Side core and Side• Cavity |



Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
CP01401T	100	-	-	-
PC1. Explain Polymerization	-	-	-	-
PC2. • Explain types, properties, and • applications of thermo plastics and • thermoset plastics	-	-	-	-
PC3. • Describe Fillers and Additive used in • Plastics	-	-	-	-
PC4. Identify Plastics by simple test	-	-	-	-
PC5. • Describe different types of Injection • Moulding machines	-	-	-	-
PC6. Specify Injection Moulding machine	-	-	-	-
PC7. • Identify and explain the function of • elements of Injection Moulding machine	-	-	-	-
PC8. Calculate Number of Cavities	-	-	-	-
PC9. Determine Parting Surface	-	-	-	-
PC10. Explain Feed System, Ejection System	-	-	-	-
PC11. Determine Core and Cavity Dimensions	-	-	-	-
PC12. • Explain Temperature Controlling of • Moulds	-	-	-	-
PC13. Prepare Mould Cycle Diagram	-	-	-	-
PC14. Explain Mould with Split Cavities	-	-	-	-
PC15. • Explain Mould with Side core and Side • Cavity	-	-	-	-



Qualification Pack

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



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3053
NOS Name	Mould Technology - 1
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3052: Employability Skills

Description

Understand Entrepreneurship skills Ability to understand financial and legal aspects Understand Occupation safety, Health, and Environment related issues. Ability to use Essential skills

Scope

The scope covers the following :

- Understand Entrepreneurship
- skills
- Ability to understand financial
- and legal aspects
- Understand Occupation safety,
- Health, and Environment
- related issues.
- Ability to use Essential skills

Elements and Performance Criteria

CP01323T

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

- PC1.**
 - Knowledge on various schemes and
 - institutions promoting Entrepreneurs.
 - Ways of setting enterprise, legal
 - compliances, marketing, and budgeting
 - etc.
- PC2.**
 - Knowledge and understanding on
 - personal finance management,
 - investments, returns, basics of taxes,
 - awareness on financial frauds and
 - prevention.
- PC3.**
 - Awareness on fundamental rights under
 - the constitution and facilities available for
 - recourse in the event of breach.
- PC4.**
 - Knowledge on Occupation safety and
 - health, at workplace, Occupation
 - Hazards, Accident prevention and PPEs,
 - Environment, Pollution and protection of
 - environment, Energy conservation,
 - Global warming, Conservation of natural
 - resources, waste management and
 - disposal, Disaster Management.
- PC5.**
 - Understanding balancing Life and
 - Career, Value based decision making,
 - Types of stress and stress management.



Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
CP01323T	100	-	-	-
PC1. - Knowledge on various schemes and institutions promoting Entrepreneurs. - Ways of setting enterprise, legal compliances, marketing, and budgeting etc.	-	-	-	-
PC2. Knowledge and understanding on personal finance management, investments, returns, basics of taxes, awareness on financial frauds and prevention.	-	-	-	-
PC3. Awareness on fundamental rights under the constitution and facilities available for recourse in the event of breach.	-	-	-	-
PC4. Knowledge on Occupation safety and health, at workplace, Occupation Hazards, Accident prevention and PPEs, Environment, Pollution and protection of environment, Energy conservation, Global warming, Conservation of natural resources, waste management and disposal, Disaster Management.	-	-	-	-
PC5. Understanding balancing Life and Career, Value based decision making, Types of stress and stress management.	-	-	-	-
NOS Total	100	-	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3052
NOS Name	Employability Skills
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3051: Workshop Practical

Description

Workshop Practical

Scope

The scope covers the following :

- Workshop Practical

Elements and Performance Criteria

CP01322P

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

- PC1.**
- Fit – Offset Fit, Universal Fit,
 - Assembly Fit



Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
CP01322P	-	98	-	-
PC1. • Fit – Offset Fit, Universal Fit, • Assembly Fit	-	-	-	-
NOS Total	-	100	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3051
NOS Name	Workshop Practical
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3050: Tool Design Drawing - 1

Description

Designing various types of Jigs and Fixtures, Press tools and Moulds

Scope

The scope covers the following :

