



Model Curriculum

QP Name: Maintenance Fitter - Mechanical

QP Code: CSC/Q0901

QP Version: 2.0

NSQF Level: 4

Model Curriculum Version: 2.0

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Training Parameters

Sector	Capital Goods
Sub-Sector	<ol style="list-style-type: none"> 1. Machine Tools 2. Dies, Moulds and Press Tools 3. Plastics Manufacturing Machinery 4. Textile Manufacturing Machinery 5. Process Plant Machinery 6. Electrical and Power Machinery 7. Light Engineering Goods
Occupation	Maintenance
Country	India
NSQF Level	4
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7212.0302
Minimum Educational Qualification and Experience	<p>10th Class with 2 years of experience in the relevant field Or ITI Fitter Or 12th Pass with 6 Months of experience in the relevant field Or Fitter Mechanical Assembly – 3 with 1 year of experience in the relevant field</p>
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 years
Last Reviewed On	31/03/2022
Next Review Date	31/03/2025
NSQC Approval Date	31/03/2022
QP Version	2.0
Model Curriculum Creation Date	31/03/2022
Model Curriculum Valid Up to Date	31/03/2025
Model Curriculum Version	2.0
Minimum Duration of the Course	480 Hours 00 Minutes
Maximum Duration of the Course	480 Hours 00 Minutes

Program Overview

This section summarizes the end objectives of the program along with its duration.

Training Outcomes

At the end of the program, the learner should have acquired the listed knowledge and skills.

- Identify the various equipment and machinery used in the maintenance process.
- Conduct maintenance of the mechanical systems of the equipment.
- Maintain records, documents and reports related to the maintenance activities done on the equipment.
- Work effectively and efficiently as per schedules and timelines.
- Implement safety practices.
- Optimize the use of resources to ensure less wastage and maximum conservation.

Compulsory Modules

The table lists the modules and their duration corresponding to the Compulsory NOS of the QP.

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
Bridge Module					
Module 1: Introduction to the role of a Maintenance Fitter - Mechanical	8:00	0:00	0:00	00:00	8:00
CSC/N1335 – Follow the health and safety practices at work NOS Version- 2.0 NSQF Level- 3	20:00	40:00	0:00	0:00	60:00
Module 2: Health and safety practices	20:00	40:00	0:00	00:00	60:00
CSC/N1336 – Coordinate with co-workers to achieve work efficiency NOS Version-2.0 NSQF Level- 3	20:00	30:00	0:00	00:00	50:00
Module 3: Process of coordinating with co-workers to achieve work efficiency	20:00	30:00	0:00	00:00	50:00
CSC/N0901 – Perform maintenance activities on mechanical equipment NOS Version No. – 2.0 NSQF Level – 4	102:00	260:00	0:00	00:00	362:00
Module 4: Perform maintenance activities on mechanical equipment	102:00	260:00	0:00	00:00	362:00
Total Duration	150:00	330:00	0:00	00:00	480:00

Module Details

Module 1: Introduction to the role of a Maintenance Fitter - Mechanical

Bridge module

Terminal Outcomes:

- Discuss the role and responsibilities of a Maintenance Fitter - Mechanical.

Duration: 08:00	Duration: 00:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the role and responsibilities of a Maintenance Fitter - Mechanical. • Discuss the job opportunities of a Maintenance Fitter – Mechanical. • Describe the size and scope of the capital good industry and its sub-sectors. • Explain about Indian capital goods manufacturing market. • Discuss the standards and procedures involved in the different operations of maintenance work. 	
Classroom Aids:	
Whiteboard, marker pen, projector, standard checklists and schedules	
Tools, Equipment and Other Requirements	

Module 2: Health and safety Practices

Mapped to CSC/N1335 v2.0

Terminal Outcomes:

- Demonstrate ways to maintain personal health and safety.
- Describe the process of assisting in hazard management.
- Explain how to check the first aid box, firefighting and safety equipment.
- Describe the process of assisting in waste management.
- Explain the importance of following the fire safety guidelines.
- Explain the importance of following the emergency and first-aid procedures.
- Demonstrate the process of carrying out relevant documentation and review.

