



Model Curriculum

QP Name: Blacksmith

QP Version: 1.0

NSQF Level: 2.5

Model Curriculum Version: 1.0

Capital Goods Skill Council || 1st Floor, L-29, Outer Circle, Connaught Place New Delhi – 110001 ||
[Email: coo@cgsc.in](mailto:coo@cgsc.in)

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Training Parameters

Sector	Capital Goods
Sub-Sector	Light Engineering Goods
Occupation	Blacksmith
Country	India
NSQF Level	2.5
Aligned to NCO/ISCO/ISIC Code	NCO-2015/NIL
Minimum Educational Qualification and Experience	9 th grade pass OR 8 th grade pass with continuous schooling OR 5 th grade pass with 4 years of relevant experience OR Ability to read and write with 4 years of relevant experience
Pre-Requisite License or Training	NA
Minimum Job Entry Age	18 years
Last Reviewed On	
Next Review Date	
NSQC Approval Date	
QP Version	1.0
Model Curriculum Creation Date	
Model Curriculum Valid Up to Date	
Model Curriculum Version	
Minimum Duration of the Course	40 Hours 00 Minutes
Maximum Duration of the Course	40 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.

- Interpret drawing/work instructions/SOPs for identification of raw material, tools and equipment required for various operations performed by blacksmith.
- Carry out activities such as lifting of workpiece, inspection of tools and equipments etc.
- Carry out forging, hammering, drawing, upsetting, bending and punching operations
- 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	02:00	00:00	0:00	00:00	02:00
Module 1: Introduction to the role of a Blacksmith	02:00	0:00	0:00	00:00	02:00
Follow the health and safety practices at work NOS Version- 2.0 NSQF Level- 3	01:00	02:00	0:00	0:00	03:00
Module 2: Health and safety practices	01:00	02:00	0:00	00:00	02:00
Coordinate with co-workers to achieve work efficiency NOS Version-2.0 NSQF Level- 3	01:00	02:00	0:00	00:00	03:00
Module 3: Process of coordinating with co-workers to achieve work efficiency	01:00	02:00	0:00	00:00	03:00
Perform forging, hammering and drawing operations NOS Version No. – 1.0 NSQF Level – 2.5	04:30	06:30	0:00	00:00	11:00
Module 4: Perform forging, hammering and drawing operations	04:30	06:30	0:00	00:00	11:00
Perform upsetting, bending and punching operations NOS Version No. – 1.0	04:30	06:30	0:00	00:00	11:00

NSQF Level – 2.5					
Module 5: Perform upsetting, bending and punching operations	04:30	06:30	0:00	00:00	11:00
DGT/VSQ/N0101 - Employability Skills (3hours) NOS Version No. – 1.0 NSQF Level – 2	04:00	06:00	0:00	00:00	10:00
Module 6: Financial and Legal Literacy	02:00	03:00	0:00	00:00	05:00
Module 7: Essential Digital Skills	02:00	03:00	0:00	00:00	05:00
Total Duration	17:00	23:00	0:00	00:00	40:00

Module Details

Module 1: Introduction to the role of a Blacksmith

Bridge module

Terminal Outcomes:

- Discuss the role and responsibilities of a Blacksmith.

Duration: 02:00	Duration: 00:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • List the role and responsibilities of a Blacksmith. • Discuss the job opportunities of a Blacksmith. • 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 forging. 	
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.
- Explain how to check the first aid box, firefighting and safety equipment.
- Explain the importance of following the fire safety guidelines.
- Explain the importance of following the emergency and first-aid procedures.

Duration: 01:00	Duration: 02:00
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 importance of following the manufacturer’s instructions and workplace safety guidelines while working on heavy machinery, tools and equipment. • 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 condition. • 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. • Explain the importance of ensuring easy access to firefighting and safety equipment. 	<ul style="list-style-type: none"> • Demonstrate the use of appropriate Personal Protective Equipment (PPE) relevant to the task and work conditions. • 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.

