Model Curriculum

QP Name:	**Construction Fabricator** **Electives: Masonry/ Woodworking/Metal Working/ Concreting** **Options: Sheet Metal Fitting/ Mivan Shuttering: Aluminium Formwork**
QP Code:	**ICE/CON/Q0501**
Version:	**1.0**
NSQF Level:	**4**
Model Curriculum Version:	**1.0**

The Institution of Civil Engineers Society (ICES)
301-303, Suncity Trade Tower, Sector-21, Gurugram, Haryana || Email: ceo@iceskills.in

Table of Contents

Training Parameters

Sector	Construction		
Sub-Sector	Infrastructure Construction		
Occupation	Masonry/Shuttering Carpentry/Bar Bending/Fabrication		
Country	India		
NSQF Level	4		
Aligned to NCO/ISCO/ISIC Code	NCO-2015/7122.0601, NCO-2015/7112.0200, NCO-2015/7115.0201, NCO-2015/7213.0200, NCO-2015/7114.9900		
Minimum Educational Qualification and Experience	**S. No.**	**Academic/Skill Qualification (with Specialization - if applicable)**	**Required Experience (with Specialization - if applicable)**
	1	12th Grade pass	
	OR		
	2	10th Grade pass	3 years of Relevant Industry Experience
	OR		
	3	8th Grade pass	6 years of Relevant Industry Experience
	OR		
	4	Previous relevant Qualification of NSQF Level 3	3 years of relevant experience
	OR		
	5	Previous relevant Qualification of NSQF Level 3.5	1.5 years of relevant experience
Pre-Requisite License or Training	Not Applicable		
Minimum Job Entry Age	As per Govt. Norms		
Last Reviewed On	07-10-2025		
Next Review Date	07-10-2028		
NSQC Approval Date	07-10-2025		
QP Version	1.0		
Model Curriculum Creation Date	07-10-2025		
Model Curriculum Valid Up to Date	07-10-2028		
Model Curriculum Version	1.0		
Minimum Duration of the Course	390 Hours		
Maximum Duration of the Course	1230 Hours		

Program Overview

This section summarises 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 to:

- Identify and classify construction materials, their properties and appropriate applications for civil works.
- Interpret construction drawings, dimensions and specifications for layout and execution.
- Apply occupational health, safety and environmental practices as per site standards.
- Demonstrate teamwork, communication and employability skills required for the construction industry.
- Use basic digital tools and documentation techniques for construction data and reporting
- Prepare masonry layouts and foundations with accurate alignment and levelling.
- Mix and apply mortar in correct proportions for different masonry applications.
- Construct brick, block and stone masonry walls maintaining plumb, bond and uniform joints.
- Build masonry staircases, corners and junctions as per design and safety norms.
- Apply plastering, rendering and finishing techniques for smooth and decorative surfaces.
- Install and maintain masonry paving systems ensuring slope, joint filling and surface finish.
- Use advanced masonry technologies like interlocking blocks and AAC systems for energy-efficient construction.
- Identify types of timber, joints and tools used for carpentry and formwork.
- Prepare and assemble wooden frameworks for doors, windows and structural elements.
- Install interior wooden partitions, panels and linings ensuring level and finish quality.
- Assemble, align and dismantle shuttering for concreting as per formwork design.
- Construct and install wooden structural or decorative features following dimensional accuracy.
- Plan fabrication tasks based on metal types, dimensions and structural drawings.
- Cut, bend and tie reinforcement bars as per bar bending schedules.
- Weld and assemble metal components ensuring correct joints and alignment.
- Apply protective coatings and surface treatments to prevent corrosion and enhance durability.
- Install metal cladding and structural components ensuring stability and insulation efficiency.
- Prepare, pour and compact concrete mixes ensuring uniform quality and proper curing.
- Execute concreting for beams, columns, slabs and footings maintaining alignment and finish.
- Carry out reinforced concrete works integrating rebar and formwork systems safely.
- Perform repair and restoration of concrete surfaces using appropriate materials and techniques.
- Construct and install precast concrete components following lifting and installation procedures.
- Cut, shape and assemble sheet metal components as per design and tolerance requirements.
- Operate advanced fabrication equipment for precision sheet metal and aluminium structures.
- Apply finishing, coating and surface treatments to achieve desired texture and protection.
- Conduct inspection and quality control checks to ensure dimensional accuracy in fabrication.
- Identify and assemble aluminium formwork panels and accessories as per layout.
- Install and secure aluminium formwork on site maintaining alignment and structural stability.
- Carry out concrete pouring, vibration and safe dismantling of aluminium formwork after curing.
- Demonstrate professional work ethics, environmental awareness and commitment to
- Demonstrate professional work ethics, environmental awareness and commitment to sustainable construction practices.

Compulsory Modules:

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

NOS and Module Details	Theory Duration (in Hours)	Practical Duration (in Hours)	On-the-Job Training Duration (Mandatory) (in Hours)	On-the-Job Training Duration (Recommended) (in Hours)	Total Duration (in Hours)
ICE/CON/N0501: Identify construction building materials and components NOS Version: 1.0 NSQF Level: 4	**20:00**	**70:00**	**30:00**	**00:00**	**120:00**
Module 1: Introduction to the Construction Industry and the job role "Construction Fabricator"	05:00	00:00	00:00	00:00	05:00
Module 2: Identify construction building materials and components	15:00	70:00	30:00	00:00	115:00
ICE/CON/N0502: Follow Environmental, Health and Safety (EHS) Guidelines at Construction Sites NOS Version: 1.0 NSQF Level: 4	**10:00**	**20:00**	**00:00**	**00:00**	**30:00**
Module 3: Workplace Safety and Health Compliance	05:00	10:00	00:00	00:00	15:00
Module 4: Environmental Protection and Emergency Preparedness	05:00	10:00	00:00	00:00	15:00
DGT/VSQ/N0102: Employability Skills (60 Hours) NOS Version: 1.0 NSQF Level: 4	**60:00**	**00:00**	**00:00**	**00:00**	**60:00**
Module 5: Employability Skills (60 Hours)	60:00	00:00	00:00	00:00	60:00
Total Duration	**90:00**	**90:00**	**30:00**	**00:00**	**210:00**

Elective Modules:

Elective 1: Masonry

NOS and Module Details	Theory Duration (in Hours)	Practical Duration (in Hours)	On-the-Job Training Duration (Mandatory) (in Hours)	On-the-Job Training Duration (Recommended) (in Hours)	Total Duration (in Hours)
ICE/CON/N0503: Plan and Execute Masonry Layouts and Foundations NOS Version: 1.0 NSQF Level: 4.0	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 6: Plan and Execute Masonry Layouts and Foundations	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0530: Construct Masonry Walls and Blocks NOS Version: 1.0 NSQF Level: 4.0	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 7: Construct Masonry Walls and Blocks	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0504: Construct and Assemble Masonry Staircases NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 8: Construct and Assemble Masonry Staircases	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0505: Apply Plastering and Finishing Techniques NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 9: Apply Plastering and Finishing Techniques	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0506: Install and Maintain Masonry Paving Systems NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**

Module 10: Install and Maintain Masonry Paving Systems	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0507: Implement Advanced Construction Technologies in Masonry NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 11: Implement Advanced Construction Technologies in Masonry	10:00	15:00	05:00	00:00	30:00
Total Duration	**60:00**	**90:00**	**30:00**	**00:00**	**180:00**