- Designing various types of Jigs and Fixtures, Press tools and Moulds

Elements and Performance Criteria

CP01313P

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

- PC1.** Explain basic principle to be followed in Design
- PC2.** Design Fixtures
- PC3.** Design Jigs
- PC4.** Design Guide Plate Tool
- PC5.** Design Press Tool with Die set
- PC6.** Design Progressive Tool
- PC7.** Design Compound Tool
- PC8.** Design Bending Tool
- PC9.** Design Drawing Tool
- PC10.** Design Hand Injection Mould
- PC11.** Use Autodesk Fusion 360
- PC12.** Use of different sketch commands, dimensioning and constraints in fusion 360
- PC13.** Do Assembly Modelling



Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>CP01313P</i>	-	100	-	-
PC1. Explain basic principle to be followed in Design	-	-	-	-
PC2. Design Fixtures	-	-	-	-
PC3. Design Jigs	-	-	-	-
PC4. Design Guide Plate Tool	-	-	-	-
PC5. Design Press Tool with Die set	-	-	-	-
PC6. Design Progressive Tool	-	-	-	-
PC7. Design Compound Tool	-	-	-	-
PC8. Design Bending Tool	-	-	-	-
PC9. Design Drawing Tool	-	-	-	-
PC10. Design Hand Injection Mould	-	-	-	-
PC11. Use Autodesk Fusion 360	-	-	-	-
PC12. Use of different sketch commands, dimensioning and constraints in fusion 360	-	-	-	-
PC13. Do Assembly Modelling	-	-	-	-
NOS Total	-	100	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3050
NOS Name	Tool Design Drawing - 1
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3049: CAD - Fusion 360 Lab

Description

Designing various types of Jigs and Fixtures, Press tools and Moulds

Scope

The scope covers the following :

- Designing various types of Jigs and Fixtures, Press tools and Moulds

Elements and Performance Criteria

CP01305P

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

- PC1.** Explain basic principle to be followed in Design
- PC2.** Design Fixtures
- PC3.** Design Jigs
- PC4.** Design Guide Plate Tool
- PC5.** Design Press Tool with Die set
- PC6.** Design Progressive Tool
- PC7.** Design Compound Tool
- PC8.** Design Bending Tool
- PC9.** Design Drawing Tool
- PC10.** Design Hand Injection Mould
- PC11.** Use Autodesk Fusion 360
- PC12.** Use of different sketch commands, dimensioning and constraints in fusion 360
- PC13.** Do Assembly Modelling



Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>CP01305P</i>	-	100	-	-
PC1. Explain basic principle to be followed in Design	-	-	-	-
PC2. Design Fixtures	-	-	-	-
PC3. Design Jigs	-	-	-	-
PC4. Design Guide Plate Tool	-	-	-	-
PC5. Design Press Tool with Die set	-	-	-	-
PC6. Design Progressive Tool	-	-	-	-
PC7. Design Compound Tool	-	-	-	-
PC8. Design Bending Tool	-	-	-	-
PC9. Design Drawing Tool	-	-	-	-
PC10. Design Hand Injection Mould	-	-	-	-
PC11. Use Autodesk Fusion 360	-	-	-	-
PC12. Use of different sketch commands, dimensioning and constraints in fusion 360	-	-	-	-
PC13. Do Assembly Modelling	-	-	-	-
NOS Total	-	100	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3049
NOS Name	CAD - Fusion 360 Lab
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3048: Strength of Materials - 1

Description

Understanding the behaviour of materials on application of force and determining their parameters

Scope

The scope covers the following :

- Understanding the behaviour of materials on application of force and determining their parameters

Elements and Performance Criteria

CP01312T

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

- PC1.** Explain the Stress, Strain, and its relationship
- PC2.** Describe the Hook's Law, Poisson's Ratio, Bulk Modulus, Lateral Strain, and Volumetric Strain, Shear Modulus
- PC3.** Explain shear stress, Shear strain and its application
- PC4.** Describe Thermal stress and strains.
- PC5.** Define Struts and Columns. Able to understand Different end condition, Buckling load
- PC6.** Explain the bending stress and its equation
- PC7.** Define Moment of inertia, Centre of gravity, Moment of force and centroid.
- PC8.** Explain beams and its type's. Load acting on the beams
- PC9.** Explain shaft
- PC10.** Explain Torsional stress, torsional rigidity, Polar moment of inertia, Power transmitted by shaft
- PC11.** Define spring and its spring
- PC12.** Explain purpose of spring and its application
- PC13.** Explain spring equation



Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>CP01312T</i>	100	-	-	-
PC1. Explain the Stress, Strain, and its relationship	-	-	-	-
PC2. Describe the Hook's Law, Poisson's Ratio, Bulk Modulus, Lateral Strain, and Volumetric Strain, Shear Modulus	-	-	-	-
PC3. Explain shear stress, Shear strain and its application	-	-	-	-
PC4. Describe Thermal stress and strains.	-	-	-	-
PC5. Define Struts and Columns. Able to understand Different end condition, Buckling load	-	-	-	-
PC6. Explain the bending stress and its equation	-	-	-	-
PC7. Define Moment of inertia, Centre of gravity, Moment of force and centroid.	-	-	-	-
PC8. Explain beams and its type's. Load acting on the beams	-	-	-	-
PC9. Explain shaft	-	-	-	-
PC10. Explain Torsional stress, torsional rigidity, Polar moment of inertia, Power transmitted by shaft	-	-	-	-
PC11. Define spring and its spring	-	-	-	-
PC12. Explain purpose of spring and its application	-	-	-	-
PC13. Explain spring equation	-	-	-	-
NOS Total	100	-	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3048
NOS Name	Strength of Materials - 1
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3047: Jigs and Fixtures

Description

Understanding various types of Jigs and Fixtures, their parts, functions and design and manufacturing of different Jigs and Fixtures

Scope

The scope covers the following :

- Understanding various types of Jigs and Fixtures, their parts, functions and design and manufacturing of different Jigs and Fixtures

Elements and Performance Criteria

CP01311T

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

- PC1.** Explain the function Jigs and Fixtures
- PC2.** Differentiate between Jigs and Fixture
- PC3.** Describe Advantages of Jigs and Fixtures
- PC4.** Describe the freedom of movement of object
- PC5.** Explain locating methods and locators
- PC6.**
 - Describe different types of clamps and
 - stoppers
- PC7.** Explain types and application of different types of Jigs
- PC8.** Explain types and application of different types of Fixtures
- PC9.** Explain the Jigs and Machine Relation
- PC10.** Explain the Fixture and Machine Relation
- PC11.** Describe different of Clamps
- PC12.** Explain different types of locating elements
- PC13.** Explain different of drill bushes
- PC14.** Explain Different types of setting elements
- PC15.** Design mounting bases for Jigs and Fixture
- PC16.** Select material and Heat Treatment Process for Jigs and Fixture element
- PC17.** Analyze Failure of Jigs and Fixture



Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
CP01311T	100	-	-	-
PC1. Explain the function Jigs and Fixtures	-	-	-	-
PC2. Differentiate between Jigs and Fixture	-	-	-	-
PC3. Describe Advantages of Jigs and Fixtures	-	-	-	-
PC4. Describe the freedom of movement of object	-	-	-	-
PC5. Explain locating methods and locators	-	-	-	-
PC6. • Describe different types of clamps and • stoppers	-	-	-	-
PC7. Explain types and application of different types of Jigs	-	-	-	-
PC8. Explain types and application of different types of Fixtures	-	-	-	-
PC9. Explain the Jigs and Machine Relation	-	-	-	-
PC10. Explain the Fixture and Machine Relation	-	-	-	-
PC11. Describe different of Clamps	-	-	-	-
PC12. Explain different types of locating elements	-	-	-	-
PC13. Explain different of drill bushes	-	-	-	-
PC14. Explain Different types of setting elements	-	-	-	-
PC15. Design mounting bases for Jigs and Fixture	-	-	-	-
PC16. Select material and Heat Treatment Process for Jigs and Fixture element	-	-	-	-
PC17. Analyze Failure of Jigs and Fixture	-	-	-	-