Duration: 20:00	Duration: 40:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the recommended practices to be followed to ensure protection from infections and transmission to others, such as the use of hand sanitiser and face mask. • Explain the importance and process of checking the work conditions, assessing the potential health and safety risks, and take appropriate measures to mitigate them. • Explain the importance and process of selecting and using the appropriate PPE relevant to the task and work conditions. • Explain the recommended techniques to be followed while lifting and moving heavy objects to avoid injury. • Explain the importance of following the manufacturer’s instructions and workplace safety guidelines while working on heavy machinery, tools and equipment. • Explain the importance and process of identifying existing and potential hazards at work. • Describe the process of assessing the potential risks and injuries associated with the various hazards. • Explain how to prevent or minimise different types of hazards. • Explain how to handle and store hazardous materials safely. • Explain the importance of ensuring the first aid box is updated with the relevant first aid supplies. • Describe the process of checking and testing the firefighting and various safety equipment to ensure they are in a usable 	<ul style="list-style-type: none"> • Demonstrate the use of appropriate Personal Protective Equipment (PPE) relevant to the task and work conditions. • Demonstrate how to handle hazardous materials safely. • Demonstrate the process of testing the firefighting and various safety equipment to ensure they are in usable condition. • Demonstrate the process of recycling and disposing different types of waste appropriately. • Demonstrate how to use the appropriate type of fire extinguisher to extinguish different types of fires safely. • Demonstrate how to administer appropriate first aid to the injured personnel. • Demonstrate the process of performing Cardiopulmonary Resuscitation (CPR) on a potential victim of cardiac arrest. • Demonstrate the process of carrying out appropriate documentation following a health and safety incident at work, including all the required information.

condition.

- Explain the criteria for segregating waste into appropriate categories.
- Describe the appropriate methods for recycling recyclable waste.
- Describe the process of disposing of the non-recyclable waste safely and the applicable regulations.
- Explain the use of different types of fire extinguishers to extinguish different types of fires.
- State the recommended practices to be followed for a safe rescue during a fire emergency.
- Explain how to request assistance from the fire department to extinguish a serious fire.
- Explain the appropriate practices to be followed during workplace emergencies to ensure safety and minimise loss to organisational property.
- State the common health and safety hazards present in a work environment, associated risks, and how to mitigate them.
- State the safe working practices to be followed while working at various hazardous sites and using electrical equipment.
- Explain the importance of ensuring easy access to firefighting and safety equipment.
- Explain the appropriate preventative and remedial actions to be taken in the case of exposure to toxic materials, such as poisonous chemicals and gases.
- Explain various causes of fire in different work environments and the recommended precautions to be taken to prevent fire accidents.
- Describe different methods of extinguishing fire.
- List different materials used for extinguishing fire.
- Explain the applicable rescue techniques to be followed during a fire emergency.
- Explain the importance of placing safety signs and instructions at strategic locations in a workplace and following them.
- Explain different types of first aid treatment to be provided for different

<p>types of injuries.</p> <ul style="list-style-type: none"> • State the potential injuries associated with incorrect manual handling. • Explain how to move an injured person safely. • State various hazards associated with the use of various machinery, tools, implements, equipment and materials. • Explain the importance of ensuring no obstruction and free access to fire exits. • Explain how to free a person from electrocution safely. • Explain how to administer appropriate first aid to an injured person. • Explain how to perform Cardiopulmonary Resuscitation (CPR). • Explain the importance of coordinating with the emergency services to request urgent medical assistance for persons requiring professional medical attention or hospitalisation. • State the appropriate documentation to be carried out following a health and safety incident at work, and the relevant information to be included. • Explain the importance and process of reviewing the health and safety conditions at work regularly or following an incident. • Explain the importance and process of implementing appropriate changes to improve the health and safety conditions at work. 	
<p>Classroom Aids</p>	
<p>Computer, Projection Equipment, PowerPoint Presentation and Software, Facilitator’s Guide, Participant’s Handbook.</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>Personal Protective Equipment, Cleaning Equipment and Materials, Sanitizer, Soap, Mask</p>	