Elective 2: Woodworking

NOS and Module Details	Theory Duration (in Hours)	Practical Duration (in Hours)	On-the-Job Training Duration (Mandatory) (in Hours)	On-the-Job Training Duration (Recommended) (in Hours)	Total Duration (in Hours)
ICE/CON/N0508: Prepare and Construct Timber Frameworks NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 12: Prepare and Construct Timber Frameworks	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0509: Construct Wooden Frames for Structural Elements NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 13: Construct Wooden Frames for Structural Elements	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0510: Install Interior Wooden Partitions and Panels NOS Version: 1.0 NSQF Level: 4	**20:00**	**30:00**	**10:00**	**00:00**	**60:00**
Module 14: Install Interior Wooden Partitions and Panels	20:00	30:00	10:00	00:00	60:00
ICE/CON/N0511: Assemble and Dismantle Shuttering for Concreting NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 15: Assemble and Dismantle Shuttering for Concreting	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0512: Construct and Install Wooden Structural Features NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 16: Construct and Install Wooden Structural Features	10:00	15:00	05:00	00:00	30:00
Total Duration	**60:00**	**90:00**	**30:00**	**00:00**	**180:00**

Elective 3: Metal Working

NOS and Module Details	Theory Duration (in Hours)	Practical Duration (in Hours)	On-the-Job Training Duration (Mandatory) (in Hours)	On-the-Job Training Duration (Recommended) (in Hours)	Total Duration (in Hours)
ICE/CON/N0513: Plan and Execute Metal Fabrication NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 17: Plan and Execute Metal Fabrication	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0514: Cut, Bend and Assemble Reinforcement Bars NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 18: Cut, Bend and Assemble Reinforcement Bars	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0515: Install and Weld Metal Structural Components NOS Version: 1.0 NSQF Level: 4	**20:00**	**30:00**	**10:00**	**00:00**	**60:00**
Module 19: Install and Weld Metal Structural Components	20:00	30:00	10:00	00:00	60:00
ICE/CON/N0516: Apply Surface Coatings and Treatments NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 20: Apply Surface Coatings and Treatments	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0517: Install Energy-Efficient Metal Cladding Systems NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 21: Install Energy-Efficient Metal Cladding Systems	10:00	15:00	05:00	00:00	30:00
Total Duration	**60:00**	**90:00**	**30:00**	**00:00**	**180:00**

Elective 4: Concreting

NOS and Module Details	Theory Duration (in Hours)	Practical Duration (in Hours)	On-the-Job Training Duration (Mandatory) (in Hours)	On-the-Job Training Duration (Recommended) (in Hours)	Total Duration (in Hours)
ICE/CON/N0518: Prepare, Pour and Cure Concrete Structures NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 22: Prepare, Pour and Cure Concrete Structures	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0519: Perform Concreting for Structural Elements NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 23: Perform Concreting for Structural Elements	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0520: Carry Out Reinforced Concrete Works NOS Version: 1.0 NSQF Level: 4	**20:00**	**30:00**	**10:00**	**00:00**	**60:00**
Module 24: Carry Out Reinforced Concrete Works	20:00	30:00	10:00	00:00	60:00
ICE/CON/N0521: Repair and Restore Concrete Surfaces NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 25: Repair and Restore Concrete Surfaces	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0522: Construct and Install Precast Concrete Structures NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 26: Construct and Install Precast Concrete Structures	10:00	15:00	05:00	00:00	30:00
Total Duration	**60:00**	**90:00**	**30:00**	**00:00**	**180:00**

Optional Modules

Option 1: Sheet Metal Fitting

NOS and Module Details	Theory Duration (in Hours)	Practical Duration (in Hours)	On-the-Job Training Duration (Mandatory) (in Hours)	On-the-Job Training Duration (Recommended) (in Hours)	Total Duration (in Hours)
ICE/CON/N0523: Cut, Shape and Install Sheet Metal Structures NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 27: Cut, Shape and Install Sheet Metal Structures	10:00	15:00	05:00	00:00	30:00
ICE/CON/N0524: Assemble and Fabricate Sheet Metal Structures Using Advanced Techniques NOS Version: 1.0 NSQF Level: 4	**05:00**	**45:00**	**10:00**	**00:00**	**60:00**
Module 28: Assemble and Fabricate Sheet Metal Structures Using Advanced Techniques	05:00	45:00	10:00	00:00	60:00
ICE/CON/N0525: Apply Surface Treatments and Coatings to Sheet Metal NOS Version: 1.0 NSQF Level: 4	**05:00**	**15:00**	**10:00**	**00:00**	**60:00**
Module 29: Apply Surface Treatments and Coatings to Sheet Metal	05:00	15:00	10:00	00:00	60:00
ICE/CON/N0526: Ensure Quality Control and Precision in Sheet Metal Fabrication NOS Version: 1.0 NSQF Level: 4	**10:00**	**15:00**	**05:00**	**00:00**	**30:00**
Module 30: Ensure Quality Control and Precision in Sheet Metal Fabrication	10:00	15:00	05:00	00:00	30:00
Total Duration	**30:00**	**90:00**	**30:00**	**00:00**	**150:00**

Option 2: Mivan Shuttering: Aluminium Formwork

NOS and Module Details	Theory Duration (in Hours)	Practical Duration (in Hours)	On-the-Job Training Duration (Mandatory) (in Hours)	On-the-Job Training Duration (Recommended) (in Hours)	Total Duration (in Hours)
ICE/CON/N0527: Assemble Aluminium Formwork Systems NOS Version: 1.0 NSQF Level: 4	**05:00**	**15:00**	**10:00**	**00:00**	**30:00**
Module 31: Assemble Aluminium Formwork Systems	05:00	15:00	10:00	00:00	30:00
ICE/CON/N0528: Install and Secure Aluminium Formwork on Construction Sites NOS Version: 1.0 NSQF Level: 4	**05:00**	**45:00**	**10:00**	**00:00**	**60:00**
Module 32: Install and Secure Aluminium Formwork on Construction Sites	05:00	45:00	10:00	00:00	60:00
ICE/CON/N0529: Perform Concrete Pouring and Removal of Aluminium Formwork NOS Version: 1.0 NSQF Level: 4	**20:00**	**30:00**	**10:00**	**00:00**	**60:00**
Module 33: Perform Concrete Pouring and Removal of Aluminium Formwork	20:00	30:00	10:00	00:00	60:00
Total Duration	**30:00**	**90:00**	**30:00**	**00:00**	**150:00**

Module Details

Module 1: Introduction to the Construction Industry and the job role "Construction Fabricator"

Mapped to ICE/CON/N0501, v1.0

Terminal Outcomes:

- Explain the importance of Construction Industry.
- Describe the responsibilities and career opportunities of a Construction Fabricator.

Duration: 05:00	**Duration: 00:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Define the Construction Industry. • Describe the main sectors within the construction industry and their impact on infrastructure development. • Discuss the scope of employment in the Construction Industry. • Explain the role and responsibilities of a Construction Fabricator. • Discuss the skills and qualifications necessary for a career as a Construction Fabricator. • Identify various career opportunities available for a Construction Fabricator.	
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
NA	

Module 2: Identify construction building materials and components

Mapped to ICE/CON/N0501, v1.0

Terminal Outcomes:

- Explain the process of identifying different construction materials and components used in fabrication tasks.
- Demonstrate the methods for inspecting, verifying and organizing construction materials for fabrication.