Qualification Pack

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



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3047
NOS Name	Jigs and Fixtures
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3046: Press Tool Technology - 1

Description

Understanding various types of Press tools, their parts, functions. Design and manufacturing of Press Tools

Scope

The scope covers the following :

- Understanding various types of Press tools, their parts, functions. Design and manufacturing of Press Tools

Elements and Performance Criteria

CP01310T

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

- PC1.** Explain Press Tool Operation
- PC2.** Describe different types of Press Tool
- PC3.** Select Stock Material for press tool operation
- PC4.** Explain shearing theory and stages of shearing
- PC5.** Explain Cutting Clearance in a Press tool
- PC6.** Effect of Excessive and Insufficient cutting clearance and misalignment of punch and die in Press Tool operation
- PC7.** Identify and appearance characteristics of the component with relation to Insufficient cutting clearance and misalignment of Punch and Die
- PC8.** State relation between piece parts size to punch and die size
- PC9.** Calculate cutting clearance
- PC10.** Describe Importance of land in a Die
- PC11.** Explain angular clearance and its importance
- PC12.** Calculate cutting force for press tool operation
- PC13.** State methods for reducing cutting force
- PC14.** Identify and explain the function of elements of guide plate tool
- PC15.** Describe working principle of progressive tool
- PC16.** Identify and explain the function of elements of progressive too
- PC17.** Describe working principle of Compound tool
- PC18.** Identify and explain the function of elements of Compound tool
- PC19.** Compare Progressive Tool and Compound tool
- PC20.** Determine Economic strip layout
- PC21.** Explain different types of Dies
- PC22.** Explain different types of Punches
- PC23.** Select Punches to suit requirements
- PC24.** Explain function of striper and gauges



Qualification Pack

- PC25.** Explain function of stoppers
- PC26.** Describe different types of stoppers
- PC27.** Explain purpose of Pilots and their applications
- PC28.** Explain different types of pilots and their functions
- PC29.** Differentiate between direct piloting and indirect piloting
- PC30.** Describe function of Side Cutter and their advantage
- PC31.** Explain function and types of ejectors and shedders
- PC32.** Explain types, functions, specification, and applications of Dowel
- PC33.** Explain types, functions, specification, and applications of Fasteners for Press Tools
- PC34.** Explain Different types of shanks
- PC35.** Determine Location of Shanks
- PC36.** Describe types, parts and functions and specifications of Presses
- PC37.** Explain Strip Feeding arrangement
- PC38.** Select Press according to Requirement
- PC39.** Describe Pneumatic Dry Cushion and Hydro pneumatic Dry Cushion
- PC40.** Explain Dry sets and Select Standard Die Set
- PC41.**
 - Explain Terms associate with bending
 - process
- PC42.** Describe Parts and Functions of U bending and V Bending Tools
- PC43.** Develop Blanks for Bend Components
- PC44.** Describe Forming Operation
- PC45.** Describe Shaving Operation
- PC46.** Describe Fine Blanking Operation
- PC47.** Explain Unit Tooling
- PC48.** Describe Forging Tool
- PC49.** Describe Extrusion Tool
- PC50.**
 - Describe criteria for selection of Tool
 - material
- PC51.** Describe Tool Handling Devices



Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
CP01310T	100	-	-	-
PC1. Explain Press Tool Operation	-	-	-	-
PC2. Describe different types of Press Tool	-	-	-	-
PC3. Select Stock Material for press tool operation	-	-	-	-
PC4. Explain shearing theory and stages of shearing	-	-	-	-
PC5. Explain Cutting Clearance in a Press tool	-	-	-	-
PC6. Effect of Excessive and Insufficient cutting clearance and misalignment of punch and die in Press Tool operation	-	-	-	-
PC7. Identify and appearance characteristics of the component with relation to Insufficient cutting clearance and misalignment of Punch and Die	-	-	-	-
PC8. State relation between piece parts size to punch and die size	-	-	-	-
PC9. Calculate cutting clearance	-	-	-	-
PC10. Describe Importance of land in a Die	-	-	-	-
PC11. Explain angular clearance and its importance	-	-	-	-
PC12. Calculate cutting force for press tool operation	-	-	-	-
PC13. State methods for reducing cutting force	-	-	-	-
PC14. Identify and explain the function of elements of guide plate tool	-	-	-	-
PC15. Describe working principle of progressive tool	-	-	-	-
PC16. Identify and explain the function of elements of progressive too	-	-	-	-