- 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 different types of first aid treatment to be provided for different types of injuries.
- State the potential injuries associated with incorrect manual handling.
- Explain how to move an injured person safely.
- Explain the importance of ensuring no obstruction and free access to fire exits.
- 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.
- 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.

Classroom Aids

Computer, Projection Equipment, PowerPoint Presentation and Software.

Tools, Equipment and Other Requirements

Personal Protective Equipment, Cleaning Equipment and Materials, Sanitizer, Soap, Mask

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: 01:00	Duration: 02:00
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. • Explain the importance of providing 	<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.

<p>appropriate information clearly and systematically in work documents.</p> <ul style="list-style-type: none"> • 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. 	
<p>Classroom Aids:</p>	
<p>Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop</p>	
<p>Tools, Equipment and Other Requirements</p>	
<p>NA</p>	

Module 4: Perform forging, hammering and drawing operations

Terminal Outcomes:

- Identify tools and equipment required for forging, hammering and drawing operations.
- Perform operations on ferrous, non-ferrous metals and alloys.

Duration: 04:30	Duration: 06:30
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe mechanical and heat laws applicable on forging. • Discuss the information derived from the engineering drawings, work order, SOPs and instructions from supervisor. • List the tools, apparatus and input materials required during forging, hammering and drawing work. • Describe the selection criteria of tools, apparatus and input materials required during work. • Describe metallurgical properties of the material used. • Discuss the organisational process of collecting and arranging the tools, forging, hammering and drawing apparatus and input materials from the store. • Summarise the steps to be performed for checking the tools, various apparatus and input materials before use. • Discuss various heat treatment parameters and their impact on output. • Discuss the necessary precautions to avoid any hazard and accident during heat treatment activities. • Describe various forging, hammering and drawing processes • Discuss the process of lifting and placing the billets in the furnace as per the work instructions. • Discuss the importance of appropriate temperature levels of heating zones when the billets are passing through the furnace. • Explain methods of inspecting the quality, geometry, dimension and material of forged/hammered or drawn out output. • Discuss the process of segregating bad quality and good quality billets. 	<ul style="list-style-type: none"> • Demonstrate the standard operating procedure to use tools and forging apparatus required during forging work. • Show how to select and arrange the required tools, heat treatment apparatus and input materials from the store. • Apply appropriate ways to check tools, heat treatment apparatus and input materials for proper functionality and calibration work before use. • Show how to prepare the work area and material for heat treatment work as per SOP. • Show how to set the tools, equipment and heat treatment apparatus and its parameters as per the work instructions. • Show how to set the induction heater temperature for pre-heating, heating as well as post-heating process. • Perform the steps of lifting and placing the billets in the furnace manually or by using lifting tools. • Apply appropriate ways to monitor the temperature levels of heating zones when the billets are passing through the furnace. • Demonstrate organisational procedure of performing various heat treatment processes on the work piece. • Show how to observe the uniform heating of metal. • Apply appropriate ways to cool the treated object as per SOP. • Demonstrate organisational procedure of performing quenching/cooling process on the components by using the appropriate medium and technique. • Employ appropriate ways of inspecting and measuring the worked output for required quality standards, dimensions, geometry and material.

	<ul style="list-style-type: none"> • Show how to shut down the various equipments to a safe condition. • Perform steps to report any emergencies/ deviations from the Work Instructions/ SOP to the supervisor.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	
<ul style="list-style-type: none"> • Basic tool box, Work bench with vice • Various metal samples- carbon steel, stainless steel, cast steel, tool steel, bronze, bronze alloys, copper, copper alloys, Various types of furnaces (gas, electric, oil fired). hearth, pit, induction heating, kilns, tempering ovens, heated baths, gas torches, specialized tongs, lifting equipment, anvil, hammer, chisels, forge, punch, saw etc. • 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 	

Module 5: Perform upsetting, bending and punching operations

Terminal Outcomes:

- Identify tools and equipment required for upsetting, bending and punching operations.
- Perform forging techniques on ferrous, non-ferrous metals and alloys.