Duration: 15:00	**Duration: 70:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the types of construction materials (metals like steel, aluminium, alloys and non-metals like concrete, glass, wood and plastics) and their properties and applications in construction. • Describe the properties of construction materials, including strength, durability and environmental resistance and how they influence material selection. • Elucidate the role of material specifications and technical datasheets in identifying the correct materials for fabrication. • Identify different construction components, such as beams, columns, trusses and panels, based on drawings and specifications. • List the common construction material defects, such as cracks, rust, warping and how they affect material suitability. • Explain the different material certifications and standards (e.g., BIS, ASTM) and their relevance in ensuring material quality. • Describe the procedures for verifying material quality through visual inspection, physical testing and reviewing certifications. • Identify the importance of proper material storage and the safety precautions associated with material handling.	• Show how to identify various building materials (metals, non-metals) by inspecting their properties and uses. • Demonstrate how to check construction materials for defects like cracks, rust and warping using manual and visual inspection techniques. • Show how to verify material specifications by reviewing technical datasheets, product catalogues and construction drawings. • Demonstrate how to assess the physical condition of materials by comparing them against the required specifications. • Show how to organize and label materials according to type, size and intended use to facilitate efficient storage and handling. • Demonstrate the proper storage methods for different materials to prevent damage and contamination. • Show how to use measuring tools, such as rulers, micrometers and calipers, to check the dimensions of materials. • Demonstrate how to safely handle materials using equipment like forklifts, pallet jacks and trolleys during fabrication tasks.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Micrometers, calipers, rulers, forklifts, pallet jacks, trolleys, safety gloves, safety shoes, material datasheets, product catalogues, technical specifications, measuring tape, weighing scales, label markers, storage bins, material certification documents and personal protective equipment (PPE) such as helmets, face shields and protective gloves	

Module 3: Workplace Safety and Health Compliance

Mapped to ICE/CON/N0502, v1.0

Terminal Outcomes:

- Explain workplace hazards and safety measures in construction.
- Demonstrate the use of personal protective equipment (PPE) and emergency response procedures.

Duration: 05:00	**Duration: 10:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the importance of Safety, Health and Environment (SHE) guidelines in maintaining a safe workplace. • Describe how company policies help in ensuring safety and compliance on construction sites. • Explain the correct procedure for reporting safety incidents or workplace hazards. • Describe the reporting structure for safety concerns within a construction site. • Identify the key personnel responsible for workplace safety, such as the safety officer and site engineer. • Explain the roles and responsibilities of the safety officer in maintaining site safety. • List different types of construction hazards, including chemical, physical and ergonomic risks. • Describe the potential impact of construction hazards on workers' health and safety. • Discuss the correct use of personal protective equipment (PPE) such as helmets, gloves, safety boots and harnesses. • Explain how to properly maintain PPE to ensure its effectiveness and durability.	• Show the process to identify common construction site hazards, including falling objects, slippery surfaces and electrical risks. • Demonstrate the process of evaluating potential risks associated with workplace hazards. • Show how to report identified hazards to a supervisor or safety officer using the correct reporting procedures. • Demonstrate the proper use and maintenance of personal protective equipment (PPE), including helmets, gloves, safety boots and harnesses. • Show the ability to follow safety signage and barricading instructions to avoid restricted or hazardous areas. • Demonstrate safe lifting techniques and the proper use of lifting tools to minimize strain and prevent injuries. • Demonstrate proper personal hygiene practices, including the use of clean drinking water and designated rest areas. • Show how to recognize and report health symptoms such as respiratory issues or heatstroke to the designated authority. • Demonstrate safe handling and disposal procedures for hazardous materials such as asbestos and chemicals to ensure workplace safety.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Safety helmets, gloves, safety boots, safety harnesses, high-visibility vests, safety goggles, ear protection, dust masks, fire extinguishers, first aid kits, emergency response charts, barricading tape, safety cones, hazard signage, lifting belts, lifting tools such as pulleys and ropes, spill control kits, asbestos handling kits, chemical-resistant gloves, chemical spill absorbents, lockout/tagout (LOTO) kits, electrical insulating mats, hand wash stations and waste disposal bins for hazardous materials.	

Module 4: Environmental Protection and Emergency Preparedness

Mapped to ICE/CON/N0502, v1.0

Terminal Outcomes:

- Describe sustainable construction practices and waste management techniques.
- Explain emergency preparedness measures for fire, chemical spills and natural disasters.

Duration: 05:00	**Duration: 10:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the importance of first aid in construction site safety. • Describe basic first aid procedures for common workplace injuries such as cuts, burns and fractures. • Identify the steps to take in case of a fire emergency. • Explain how to use fire extinguishers and other firefighting equipment. • Describe the role of emergency response teams in handling accidents and fires. • Explain the importance of environmental regulations in construction work. • Describe dust control measures used to minimize air pollution on construction sites. • Discuss proper waste disposal techniques for hazardous and non-hazardous materials. • Identify water conservation methods used in construction activities. • Explain the impact of poor environmental practices on health and safety. • Describe the correct procedures for handling and using construction tools safely. • List the common hand tools and power tools used in interior finishing work. • Explain the risks associated with improper use of construction equipment. • Describe safety precautions to follow while using hand tools and power tools. • Discuss the importance of regular maintenance and inspection of tools to prevent accidents.	• Demonstrate the correct way to prevent spills of construction materials and chemicals. • Show how to properly segregate biodegradable and non-biodegradable waste for recycling and disposal. • Demonstrate water conservation practices while performing construction activities. • Show how to follow energy-saving protocols at a construction site. • Identify emergency alarms and evacuation routes at a construction site. • Demonstrate the correct use of firefighting equipment, such as fire extinguishers and sand buckets. • Show how to assist in basic first aid procedures for minor injuries. • Demonstrate the correct method for performing CPR in an emergency.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
First aid kits, gloves, fire extinguishers (ABC, CO_2, foam), sand buckets, fire blankets, emergency alarm systems, evacuation maps, color-coded waste bins, spill control kits, dust suppression tools such as water sprayers and dust nets, hand tools ,power tools	

Module 5: Employability Skills (60 Hours)

Mapped to DGT/VSQ/N0102, v1.0

Duration (in hours): 60:00

Key Learning Outcomes

After completing this programme, participants will be able to:

Introduction to Employability Skills :

1. Discuss the Employability Skills required for jobs in various industries.
2. List different learning and employability-related GOI and private portals and their usage.

Constitutional values - Citizenship :

3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen.
4. Show how to practice different environmentally sustainable practices.

Becoming a Professional in the 21st Century :

5. Discuss the importance of relevant 21st-century skills.
6. Exhibit 21st-century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
7. Elucidate the appropriate code of conduct.

Basic English Skills :

8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone.
9. Read and interpret text written in basic English.
10. Write a short note/paragraph / letter/e -mail using basic English.

Career Development & Goal Setting :

11. Discuss the difference between job and career.
12. Create a career development plan with well-defined short- and long-term goals.

Communication Skills :

13. Elucidate the importance of communication and professional communication.
14. Explain the importance of following verbal and non-verbal communication etiquette in various settings.
15. Elucidate the process of interacting with reporting superiors regarding job order, work output requirements, targets, performance indicators and incentives.
16. Discuss how effective coordination ensures the timely completion of tasks in accordance with quality standards.
17. Describe the steps involved in ensuring the timely resolution of problems, complaints and delays through coordination with relevant personnel and superiors.
18. Determine the role of active communication and respect in achieving a smooth workflow and resolving work standards and quality-related concerns with personnel and superiors.
19. Explain the significance of maintaining appropriate documentation concerning completed work schedules as per organizational requirements.
20. Elucidate the importance of prioritizing teamwork and supporting team members in achieving shared goals.

Diversity & Inclusion :

21. Describe the recommended practices for preventing sexual harassment, physical and verbal abuse and the objectification of women in the workplace.
22. Discuss the appropriate safety precautions to follow while utilizing transportation facilities and during night trips, particularly concerning women's safety.
23. Elucidate the process for escalating issues related to abuse and sexual harassment in the

workplace according to the POSH Act and organizational procedures.

24. Determine how to effectively educate co-workers on women's rights and the importance of showing respect to all genders, including persons with disabilities.

Financial and Legal Literacy :

25. Outline the importance of selecting the right financial institution, product and service.
26. Overview how to carry out offline and online financial transactions, safely and securely.
27. List the common components of salary and compute income, expenditure, taxes, investments etc.
28. Discuss the legal rights, laws and aids.
29. Elucidate the purchase, inspection, indenting and recordkeeping procedure for stores.

Essential Digital Skills :

30. Describe the role of digital technology in today's life.
31. Overview how to operate digital devices and use the associated applications and features, safely and securely.
32. Discuss the significance of displaying responsible online behaviour while browsing, using various social media platforms, e-mails, etc., safely and securely.
33. Create sample word documents, excel sheets and presentations using basic features.
34. utilize virtual collaboration tools to work effectively.