Module 3: Process of coordinating with co-workers to achieve work efficiency

Mapped to CSC/N1336 v2.0

Terminal Outcomes:

- Demonstrate ways to work and communicate effectively with co-workers.
- Discuss ways to promote diversity and inclusion at the workplace.

Duration: 20:00	Duration: 30:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the importance and process of effective communication in the workplace. • Explain the barriers to effective communication and how to overcome them. • Explain the importance of teamwork in an organisation's and individual's success. • Explain the importance of active listening in the work environment. • State the appropriate techniques to be followed for active listening. • Explain the importance of tone and pitch ineffective communication. • Explain the importance of avoiding casual expletives and unpleasant terms while communicating professional circles. • Explain the importance of maintaining discipline and ethical behaviour at work. • State the common reasons for interpersonal conflict and how to resolve them. • Explain the importance of developing effective working relationships for professional success. • Describe the process of expressing and addressing grievances appropriately and effectively. • Explain the importance and process of planning daily tasks to ensure their timely completion and efficient use of time. • Explain the importance of adhering to the limits of authority at work. • Explain the importance of following the applicable quality standards and timescales at work. • Explain the importance of coordinating with co-workers to achieve the work objectives efficiently. • Explain the relevant documentation requirements. 	<ul style="list-style-type: none"> • Demonstrate the process of preparing the relevant documents and reports as per the supervisor's instructions, providing appropriate information clearly and systematically. • Demonstrate how to mentor and assist subordinates in the execution of their work responsibilities. • Demonstrate the process of using various resources efficiently to ensure maximum utilisation and minimum wastage. • Demonstrate how to communicate clearly and politely to ensure effective communication with co-workers. • Demonstrate appropriate verbal and non-verbal communication that is respectful of genders and disability.

- Explain the importance of providing appropriate information clearly and systematically in work documents.
- State the escalation matrix to be followed to deal with out of authority tasks and concerns.
- Explain the importance and process of mentoring and assisting subordinates in the execution of their work responsibilities.
- Explain how to identify possible disruptions to work prevent them.
- Explain how to use various resources efficiently to ensure maximum utilisation and minimum wastage.
- Explain the recommended practices to be followed at work to avoid and resolve conflicts at work.
- Explain the importance and process of efficient and timely dissemination of information to the authorised personnel.
- Explain the procedure to report inappropriate behaviour e.g., harassment.

Classroom Aids:

Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop

Tools, Equipment and Other Requirements

NA

Module 4: Perform maintenance activities on mechanical equipment

Mapped to CSC/N0901, v2.0

Terminal Outcomes:

- Identify tools and equipment required for maintenance of mechanical equipment.
- Perform maintenance and repairing of mechanical equipment.