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC17. Describe working principle of Compound tool	-	-	-	-
PC18. Identify and explain the function of elements of Compound tool	-	-	-	-
PC19. Compare Progressive Tool and Compound tool	-	-	-	-
PC20. Determine Economic strip layout	-	-	-	-
PC21. Explain different types of Dies	-	-	-	-
PC22. Explain different types of Punches	-	-	-	-
PC23. Select Punches to suit requirements	-	-	-	-
PC24. Explain function of stripper and gauges	-	-	-	-
PC25. Explain function of stoppers	-	-	-	-
PC26. Describe different types of stoppers	-	-	-	-
PC27. Explain purpose of Pilots and their applications	-	-	-	-
PC28. Explain different types of pilots and their functions	-	-	-	-
PC29. Differentiate between direct piloting and indirect piloting	-	-	-	-
PC30. Describe function of Side Cutter and their advantage	-	-	-	-
PC31. Explain function and types of ejectors and shedders	-	-	-	-
PC32. Explain types, functions, specification, and applications of Dowel	-	-	-	-
PC33. Explain types, functions, specification, and applications of Fasteners for Press Tools	-	-	-	-
PC34. Explain Different types of shanks	-	-	-	-
PC35. Determine Location of Shanks	-	-	-	-



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC36. Describe types, parts and functions and specifications of Presses	-	-	-	-
PC37. Explain Strip Feeding arrangement	-	-	-	-
PC38. Select Press according to Requirement	-	-	-	-
PC39. Describe Pneumatic Dry Cushion and Hydro pneumatic Dry Cushion	-	-	-	-
PC40. Explain Dry sets and Select Standard Die Set	-	-	-	-
PC41. • Explain Terms associate with bending • process	-	-	-	-
PC42. Describe Parts and Functions of U bending and V Bending Tools	-	-	-	-
PC43. Develop Blanks for Bend Components	-	-	-	-
PC44. Describe Forming Operation	-	-	-	-
PC45. Describe Shaving Operation	-	-	-	-
PC46. Describe Fine Blanking Operation	-	-	-	-
PC47. Explain Unit Tooling	-	-	-	-
PC48. Describe Forging Tool	-	-	-	-
PC49. Describe Extrusion Tool	-	-	-	-
PC50. • Describe criteria for selection of Tool • material	-	-	-	-
PC51. Describe Tool Handling Devices	-	-	-	-
NOS Total	100	-	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3046
NOS Name	Press Tool Technology - 1
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3045: Material Technology and Heat Treatment

Description

Understanding the heat treatment process

Scope

The scope covers the following :

- Understanding the heat treatment process

Elements and Performance Criteria

CP01308T

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

- PC1.** Explain types of atomic bonds
- PC2.** Describe Crystalline structure of metals
- PC3.** Explain Solid Solutions
- PC4.** Describe Phase Diagram
- PC5.** Explain Solidification of Metals
- PC6.** Explain the Purpose of Heat Treatment
- PC7.** Interpret Iron Carbon and TTT
- PC8.** Describe Heat treatment Processes – Procedure, Structural change, Change in Properties and Application
- PC9.** Select Heat treatment Process for Different Material
- PC10.** State Defects in Heat treatment and Explain Remedial Measures
- PC11.** Explain Types and Applications of Heat treatment Equipment
- PC12.** Explain Post Heat treatment processes
- PC13.** Describe Different Surface Treatment processes and process Applications



Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>CP01308T</i>	100	-	-	-
PC1. Explain types of atomic bonds	-	-	-	-
PC2. Describe Crystalline structure of metals	-	-	-	-
PC3. Explain Solid Solutions	-	-	-	-
PC4. Describe Phase Diagram	-	-	-	-
PC5. Explain Solidification of Metals	-	-	-	-
PC6. Explain the Purpose of Heat Treatment	-	-	-	-
PC7. Interpret Iron Carbon and TTT	-	-	-	-
PC8. Describe Heat treatment Processes – Procedure, Structural change, Change in Properties and Application	-	-	-	-
PC9. Select Heat treatment Process for Different Material	-	-	-	-
PC10. State Defects in Heat treatment and Explain Remedial Measures	-	-	-	-
PC11. Explain Types and Applications of Heat treatment Equipment	-	-	-	-
PC12. Explain Post Heat treatment processes	-	-	-	-
PC13. Describe Different Surface Treatment processes and process Applications	-	-	-	-
NOS Total	100	-	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3045
NOS Name	Material Technology and Heat Treatment
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQF Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3044: Production Technology 3

Description

Understanding the operations of various Conventional, Nonconventional and Special purpose machines

Scope

The scope covers the following :

- Understanding the operations of various Conventional, Nonconventional and Special purpose machines

Elements and Performance Criteria

CP01306T

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

- PC1.** Explain different milling processes
- PC2.** Identify and Specify milling cutters
- PC3.** Identify nomenclature of milling cutter
- PC4.**
 - Explain feed and depth of cut in milling
 - operations
- PC5.** Mill parts as per drawings
- PC6.**
 - Explain different surface grinding
 - operations
- PC7.**
 - Describe work holding methods in
 - surface grinder
- PC8.**
 - Select grinding wheels as per
 - operations
- PC9.**
 - Dress, True, Balance and Mount
 - Grinding Wheels
- PC10.**
 - Perform different surface grinding
 - operations
- PC11.**
 - Do Surface Grinding of jobs as per
 - drawing
- PC12.**
 - Classify types of Cylindrical Grinding
 - machine
- PC13.** Specify Cylindrical Grinder
- PC14.**
 - Explain different cylindrical grinding
 - operations
- PC15.**
 - Describe work holding methods in
 - cylindrical grinder
- PC16.**
 - Perform different cylindrical grinding
 - operations
- PC17.**
 - Do cylindrical Grinding of jobs as per
 - drawing



Qualification Pack

- PC18.** Specify Tool and Cutter Grinder
- PC19.** • Describe work holding methods in Tool
• and Cutter Grinder
- PC20.** • Select grinding wheels as per
• operations
- PC21.** • Regrind Single Point tool milling cutter,
• reamers, broaches, etc.
- PC22.** Explain Broaching process
- PC23.** • Explain Different types of Broaching
• machine
- PC24.** Explain Jig boring Operation
- PC25.** Explain Jig grinding Operation
- PC26.** Explain Honing Operation
- PC27.** Explain Lapping Operation
- PC28.** • Explain Welding, soldering, brazing,
• riveting and their applications and
• advantages
- PC29.** Specify Spark Erosion Machine
- PC30.** • Explain working of spark erosion
• machine
- PC31.** • Describe different types and materials
• for electrode
- PC32.** Design electrodes
- PC33.** Operate Spark Erosion Machine
- PC34.** • Able to set Spark EDM with Cutting
• Parameters
- PC35.** Specify Wire EDM
- PC36.** Explain working of Wire EDM
- PC37.** • Describe and specify different types
• and materials for Wire
- PC38.** • Select wires appropriate for the
• operations
- PC39.** Operate Wire EDM
- PC40.** Able to set Wire EDM with Cutting Parameters
- PC41.** • Explain the Process of Sandcasting,
• Investment Casting, Centrifugal casting
• and Die casting
- PC42.** • Explain applications, advantages and
• disadvantages of Sandcasting,
• Investment Casting, Centrifugal casting
• and Die casting
- PC43.** • Differentiate between hot working and
• cold working of metals
- PC44.** • Describe merits and demerits of hot
• working and cold working



Qualification Pack

- PC45.** • Describe the following hot working
• process Rolling, Forging, Piercing,
• Drawing, Spinning and Extrusion
- PC46.** Describe the following cold working process cold drawing, cold rolling, bending, squeezing, peening and spinning
- PC47.** Describe the process of Powder Metallurgy
- PC48.** Explain the characters of Powders
- PC49.** Explain the different steps in manufacturing parts by Powder Metallurgy
- PC50.** Explain Process and Operations of the following non-conventional machining Operations
Chemical machining, Ultrasonic machining, Abrasive jet machining, Laser beam machining,
Electron beam machining, Plasma arc machining, Ion beam machining.
- PC51.** Describe Preventive breakdown Maintenance



Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
CP01306T	100	-	-	-
PC1. Explain different milling processes	-	-	-	-
PC2. Identify and Specify milling cutters	-	-	-	-
PC3. Identify nomenclature of milling cutter	-	-	-	-
PC4. Explain feed and depth of cut in milling operations	-	-	-	-
PC5. Mill parts as per drawings	-	-	-	-
PC6. Explain different surface grinding operations	-	-	-	-
PC7. Describe work holding methods in surface grinder	-	-	-	-
PC8. Select grinding wheels as per operations	-	-	-	-
PC9. Dress, True, Balance and Mount Grinding Wheels	-	-	-	-
PC10. Perform different surface grinding operations	-	-	-	-
PC11. Do Surface Grinding of jobs as per drawing	-	-	-	-
PC12. Classify types of Cylindrical Grinding machine	-	-	-	-
PC13. Specify Cylindrical Grinder	-	-	-	-
PC14. Explain different cylindrical grinding operations	-	-	-	-



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC15. • Describe work holding methods in • cylindrical grinder	-	-	-	-
PC16. • Perform different cylindrical grinding • operations	-	-	-	-
PC17. • Do cylindrical Grinding of jobs as per • drawing	-	-	-	-
PC18. Specify Tool and Cutter Grinder	-	-	-	-
PC19. • Describe work holding methods in Tool • and Cutter Grinder	-	-	-	-
PC20. • Select grinding wheels as per • operations	-	-	-	-
PC21. • Regrind Single Point tool milling cutter, • reamers, broaches, etc.	-	-	-	-
PC22. Explain Broaching process	-	-	-	-
PC23. • Explain Different types of Broaching • machine	-	-	-	-
PC24. Explain Jig boring Operation	-	-	-	-
PC25. Explain Jig grinding Operation	-	-	-	-
PC26. Explain Honing Operation	-	-	-	-
PC27. Explain Lapping Operation	-	-	-	-
PC28. • Explain Welding, soldering, brazing, • riveting and their applications and • advantages	-	-	-	-
PC29. Specify Spark Erosion Machine	-	-	-	-
PC30. • Explain working of spark erosion • machine	-	-	-	-



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC31. • Describe different types and materials • for electrode	-	-	-	-
PC32. Design electrodes	-	-	-	-
PC33. Operate Spark Erosion Machine	-	-	-	-
PC34. • Able to set Spark EDM with Cutting • Parameters	-	-	-	-
PC35. Specify Wire EDM	-	-	-	-
PC36. Explain working of Wire EDM	-	-	-	-
PC37. • Describe and specify different types • and materials for Wire	-	-	-	-
PC38. • Select wires appropriate for the • operations	-	-	-	-
PC39. Operate Wire EDM	-	-	-	-
PC40. Able to set Wire EDM with Cutting Parameters	-	-	-	-
PC41. • Explain the Process of Sandcasting, • Investment Casting, Centrifugal casting • and Die casting	-	-	-	-
PC42. • Explain applications, advantages and • disadvantages of Sandcasting, • Investment Casting, Centrifugal casting • and Die casting	-	-	-	-
PC43. • Differentiate between hot working and • cold working of metals	-	-	-	-
PC44. • Describe merits and demerits of hot • working and cold working	-	-	-	-



Qualification Pack

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
PC45. Describe the following hot working process Rolling, Forging, Piercing, Drawing, Spinning and Extrusion	-	-	-	-
PC46. Describe the following cold working process cold drawing, cold rolling, bending, squeezing, peening and spinning	-	-	-	-
PC47. Describe the process of Powder Metallurgy	-	-	-	-
PC48. Explain the characters of Powders	-	-	-	-
PC49. Explain the different steps in manufacturing parts by Powder Metallurgy	-	-	-	-
PC50. Explain Process and Operations of the following non-conventional machining Operations Chemical machining, Ultrasonic machining, Abrasive jet machining, Laser beam machining, Electron beam machining, Plasma arc machining, Ion beam machining.	-	-	-	-
PC51. Describe Preventive breakdown Maintenance	-	-	-	-
NOS Total	100	-	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3044
NOS Name	Production Technology 3
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3043: Metrology -3