Entrepreneurship :

35. Explain the types of entrepreneurships and enterprises.
36. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan.
37. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement.
38. Create a sample business plan, for the selected business opportunity.
39. Describe the best practices for leading teams.
40. Explain the 5S Standards and their implementation for organize the workplace and create a productive work environment.
41. Explain how to manage clients, contractors, subordinates and labourers.

Customer Service :

42. Explain the importance of implementing appropriate hygiene, grooming standards and professional dress code at work to cater to different types of customers.
43. Elucidate the significance of practicing and encouraging active listening for effective communication with both customers and co-workers.
44. Discuss the methods used to ensure effective probing of customers to identify their needs and expectations.
45. Describe the strategies for maintaining effective communication with customers, keeping them informed regarding any issues and developments involving them.
46. Determine the steps involved in identifying and addressing customer dissatisfaction and complaints promptly and effectively.
47. Explain the importance of being fair and firm with staff to achieve work objectives and describe leave and attendance management.
48. Explain the importance of upskilling self and staff for continuous improvement.

Getting Ready for apprenticeship & Jobs :

49. Create a professional Curriculum Vitae (CV)
50. Use various offline and online job search sources such as employment exchanges, recruitment agencies and job portals respectively.
51. Discuss the significance of maintaining hygiene and confidence during an interview.
52. Elucidate how to give a personal introduction and present oneself.
53. Perform a mock interview.
54. List the steps for searching and registering for apprenticeship opportunities.

Module 6: Plan and Execute Masonry Layouts and Foundations

Mapped to ICE/CON/N0503, v1.0

Terminal Outcomes:

- Explain the interpretation of construction drawings for masonry layouts and foundations.
- Demonstrate the accurate measurement and marking of layouts using appropriate tools.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the types of construction drawings (site plans, foundation plans, elevation drawings) and their symbols, dimensions and specifications. • Describe methods for extracting information on load distribution, reinforcement and drainage from drawings. • Define the tools and techniques for marking layouts, including spirit levels, plumb bobs, laser measuring devices and optical leveling tools. • Identify methods for verifying squareness using the 3-4-5 method or builder's square. • Describe site preparation steps for accurate layout marking as per safety norms. • Explain the properties, mixing and application of geopolymer concrete in masonry foundations. • Describe techniques for setting up formwork with proper alignment and stability. • Explain methods for laying and aligning bricks, blocks and stones using thin joint technology, mortar, or adhesives. • Identify the importance of joint thickness, alignment and plumb in masonry construction. • Describe the use of AAC blocks with prefabricated insulation inserts for thermal efficiency. • Explain the importance of water-cement ratio and proper curing techniques for structural durability.	• Show how to read and interpret construction drawings to determine masonry layout and foundation details. • Demonstrate the process of identifying symbols, dimensions and specifications in construction drawings. • Show how to measure and mark layouts accurately using spirit levels, plumb bobs, laser measuring devices and optical leveling tools. • Demonstrate the process of verifying squareness using the 3-4-5 or builder's square method. • Show how to clear and prepare the site for layout marking while following safety norms. • Demonstrate the mixing process of geopolymer concrete for masonry applications. • Show how to set up formwork for foundation masonry with proper alignment and stability. • Demonstrate the correct method of laying and aligning bricks, blocks, or stones using thin joint technology, mortar, or adhesives. • Show how to ensure proper joint thickness and plumb for stability in masonry construction. • Demonstrate the use of AAC blocks with prefabricated insulation inserts for improved thermal efficiency. • Show how to maintain water-cement ratio and proper curing techniques to ensure durability.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	

Tools, Equipment and Other Requirements
Spirit levels, plumb bobs, laser measuring devices, optical leveling tools, builder's square, measuring tapes, trowels, mortar mixers, masonry hammers, brick jointers, rubber mallets, chalk lines, formwork panels, reinforcement bars, curing sheets, AAC blocks, prefabricated insulation inserts, safety gloves, goggles and dust masks.

Module 7: Construct Masonry Walls and Blocks

Mapped to ICE/CON/N0530, v1.0

Terminal Outcomes:

- Explain the methods for laying bricks, blocks and AAC blocks with prefabricated insulation inserts.
- Demonstrate the application of mortar and adhesives using thin joint technology.
- Construct masonry walls with proper alignment, reinforcement and finishing techniques.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the types and properties of bricks, blocks and AAC blocks used in masonry construction. • Explain methods for inspecting bricks and blocks for defects before use. • Define correct mortar mix ratios and preparation techniques as per project specifications. • Explain techniques for applying mortar evenly for strong bonding between bricks and blocks. • Describe methods for ensuring straight and level alignment using a spirit level and plumb bob. • Explain the importance of joint thickness, staggered joint placement and bonding techniques for structural strength. • Describe tools and techniques for cutting bricks and blocks to size accurately. • Explain reinforcement methods such as using wire mesh or rebar for added stability. • Describe curing procedures for masonry walls to enhance durability. • Explain properties and applications of thin joint mortar and high-performance adhesives. • Describe techniques for applying and distributing thin joint adhesive evenly using a notched trowel. • Explain the importance of precision placement and light tapping for proper bonding in thin joint technology. • Describe installation methods for AAC blocks with prefabricated insulation inserts for thermal efficiency. • Explain specialized adhesives and reinforcement techniques for AAC block walls.	• Show how to select the appropriate type and size of bricks or blocks based on construction requirements. • Show the inspection process to identify defective bricks or blocks before use. • Show the preparation of mortar mix in the correct ratio and its even application for proper bonding. • Show the laying of bricks and blocks in a straight and level manner using a spirit level and plumb bob. • Show the maintenance of proper joint thickness, alignment and staggered joint placement for structural strength. • Show cutting techniques using masonry saws or chisels to fit bricks and blocks. • Show the construction of stable corners and junctions using bonding techniques. • Show the integration of reinforcement such as wire mesh or rebar as per structural requirements. • Show the curing methods to enhance masonry durability. • Show the preparation and application of high-performance adhesive or thin joint mortar as per manufacturer guidelines. • Show the use of a notched trowel to apply a uniform and thin layer of adhesive to minimize joint thickness. • Show the positioning of blocks with precision to avoid misalignment. • Show the adjustment of block placement using light tapping for firm bonding. • Show the maintenance of consistent joint thickness and removal of excess adhesive to prevent weak bonding. • Show the preparation of the site and leveling for AAC block installation. • Show the installation of prefabricated

• Define quality checks to verify stability, alignment and strength of masonry structures.	insulation inserts accurately within AAC block joints. • Show the reinforcement of AAC block walls using steel bars or mesh where necessary. • Show the verification of wall stability and strength by conducting basic quality checks. • Show the curing procedures for AAC block construction to ensure long-term durability. • Demonstrate the alignment and positioning of bricks, blocks and AAC blocks to maintain structural accuracy. • Demonstrate the methods for applying mortar and adhesives using thin joint technology. • Demonstrate the proper use of tools and equipment required for masonry construction.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Spirit levels, plumb bobs, laser measuring devices, optical leveling tools, measuring tapes, builder's square, trowels, notched trowels, masonry saws, chisels, rubber mallets, mixing containers, reinforcement bars, wire mesh, Bricks, blocks, AAC blocks, prefabricated insulation inserts, high-performance adhesive, thin joint mortar, curing sheets, gloves, goggles, dust masks, safety boots, helmets.	