Duration: 102:00	Duration: 260:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Define maintenance. • Classify various types of maintenance. • Discuss the information derived from the instruction sheet/ job card, maintenance log book/ card/ sheet and instructions from supervisor. • Discuss how to check the equipment and collect information from operator or supervisor about the unusual conditions noticed in equipment. • Recall the information mentioned in the maintenance schedule and checklist regarding the maintenance work. • List tools, equipment, accessories, consumables and spare parts required during the maintenance work. • Describe the organisational process of collecting and arranging consumables, spare parts, tools etc. from the store. • List the commonly occurring faults/failures in the equipment and corrective actions taken to resolve them. • List the steps to be performed for dismantling the equipment for inspection, cleaning, repairing or replacing the consumables, spare parts and faulty components as per SOP. • Explain the process of evaluating the dimensional inaccuracies or internal conditions of the equipment with the specified quality standards. • Discuss breakdown maintenance process. • Explain methods of inspecting the equipment for problems and defects. • Identify different methods for disposing off waste material and scrap. • Discuss the necessary precautions to avoid any hazard and accident during maintenance activities. • List the steps to be performed for assembling back the equipment as per 	<ul style="list-style-type: none"> • Read the instruction sheet/ job card, maintenance log book/ card/ sheet, specifications, manufacturers' manuals, maintenance manual, checklist etc. for identifying the information about the equipment used for service and repairing. • Read the maintenance schedule and equipment layout for planning of the schedule for maintenance activities. • Demonstrate the standard operating procedures for using tools and equipment required during job. • Read the maintenance checklist and discuss it with the superior for confirming the maintenance tasks. • Demonstrate how to check the basic health and condition of equipment as per maintenance checklist. • Demonstrate organizational specified procedure of dismantling the equipment and repairing or replacing the consumables, spare parts and faulty components as per SOP. • Employ appropriate ways of checking the systems of the equipment to find out root cause of the problems. • Apply appropriate methods for conducting breakdown maintenance and rectifying the faults as per SOP. • Show how to relate previous reports/ records of similar fault conditions. • Employ appropriate ways for evaluate the likely risk of running the equipment and the effects the fault. • Demonstrate organizational procedure of reporting the problem to appropriate person if the problem is beyond the competence. • Employ appropriate ways for cleaning, repairing or replacing the components in the equipment

<p>SOP.</p> <ul style="list-style-type: none"> Summarise the documents, records and information to be maintained related to the maintenance and repairing done. Explain the process of evaluating the equipment specified parameters for no abnormalities at full power/speed/flow. 	<ul style="list-style-type: none"> Show how to dispose waste as per organisational guidelines. Demonstrate organizational specified procedure of assembling back the equipment and preparing it for trials as per SOP. Employ appropriate ways for conducting trials and running the equipment at full power/speed/flow for checking any abnormalities in its functioning. Show how to change the maintenance due/status sticker on the equipment. Show how to fill the daily, weekly and monthly maintenance/defect sheets as per organisational procedures. Prepare a report for the superiors about the maintenance activity done. Apply appropriate ways to identify areas of improvements in the various maintenance services and implement them by following organisational procedures.
<p>Classroom Aids:</p>	
<p>Whiteboard, marker pen, projector</p>	
<p>Tools, Equipment and Other Requirements</p>	
<ul style="list-style-type: none"> Basic tool box, Work bench with vice Allen key, spanner, torque wrench, plier, bearing puller, circlip plier, scraper, thermal indicators, dial test indicator, audio test devices, bench vice, machine vice, clamps, three jaw chuck, four jaw chuck, collet chuck, drive plate, jigs and fixtures, shafts, couplings, gears, catch, bearings and seals, cams and followers, chains and sprockets, pulleys and belts, valves, solenoid operated cylinders Measuring equipment: Vernier calliper, micrometer, feeler gauges, steel ruler, measuring tape, dial gauge etc. Cables, nuts, bolts, fasteners, connectors. Hydraulic/ pneumatic / electrical machines Safety materials: Fire extinguisher, leather safety gloves, leather aprons, safety glasses with side shields, ear plug, safety shoes and first-aid kit Cleaning material: Tip cleaner, wire brush (M.S.), cleaning agents, cleaning cloth, waste container, dust pan and brush set, liquid soap, hand towel 	

Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
Diploma	Mechanical/Fitter	3	Maintenance	1	Maintenance	NA
B.E/B.Tech	Mechanical	2	Maintenance	1	Maintenance	NA

Trainer Certification	
Domain Certification	Platform Certification
“Maintenance Fitter - Mechanical, CSC/Q0901, version 2.0”. Minimum accepted score is 80%.	“Trainer, MEP/Q2601 v1.0” Minimum accepted score is 80%.

Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
Diploma	Mechanical/Fitter	3	Maintenance	1	Maintenance	NA
B.E./B.Tech	Mechanical	2	Maintenance	1	Maintenance	NA

Assessor Certification	
Domain Certification	Platform Certification
“Maintenance Fitter - Mechanical, CSC/Q0901, version 2.0”. Minimum accepted score is 80%.	“Assessor; MEP/Q2701 v1.0” Minimum accepted score is 80%.

Assessment Strategy

1. Assessment System Overview:
 - Batches assigned to the assessment agencies for conducting the assessment on SDMS/SIP or email
 - Assessment agencies send the assessment confirmation to VTP/TC looping SSC
 - Assessment agency deploys the ToA certified Assessor for executing the assessment
 - SSC monitors the assessment process & records
2. Testing Environment:
 - Confirm that the centre is available at the same address as mentioned on SDMS or SIP
 - Check the duration of the training.
 - Check the Assessment Start and End time to be as 10 a.m. and 5 p.m.
 - If the batch size is more than 30, then there should be 2 Assessors.
 - Check that the allotted time to the candidates to complete Theory & Practical Assessment is correct.
 - Check the mode of assessment—Online (TAB/Computer) or Offline (OMR/PP).
 - Confirm the number of TABs on the ground are correct to execute the Assessment smoothly.
 - Check the availability of the Lab Equipment for the particular Job Role.
3. Assessment Quality Assurance levels / Framework:
 - Question papers created by the Subject Matter Experts (SME)
 - Question papers created by the SME verified by the other subject Matter Experts
 - Questions are mapped with NOS and PC
 - Question papers are prepared considering that level 1 to 3 are for the unskilled & semi-skilled individuals, and level 4 and above are for the skilled, supervisor & higher management
 - Assessor must be ToA certified & trainer must be ToT Certified
 - Assessment agency must follow the assessment guidelines to conduct the assessment
4. Types of evidence or evidence-gathering protocol:
 - Time-stamped & geotagged reporting of the assessor from assessment location
 - Centre photographs with signboards and scheme specific branding
 - Biometric or manual attendance sheet (stamped by TP) of the trainees during the training period
 - Time-stamped & geotagged assessment (Theory + Viva + Practical) photographs & videos
5. Method of verification or validation:
 - Surprise visit to the assessment location
 - Random audit of the batch
 - Random audit of any candidate
6. Method for assessment documentation, archiving, and access
 - Hard copies of the documents are stored
 - Soft copies of the documents & photographs of the assessment are uploaded / accessed from Cloud Storage
 - Soft copies of the documents & photographs of the assessment are stored in the Hard Drives

References

Glossary

Term	Description
Declarative Knowledge	Declarative knowledge refers to facts, concepts and principles that need to be known and/or understood in order to accomplish a task or to solve a problem.
Key Learning Outcome	Key learning outcome is the statement of what a learner needs to know, understand and be able to do in order to achieve the terminal outcomes. A set of key learning outcomes will make up the training outcomes. Training outcome is specified in terms of knowledge, understanding (theory) and skills (practical application).
OJT (M)	On-the-job training (Mandatory); trainees are mandated to complete specified hours of training on site
OJT (R)	On-the-job training (Recommended); trainees are recommended the specified hours of training on site
Procedural Knowledge	Procedural knowledge addresses how to do something, or how to perform a task. It is the ability to work, or produce a tangible work output by applying cognitive, affective or psychomotor skills.
Training Outcome	Training outcome is a statement of what a learner will know, understand and be able to do upon the completion of the training.
Terminal Outcome	Terminal outcome is a statement of what a learner will know, understand and be able to do upon the completion of a module. A set of terminal outcomes help to achieve the training outcome.

Acronyms and Abbreviations

NOS	National Occupational Standard(s)
NSQF	National Skills Qualifications Framework
QP	Qualifications Pack
TVET	Technical and Vocational Education and Training
SOP	Standard Operating Procedure
WI	Work Instructions
PPE	Personal Protective equipment