Description

Applying the prescribed method for measuring various profiles and dimensions using appropriate devices

Scope

The scope covers the following :

- Applying the prescribed method for measuring various profiles and dimensions using appropriate devices

Elements and Performance Criteria

CP01307T

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

- PC1.** Explain Different methods used for Hardness Checking
- PC2.** Describe Different Hardness checking Processes
- PC3.** Explain Interferometry and Its applications
- PC4.** Describe Form and Position Measuring/Checking Procedure
- PC5.** Explain Instrument and Process of Checking Surface Texture



Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
<i>CP01307T</i>	100	-	-	-
PC1. Explain Different methods used for Hardness Checking	-	-	-	-
PC2. Describe Different Hardness checking Processes	-	-	-	-
PC3. Explain Interferometry and Its applications	-	-	-	-
PC4. Describe Form and Position Measuring/Checking Procedure	-	-	-	-
PC5. Explain Instrument and Process of Checking Surface Texture	-	-	-	-
NOS Total	100	-	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3043
NOS Name	Metrology -3
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023



Qualification Pack

MSME/CSC/N3062: Workshop Practical

Description

Workshop Practical

Scope

The scope covers the following :

- Workshop Practical

Elements and Performance Criteria

CP01407P

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

- PC1.**
- Fit – Offset Fit, Universal Fit,
 - Assembly Fit



Qualification Pack

Assessment Criteria

Assessment Criteria for Outcomes	Theory Marks	Practical Marks	Project Marks	Viva Marks
CP01407P	-	100	-	-
PC1. • Fit – Offset Fit, Universal Fit, • Assembly Fit	-	-	-	-
NOS Total	-	100	-	-



Qualification Pack

National Occupational Standards (NOS) Parameters

NOS Code	MSME/CSC/N3062
NOS Name	Workshop Practical
Sector	Capital Goods
Sub-Sector	
Occupation	Designing
NSQF Level	4
Credits	2
Version	1.0
Last Reviewed Date	29/09/2023
Next Review Date	29/09/2028
NSQC Clearance Date	29/09/2023

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/N3061.Employability skill	100	-	-	-	100	10
MSME/CSC/N3058.Tool Design Drawing - 2	-	100	-	-	100	10
MSME/CSC/N3057.CNC Technology	100	-	-	-	100	5
MSME/CSC/N3056.Press Tool Technology - 2	100	-	-	-	100	5
MSME/CSC/N3055.Strength of Materials - 2	100	-	-	-	100	5
MSME/CSC/N3054.Production Technology - 4	100	-	-	-	100	5
MSME/CSC/N3053.Mould Technology - 1	100	-	-	-	100	5
MSME/CSC/N3052.Employability Skills	100	-	-	-	100	5
MSME/CSC/N3051.Workshop Practical	-	100	-	-	100	5
MSME/CSC/N3050.Tool Design Drawing - 1	-	100	-	-	100	5
MSME/CSC/N3049.CAD - Fusion 360 Lab	-	100	-	-	100	5
MSME/CSC/N3048.Strength of Materials - 1	100	-	-	-	100	5
MSME/CSC/N3047.Jigs and Fixtures	100	-	-	-	100	5
MSME/CSC/N3046.Press Tool Technology - 1	100	-	-	-	100	5
MSME/CSC/N3045.Material Technology and Heat Treatment	100	-	-	-	100	5
MSME/CSC/N3044.Production Technology 3	100	-	-	-	100	5



Qualification Pack

National Occupational Standards	Theory Marks	Practical Marks	Project Marks	Viva Marks	Total Marks	Weightage
MSME/CSC/N3043.Metrology -3	100	-	-	-	100	5
MSME/CSC/N3062.Workshop Practical	-	100	-	-	100	5
Total	1300	500	-	-	1800	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.



Qualification Pack

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.