Module 8: Construct and Assemble Masonry Staircases

Mapped to ICE/CON/N0504, v1.0

Terminal Outcomes:

- Explain the construction methods for masonry staircases using bricks, blocks and precast modular sections.
- Demonstrate the laying of bricks and blocks to construct staircase steps, risers and landings.
- Demonstrate the handling, positioning and assembly of precast modular staircase sections.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe different types of masonry staircases (e.g., straight, spiral, L-shaped) and their construction requirements. • Explain the process of reading and interpreting staircase construction drawings and blueprints. • Describe methods for calculating rise, run and tread dimensions to ensure ergonomic and code-compliant staircases. • Explain site preparation techniques, including foundation leveling and stability checks before staircase construction. • Describe the selection and arrangement of masonry materials such as bricks, blocks and precast sections. • Explain load-bearing capacity considerations and reinforcement requirements for masonry staircases. • Describe techniques for laying bricks and blocks to construct staircase steps, risers and landings. • Explain the importance of using formwork or shuttering to shape and support staircases during construction. • Describe the correct preparation and application of mortar mix for strong bonding and long-term durability. • Explain reinforcement methods such as using rebar or mesh for added staircase strength. • Describe the curing procedures necessary to prevent cracks and ensure staircase durability. • Explain handling and positioning techniques for precast modular staircase sections. • Describe methods for aligning precast components according to design	• Show how to read and interpret staircase construction drawings, blueprints and specifications. • Show the calculation of rise, run and tread dimensions to ensure code compliance. • Show site preparation for staircase construction, including foundation leveling and stability checks. • Show the selection and arrangement of bricks, blocks and precast sections for staircase construction. • Show the process of laying bricks and blocks to construct steps, risers and landings. • Show the use of formwork or shuttering to shape and support staircases. • Show the correct preparation and application of mortar mix for masonry staircases. • Show the installation of reinforcement bars (rebar) or mesh within staircase structures. • Show the curing methods necessary to enhance the durability of masonry staircases. • Show the handling and positioning of precast modular staircase sections. • Show the alignment of precast components as per architectural designs. • Show the application of bonding agents or mortar for secure joining of precast sections. • Show the use of fasteners, steel rods, or anchors for additional stability in precast staircases. • Show the sealing of joints in precast staircases to prevent gaps and enhance durability.

specifications. • Explain the application of bonding agents, fasteners and reinforcements to ensure staircase stability. • Describe techniques for sealing joints in precast staircases to prevent structural gaps and improve durability. • Explain procedures for conducting load-bearing tests and inspecting staircases for defects. • Describe the application of waterproofing and anti-skid treatments for staircase safety. • Explain drainage and ventilation considerations to prevent water damage to staircases. • Describe finishing techniques such as plastering and polishing for a smooth and professional appearance. • Explain compliance requirements for staircase construction according to building codes and safety regulations. • Describe methods for installing handrails, balustrades and decorative elements as per architectural designs.	• Show load-bearing tests and quality inspections for staircase strength verification. • Show the application of waterproofing and anti-skid treatments for enhanced safety. • Show the installation of handrails, balustrades, or decorative elements as per architectural requirements. • Demonstrate the alignment and positioning of staircase components to maintain structural accuracy. • Demonstrate the final quality checks to verify staircase stability, alignment and safety compliance.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Tape measures, spirit levels, plumb bobs, trowels, brick hammers, jointers, mortar pans, mortar mixers, wooden shuttering, metal shuttering, clamps, supports, masonry saws, chisels, hoists, pulleys, rebar cutters, tying wires, bonding agents, cement adhesives, waterproofing compounds, drills, anchors, gloves, helmets, goggles, harnesses.	

Module 9: Apply Plastering and Finishing Techniques

Mapped to ICE/CON/N0505, v1.0

Terminal Outcomes:

- Explain surface preparation, material selection and adhesion improvement for plastering and finishing.
- Demonstrate the application of plaster and rendering techniques for smooth and durable masonry surfaces.
- Implement self-curing plaster techniques to reduce external curing requirements.
- Perform masonry repairs using nano-particle sealants for structural strengthening and waterproofing.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe surface inspection techniques to determine preparation and treatment needs. • Explain selection criteria for plastering materials based on substrate type and environmental conditions. • Describe methods for cleaning masonry surfaces before plastering. • Explain the application of bonding agents or primers for improved plaster adhesion. • Describe the safe setup of tools, mixing equipment and scaffolding for plastering work. • Explain mixing techniques for plaster or render to achieve the correct consistency. • Describe methods for applying base and finishing coats using trowels, floats and spraying. • Explain plastering techniques such as single-coat, two-coat and multi-layer applications. • Describe the use of screeds and levelers for uniform thickness and smooth application. • Explain finishing techniques such as troweling, polishing and texturing. • Describe the identification and rectification of hollowness or cracks in plaster before drying. • Explain the process of applying self-curing plaster using polymer-based compounds. • Describe methods for monitoring and maintaining surface hydration without external curing.	• Show how to inspect surfaces and determine the necessary preparation and treatment. • Show how to select appropriate plastering materials for different masonry surfaces. • Show cleaning methods for removing dust, debris and loose particles before plastering. • Show the application of bonding agents or primers to improve plaster adhesion. • Show the setup of tools, mixing equipment and scaffolding before starting work. • Show how to mix plaster or render to the required consistency using manual or mechanical methods. • Show the application of base and finishing coats of plaster using trowels, floats and spraying techniques. • Show the use of screeds and levelers to ensure uniform thickness and smooth application. • Show finishing techniques such as troweling, polishing and textured finishing. • Show methods to check for hollowness or cracks in the plaster and rectify imperfections before drying. • Show the preparation and application of self-curing plaster using polymer-based compounds. • Show how to distribute self-curing agents evenly to reduce water evaporation losses.

• Explain identification and preparation techniques for repairing damaged masonry surfaces. • Describe selection and application methods for nano-particle sealants to strengthen and waterproof masonry. • Explain techniques for monitoring curing time and effectiveness of nano-sealants	• Show the monitoring of curing processes without external curing methods. • Show the identification of damaged or deteriorated masonry surfaces for repair. • Show cleaning techniques for cracks, voids and porous surfaces before applying nano-sealants. • Show how to select and apply nano-particle sealants using brush, roller, or spray techniques. • Show the monitoring of curing time and effectiveness of nano-sealants in strengthening and waterproofing masonry. • Show quality checks to identify weak spots and the process of reapplying sealants if necessary.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Trowels, floats, putty knives, plastering hawks, mortar pans, mixing buckets, mechanical mixers, measuring cups, spirit levels, screeds, straight edges, sponges, polishing tools, paint rollers, spray guns, scaffolding, bonding agents, primers, self-curing plaster compounds, nano-particle sealants, protective gloves, safety goggles, dust masks and waterproofing solutions.	

Module 10: Install and Maintain Masonry Paving Systems

Mapped to ICE/CON/N0506, v1.0

Terminal Outcomes:

- Explain site preparation, material selection and foundation techniques for masonry paving.
- Demonstrate the installation of masonry paving systems, ensuring proper alignment and stability.
- Implement permeable paving technology for improved drainage and sustainability.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe standard procedures for preparing, laying and maintaining masonry paving systems. • Explain applicable building codes, industry standards and safety regulations for paving works. • Describe quality standards for different types of paving materials and their application. • Explain workplace policies related to waste disposal, environmental compliance and material handling. • Describe documentation and reporting procedures for completed paving work and repairs. • Explain types of paving materials, including concrete blocks, stone pavers, clay bricks and permeable pavers. • Describe properties and durability of various paving materials under different climatic conditions. • Explain selection criteria for appropriate paving materials based on load-bearing capacity and aesthetics. • Describe methods of site assessment for drainage, soil conditions and stability. • Explain techniques for grading, compacting and leveling the base for a stable foundation. • Describe the importance of geotextile membranes and bedding layers in paving systems. • Explain laying patterns and techniques, such as herringbone, running bond and basket weave. • Describe methods for aligning, spacing and securing pavers to maintain uniformity. • Explain the role of jointing materials like	• Show how to assess site conditions, including soil type, drainage and load-bearing capacity. • Show methods for clearing debris, vegetation and obstructions from the paving area. • Show marking of layout and levels based on construction drawings and specifications. • Show compaction and leveling techniques to create a stable base foundation. • Show selection of appropriate paving materials based on site requirements and design specifications. • Show laying of pavers in prescribed patterns while maintaining uniform alignment and spacing. • Show use of jointing materials such as polymeric sand or mortar to secure pavers. • Show compaction and stabilization of pavers using a plate compactor or manual tamping. • Show installation of permeable paving materials for stormwater drainage and runoff reduction. • Show incorporation of gravel layers and drainage channels for improved water infiltration. • Show techniques for ensuring proper spacing and grading to maintain permeability and prevent clogging. • Show inspection of paving surfaces for defects such as sinking, cracking, or misalignment. • Show replacement of damaged pavers without disturbing the surrounding layout.