Duration: 04:30	Duration: 06:30
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe different types of upsetting, bending and punching processes. • Describe basic process followed for upsetting, bending and punching of the pieces. • Discuss the information derived from the engineering drawings, work order, SOPs and instructions from supervisor. • List the tools, equipment, dies and various apparatus required during upsetting work. • List the tools, equipment, dies and forging apparatus required during forging work. • List the tools, equipment, dies and apparatus required during punching work. • Describe the selection criteria of tools, equipment, dies and apparatus required for forging, upsetting and punching work. • Discuss the organisational process of collecting and arranging the tools, equipment, dies and various apparatus from the store. • Summarise the steps to be performed for checking the tools, equipment, dies and apparatus before use. • Discuss various forging, upsetting and punching machine parameters such as temperature of the furnace, cycle time for various temperature levels & time duration during the heating, pressing, cooling etc and their impact on output i.e after punching, upsetting or forging. • Discuss the necessary precautions to avoid any hazard and accident during various activities. • Discuss the importance of selecting correct program in the forging machine for operation as per the work instructions. • Discuss various pressing process parameters such as cycle time, force applied, gear and pinion movements, friction, torque etc. and their impact on output. • Elaborate ways for feeding the hot metal bars into forging presses. 	<ul style="list-style-type: none"> • Demonstrate the standard operating procedure to tools, equipment, dies and forging apparatus required during forging work. • Show how to select and arrange the required tools, equipment, dies and forging apparatus from the store. • Apply appropriate ways to check tools, equipment, dies and forging apparatus before use. • Apply appropriate ways to check that dies and forging apparatus are clean and free from dust and unwanted material. • Show how to set the forging machine and its parameters as per the work instructions. • Show how to fit the die in the forging machine. • Apply appropriate ways to measure and mark the specified features for plate bending and forming operations on the workpieces as per job specification. • Perform the steps of lifting and placing the heat-treated pieces on the pressing machine manually or by using lifting tools. • Show how to attach hammer tools and fixtures to power hammer correctly. • Show how to select the program in the forging machine and modify it as per the production requirements and WI. • Show how to adjust the temperature of the die and various parameters of main press machine including blocker, finisher and trimmer as per the output requirement. • Read the measurement gauges to monitor the process parameters and maintain the quality standards. • Apply appropriate ways to monitor the forging operations and record the operational data as per the control plan. • Demonstrate organisational procedure of processes like upsetting, forging and punching processes.

- Discuss the importance of monitoring process parameters during the various processes and correcting them as per the requirements.

Classroom Aids:

Whiteboard, marker pen, projector

Tools, Equipment and Other Requirements

- Basic tool box, Work bench with vice
- Hydraulic press, mechanical press, various types of hammers, tongs, punches, chisel, anvil, leg vice, swage block, floor mandrel, swages, jig setter, shafted tools, wired tools, shovel, blower, poker, fullers, flatters, various ferrous & nonferrous metal samples, Upsetter, Material cutting machine, bending machine, dies, punching machine etc.
- **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

Module 6: Financial and Legal Literacy

Mapped to DGT/VSQ/N0101

Terminal Outcomes:

- Describe ways of managing expenses, income, and savings.

Duration: <02:00>	Duration: <03:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Discuss the significance of using financial products and services safely and securely. Explain the importance of managing expenses, income, and savings. Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws 	<ul style="list-style-type: none"> Demonstrate ways of managing expenses, income, and savings.
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	

Module 13: Essential Digital Skills

*Mapped to
DGT/VSQ/N0101*

Terminal Outcomes:

- Demonstrate procedure of operating digital devices and associated applications safely.

Duration: <02:00>	Duration: <03:00>
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Discuss the significance of using internet for browsing, accessing social media platforms, safely and securely 	<ul style="list-style-type: none"> • Show how to operate digital devices and use the associated applications and features, safely and securely
Classroom Aids:	
Whiteboard, marker pen, projector	
Tools, Equipment and Other Requirements	