polymeric sand and mortar in enhancing stability. • Describe the working principles of permeable paving for stormwater management and eco-friendly construction. • Explain types of permeable paving materials and their water infiltration capacity. • Describe techniques for maintaining permeability by preventing clogging and sediment buildup. • Explain common paving defects, including sinking, cracking and weed growth. • Describe procedures for replacing damaged or misaligned pavers without affecting the entire surface. • Explain techniques for re-leveling, compacting and sealing joints for long-term stability. • Describe occupational hazards related to masonry paving, including lifting injuries and tripping risks. • Explain proper usage and maintenance of paving tools and equipment, such as plate compactors and rubber mallets.	• Show re-leveling and compacting of loose or uneven sections for restored stability. • Show removal of weeds, debris and sediment buildup from paved surfaces and joints. • Show safe handling and transportation of pavers to prevent injuries and breakage. • Show final inspection to ensure alignment, durability and compliance with design specifications.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Trowels, rubber mallets, hammers, chisels, jointing tools, plate compactors, manual tampers, measuring tapes, chalk lines, string lines, levels, screeds, shovels, rakes, wheelbarrows, mixing buckets, geotextile membranes, polymeric sand, mortar, gravel, drainage channels, power saws, dust masks, safety goggles, gloves and knee pads.	

Module 11: Implement Advanced Construction Technologies in Masonry

Mapped to ICE/CON/N0507, v1.0

Terminal Outcomes:

- Explain the principles and applications of 3D printing in masonry construction.
- Demonstrate the operation and troubleshooting of masonry-specific 3D printers.
- Apply automated and digital fabrication methods, including robotic bricklaying and CNC-cutting.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the principles of 3D printing and its applications in masonry construction and repairs. • Explain the types of 3D printing materials suitable for masonry, including geopolymer concrete and specialized mortars. • Describe the workflow of digital modeling, slicing and printing for masonry structures. • Explain troubleshooting methods for common defects in 3D-printed masonry structures. • Describe fundamentals of robotic bricklaying and automated block assembly techniques. • Explain the benefits and limitations of digital fabrication in masonry. • Describe the role of prefabricated masonry components in modular construction. • Explain the integration of BIM (Building Information Modeling) in masonry for precision and efficiency. • Describe how AI and IoT technologies optimize automated masonry processes. • Explain sustainability principles related to modern masonry construction methods. • Compare the environmental impact of traditional masonry with advanced construction technologies. • Describe strategies for reducing waste and improving resource efficiency through automation. • Explain the properties and benefits of advanced masonry materials, such as self-healing concrete and nanotechnology-based coatings. • Describe the importance of adhering to	• Show how to identify the principles and working mechanisms of 3D printing in masonry construction. • Show how to interpret 3D digital models and convert them into printable masonry structures. • Show how to set up and calibrate masonry-specific 3D printers for on-site and off-site applications. • Show how to prepare raw materials such as geopolymer concrete and specialized mortar for 3D printing. • Show monitoring techniques to ensure structural accuracy and material consistency during the printing process. • Show troubleshooting methods for printing defects like layer misalignment, cracking, or material inconsistencies. • Show operation of robotic bricklaying and automated block assembly systems. • Show how to program and control robotic masonry systems for efficient and precise construction. • Show how to implement prefabricated masonry components using digital design and CNC-cutting methods. • Show how to utilize BIM (Building Information Modeling) to optimize masonry layouts and workflow efficiency. • Show integration of sensor-based monitoring systems to track construction accuracy and material usage. • Show assessment of the environmental impact of traditional versus advanced masonry techniques. • Show techniques to optimize material usage by reducing waste through automated and digital fabrication

green building standards and certification programs. • Explain occupational health and safety considerations when working with automated machinery. • Describe standard safety procedures for operating 3D printers and robotic masonry equipment. • Explain maintenance practices for prolonging the life of digital and automated masonry tools. • Identify the latest trends and innovations in masonry automation and construction technology.	methods. • Show application of energy-efficient masonry solutions, such as self-healing concrete and smart insulation. • Show evaluation of cost-effectiveness and return on investment (ROI) when using advanced construction technologies. • Show compliance with green building standards and certifications when applying digital masonry techniques.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
3D printers for masonry, robotic bricklaying systems, CNC cutting machines, BIM software, AI-integrated monitoring systems, geopolymer concrete mixers, automated block assembly tools, laser measurement devices	

Module 12: Prepare and Construct Timber Frameworks

Mapped to ICE/CON/N0508, v1.0

Terminal Outcomes:

- Explain the principles of timber framework construction, including traditional and modern techniques.
- Demonstrate the ability to read and interpret construction drawings for timber frameworks.
- Show the process of selecting, preparing and treating timber for framework construction.
- Show how to construct timber frameworks using traditional and modern construction techniques.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the types of timber used in framework construction and their properties. • Explain the classification of softwood and hardwood for structural applications. • Describe engineered wood products such as plywood, LVL (Laminated Veneer Lumber) and CLT (Cross-Laminated Timber). • Explain the principles of timber joinery, including mortise and tenon, lap joints and dowel joints. • Describe techniques for cutting, shaping and assembling timber frameworks. • Explain the importance of timber treatment for durability and weather resistance. • Describe how to read and interpret technical construction drawings for timber framework assembly. • Explain the structural integrity requirements for different types of timber frameworks. • Describe prefabrication techniques in timber construction for improved efficiency. • Explain the safe handling and usage of woodworking tools, including saws, drills and chisels. • Describe methods for reinforcing timber structures to improve load-bearing capacity. • Explain the environmental impact of timber construction and sustainable sourcing of wood materials. • Describe standards and best practices for timber framework construction.	• Show how to identify structural requirements and load-bearing specifications from construction drawings. • Show how to interpret different types of timber framework designs, including traditional, prefabricated and CLT structures. • Show how to analyze measurements, dimensions and specifications for framework assembly. • Show how to ensure alignment and accuracy of construction plans before material preparation. • Show how to determine the appropriate type of timber based on strength, durability and environmental conditions. • Show how to inspect timber for defects such as warping, knots and cracks. • Show how to cut, shape and size timber as per framework specifications using appropriate tools. • Show how to treat and coat timber to enhance durability and resistance to moisture, pests and decay. • Show how to assemble and reinforce joints using screws, nails, bolts, or adhesives. • Show how to measure and mark locations for beams, posts and supports according to drawings. • Show how to assemble framework structures using traditional joinery techniques such as mortise and tenon, lap joints and dowel joints. • Show how to secure framework components using manual nailing,

• Explain quality control measures in timber framework installation. • Describe occupational health and safety practices related to timber framework assembly. • Explain the fire resistance properties of different timber types and treatments. • Describe advanced timber framing techniques used in modern construction.	screwing and bolting methods. • Show how to use hand tools such as chisels, saws and drills for shaping and assembling timber parts. • Show how to ensure accurate spacing and reinforcement of framework components for stability. • Show how to install timber bracing and supports to enhance structural integrity. • Show how to inspect and correct any misalignment or structural inconsistencies in the framework. • Show how to use prefabricated timber components for faster and more efficient construction. • Show how to integrate engineered wood products such as plywood and LVL in framework assembly. • Show how to apply Cross-Laminated Timber (CLT) for structural strength and sustainability. • Show how to use digital tools such as laser levels and CAD-based measurements for precise framework installation. • Show how to install prefabricated connectors and fasteners for quicker and more secure assembly. • Show how to ensure proper alignment and weight distribution when working with large-scale prefabricated timber elements.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Woodworking saws, chisels, drills, hammers, nails, screws, bolts, adhesives, measuring tapes, spirit levels, laser levels, framing squares, clamps, timber treatment solutions, prefabricated timber components, CAD software, power tools (circular saws, jigsaws, routers), safety gear (gloves, goggles, dust masks) and digital alignment tools.	

Module 13: Construct Wooden Frames for Structural Elements

Mapped to ICE/CON/N0509, v1.0

Terminal Outcomes:

- Explain the principles of constructing wooden frames for structural elements such as foundations, flooring, doors and windows.
- Demonstrate the ability to construct wooden frames using traditional and modern techniques.
- Apply prefabricated timber systems and CNC precision cutting techniques for efficient frame construction.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe the types of timber used for structural framing and their load-bearing properties. • Explain traditional joinery techniques such as mortise and tenon, dowel joints and half-lap joints. • Describe modern timber framing methods, including prefabricated and engineered wood systems. • Explain CNC machining and its application in precision cutting for wooden frames. • Describe installation techniques for wooden foundations, flooring, doors and windows. • Explain fastening systems such as nails, screws, bolts and adhesives for wooden structures. • Describe the importance of moisture resistance and protective coatings in timber construction. • Explain the use of digital tools for accurate measurement and alignment of prefabricated components. • Describe quality control measures in wooden frame construction.	• Show how to identify structural requirements for wooden frame foundations and flooring. • Show how to select appropriate timber based on strength, load-bearing capacity and environmental conditions. • Show how to measure, cut and assemble wooden beams, joists and subfloor components. • Show how to secure foundation frames using nails, screws, bolts, or brackets. • Show how to ensure accurate spacing and alignment of wooden floor joists to support load distribution. • Show how to install moisture barriers or protective coatings to prevent wood degradation. • Show how to reinforce connections using bracing or additional support elements. • Show how to conduct inspections to verify stability and structural integrity before installation. • Show how to select and prepare engineered wood products such as CLT and LVL. • Show how to assemble prefabricated timber frames using modular construction techniques. • Show how to apply advanced fastening systems such as metal connectors and adhesives for enhanced durability. • Show how to align and position prefabricated components using laser levels and digital measuring tools. • Show how to integrate prefabricated frames into structural elements with minimal modifications.

	• Show how to determine the dimensions and specifications of wooden door and window frames. • Show how to select high-quality timber suitable for frame construction. • Show how to use CNC machines for precision cutting and shaping of wooden components. • Show how to ensure accurate mortise and tenon joints, grooves and notches for seamless assembly. • Show how to assemble door and window frames using clamps, fasteners and adhesives. • Show how to align frames precisely within wall openings to prevent warping or misalignment. • Show how to install reinforcements such as weatherproofing strips and insulation materials. • Show how to conduct finishing operations such as sanding, sealing and varnishing for durability.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Measuring tapes, framing squares, saws (hand saws, circular saws, jigsaws), chisels, hammers, drills, nails, screws, bolts, brackets, adhesives, clamps, prefabricated timber components, laser levels, CNC machines, weatherproofing strips, insulation materials, sanding tools, sealants and varnishes.	

Module 14: Install Interior Wooden Partitions and Panels

Mapped to ICE/CON/N0510, v1.0

Terminal Outcomes:

- Explain the principles and techniques for installing interior wooden partitions and panels for structural and decorative purposes.
- Demonstrate the process to set up, align and secure wooden partitions using appropriate materials and fastening methods.

Duration: 20:00	**Duration: 30:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe types of wood and engineered wood materials suitable for partitions and panels. • Explain measuring and marking techniques for accurate layout and alignment. • Describe fastening methods such as concealed clips, adhesives, nails and screws. • Explain soundproofing and insulation techniques for interior wooden partitions. • Describe finishing techniques including sanding, polishing and protective coatings. • Explain expansion and contraction properties of wood in different environmental conditions. • Describe safety precautions in handling and installing wooden components. • Explain tools and equipment used for cutting, fastening and finishing wooden partitions. • Describe structural reinforcement techniques for stability and durability. • Explain quality control measures for inspecting alignment, durability and aesthetics. • Describe sustainable wood sourcing and waste management practices in interior construction.	• Show how to select appropriate timber, plywood, MDF, or engineered wood for partition construction. • Show how to measure and mark partition dimensions using precision tools. • Show how to cut wooden sections using saws, routers and CNC machines for accuracy. • Show how to assemble and secure wooden partition frames with mortise and tenon, dowel, or screw joints. • Show how to integrate steel or aluminum reinforcements for enhanced durability. • Show how to align and fix partitions to walls, floors and ceilings using brackets, adhesives and mechanical fasteners. • Show how to install adjustable or removable wooden partitions for flexible space management. • Show how to integrate soundproofing and insulation materials within partition cavities. • Show how to check vertical alignment and structural stability before finalizing installation. • Show how to select and source high-quality wooden panels suited for interior applications. • Show how to prepare and treat wooden panels with sanding, priming, or moisture-proof coatings. • Show how to measure and cut panels to fit designated wall, ceiling, or partition surfaces. • Show how to install panels using concealed clips, adhesives, mechanical fasteners, or interlocking systems. • Show how to align and secure panels to maintain uniformity, stability and smooth finishing.

	• Show how to integrate acoustic panels for enhanced sound absorption in designated spaces. • Show how to incorporate decorative woodwork such as moldings, carvings, or laminated finishes. • Show how to apply expansion gaps to prevent warping due to temperature or humidity changes. • Show how to install fire-retardant or anti-bacterial coatings where required. • Show how to assemble modular wooden partition panels in workshop settings for on-site installation. • Show how to use prefabricated interlocking wooden sections for quicker assembly. • Show how to incorporate built-in storage or shelving units within partition designs. • Show how to align and install modular partitions with minimal on-site cutting or modifications. • Show how to integrate sliding, folding, or movable partitions for adaptable interior layouts. • Show how to sand and smooth wooden partitions and panels before applying finishes. • Show how to apply stains, paints, polishes, or sealants for enhanced durability and aesthetics. • Show how to integrate protective coatings for fire resistance, waterproofing, or anti-termite protection. • Show how to ensure even coating application using brushes, rollers, or spray techniques. • Show how to inspect final surface finish for defects, inconsistencies, or unevenness.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Measuring tapes, framing squares, saws (hand saws, circular saws, jigsaws), routers, chisels, CNC machines, drills, screws, nails, adhesives, clamps, fasteners, brackets, priming and sealing tools, sanding tools, paintbrushes, rollers, spray guns, safety equipment (gloves, goggles, masks), soundproofing and insulation materials and decorative woodwork accessories.	

Module 15: Assemble and Dismantle Shuttering for Concreting

Mapped to ICE/CON/N0511, v1.0

Terminal Outcomes:

- Explain the principles and techniques for constructing, installing and dismantling formwork for concreting.
- Demonstrate the ability to assemble and secure wooden and prefabricated formwork systems.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe types of wood and engineered materials used in shuttering and formwork construction. • Explain properties of concrete, including setting time, curing requirements and load-bearing capacity. • Describe methods for measuring, cutting and assembling wooden formwork components. • Explain techniques for securing and stabilizing formwork for different concrete structures. • Describe prefabricated shuttering systems and their advantages in construction projects. • Explain methods for adjusting prefabricated shuttering to suit project specifications. • Describe common defects in formwork and their impact on concrete quality. • Explain handling, maintenance and storage of wooden and prefabricated formwork for reuse. • Describe types of release agents and their application in preventing concrete adhesion to formwork. • Explain tools and equipment used for cutting, assembling and dismantling formwork. • Describe different types of fasteners, connectors and supports used in formwork assembly. • Explain best practices for efficient dismantling to avoid damage to cured concrete. • Describe techniques for inspecting formwork for signs of damage or	• Show how to select appropriate timber, plywood, or engineered wood for formwork construction. • Show how to measure and cut formwork components to required dimensions using hand tools and power tools. • Show how to assemble wooden panels, beams and braces to create a sturdy framework for pouring concrete. • Show how to secure formwork components with nails, screws, or clamps to maintain shape and strength. • Show how to install bracing and support structures to prevent deformation during concreting. • Show how to position and secure wooden formwork for columns, beams, slabs and walls. • Show how to ensure proper alignment and leveling using spirit levels and measuring tools. • Show how to adjust and reinforce joints to prevent leakage or displacement of concrete. • Show how to apply release agents to the inner surfaces of the formwork for easy removal. • Show how to select and assemble modular prefabricated shuttering panels for rapid installation. • Show how to use aluminum, steel, or plastic-coated formwork for repeated usage. • Show how to integrate interlocking formwork systems for faster setup and dismantling. • Show how to adjust prefabricated panels to suit varying dimensions and design specifications. • Show how to remove temporary supports and fasteners systematically to avoid structural damage.

deterioration. • Explain factors affecting the reusability of shuttering materials.	• Show how to carefully detach wooden or prefabricated panels without chipping or cracking concrete. • Show how to clean and store reusable shuttering components for future use. • Show how to inspect formwork materials for wear and damage before reassembly.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Measuring tapes, spirit levels, saws (hand saws, circular saws, jigsaws), chisels, hammers, drills, screws, nails, clamps, formwork fasteners, release agents, wrenches, pliers, power tools, braces, supports, prefabricated formwork panels, cleaning tools and safety equipment (gloves, goggles, helmets).	

Module 16: Construct and Install Wooden Structural Features

Mapped to ICE/CON/N0512, v1.0

Terminal Outcomes:

- Explain the properties of wood, selection criteria and treatment methods for durability.
- Demonstrate the construction and installation of wooden staircases, railings, beams and decorative frameworks.
- Show the woodworking techniques for accurate cutting, joining and securing of wooden structures.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe basic properties of wood, including grain structure, hardness, moisture content and workability. • Explain classification of wood types: hardwoods (e.g., teak, oak, mahogany) vs. softwoods (e.g., pine, cedar). • Describe factors affecting wood selection for different structural applications. • Explain seasoning and treatment of wood to improve durability and resistance to moisture and pests. • Describe measurement tools and techniques for accurate wood cutting and assembly. • Explain methods for marking and layout for precision woodworking. • Describe different types of saws (hand saws, circular saws, band saws) and their applications. • Explain traditional woodworking joints such as mortise and tenon, dovetail, lap joint and tongue and groove. • Describe modern joinery techniques using adhesives, dowels and screws. • Explain CNC precision cutting and assembly techniques for high-accuracy joinery. • Describe fastening methods for securing structural wooden components. • Explain load-bearing properties of wooden elements and their applications. • Describe reinforcement techniques for wooden staircases, railings and	• Show how to select appropriate wood types for staircase treads, risers and stringers. • Show how to measure and cut wooden components according to staircase design and dimensions. • Show how to assemble and secure staircases using joinery techniques such as mortise and tenon or dovetail joints. • Show how to install supporting framework and reinforcements to ensure staircase stability. • Show how to measure and mark positions for railing posts, handrails and balusters. • Show how to cut and shape wooden components to match design specifications. • Show how to assemble and secure railings using wooden dowels, screws, or adhesives. • Show how to align and fasten balustrades to staircases or balconies with proper anchoring. • Show how to cut and join wooden beams using traditional and modern woodworking methods. • Show how to assemble and install wooden load-bearing structures for ceilings and partitions. • Show how to reinforce beams with metal brackets or engineered wood supports for additional strength. • Show how to integrate prefabricated wooden structural components for faster installation. • Show how to cut and shape wooden components for aesthetic and architectural designs. • Show how to assemble wooden frameworks for ceilings, archways and wall paneling. • Show how to install decorative wooden panels and moldings to enhance visual

beams. • Explain the integration of engineered wood products such as laminated veneer lumber (LVL) and cross-laminated timber (CLT). • Describe prefabricated wooden structural components for efficient installation.	appeal. • Show how to use CNC precision cutting for intricate and customized wooden designs.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Measuring tapes, marking gauges, spirit levels, saws (hand saws, circular saws, band saws, jigsaws), chisels, hammers, drills, screws, nails, clamps, wooden dowels, adhesives, mortising machines, CNC cutting machines, routers, sanders, wood planes, metal brackets, engineered wood products (LVL, CLT) and safety gear (gloves, goggles, dust masks, helmets).	

Module 17: Plan and Execute Metal Fabrication

Mapped to ICE/CON/N0513, v1.0

Terminal Outcomes:

- Explain fundamental properties of metals and their classification for fabrication.
- Demonstrate the ability to read and interpret fabrication drawings, including GD&T symbols.
- Apply metal cutting, shaping and welding techniques for fabrication.
- Utilize CAD and CAM software for precision metal design and CNC machining.
- Operate automated fabrication systems, including CNC machines and robotic welding.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe fundamental properties of metals: strength, ductility, malleability and corrosion resistance. • Explain the classification of metals: ferrous (steel, cast iron) vs. non-ferrous (aluminum, copper, brass). • Describe methods of cutting and shaping metal: sawing, shearing, plasma cutting, laser cutting, bending and rolling. • Explain different welding techniques: MIG, TIG, arc welding and spot welding. • Interpret fabrication drawings, symbols and geometric dimensioning and tolerancing (GD&T). • Describe the use of CAD software (AutoCAD, SolidWorks, Fusion 360) for metal design and drafting. • Explain the application of CAM software for generating tool paths and CNC programming. • Describe CNC machining principles, including milling, turning and laser cutting. • Explain automation in metal fabrication, including robotic welding, automated bending and precision assembly. • Describe quality control methods in metal fabrication, including dimensional checks and tolerance inspections.	• Show how to read and interpret technical drawings, blueprints and material specifications. • Show how to identify dimensions, tolerances and material requirements for metal fabrication. • Show how to prepare fabrication plans based on project requirements and structural integrity. • Show how to select appropriate metal types based on strength, corrosion resistance and application. • Show how to measure, mark and cut metal sheets, rods and beams according to specifications. • Show how to apply shaping techniques such as bending, rolling and pressing for component preparation. • Show how to design metal components and assemblies using CAD software. • Show how to generate CNC machining programs using CAM software for automated cutting and shaping. • Show how to simulate and verify machining operations to ensure accuracy before production. • Show how to operate CNC machines for precision metal cutting, drilling and shaping. • Show how to integrate robotic welding and automated assembly systems in fabrication. • Show how to monitor and adjust automated fabrication processes for consistency and efficiency.

Classroom Aids
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films
Tools, Equipment and Other Requirements
Measuring tools (calipers, micrometers, rulers, gauges), metal cutting tools (plasma cutters, laser cutters, shears, saws), welding equipment (MIG, TIG, arc welders), bending and rolling machines, CNC machines (milling, turning, drilling), CAD software (AutoCAD, SolidWorks), CAM software (Fusion 360, Mastercam), robotic welding systems, quality inspection tools (coordinate measuring machines, dial indicators, height gauges) and safety gear (gloves, welding masks, goggles, fire-resistant clothing).

Module 18: Cut, Bend and Assemble Reinforcement Bars

Mapped to ICE/CON/N0514, v1.0

Terminal Outcomes:

- Explain types of reinforcement bars and their applications.
- Demonstrate cutting, bending and assembling reinforcement bars according to structural drawings.
- Apply different rebar tying and securing techniques for reinforcement structures.
- Use advanced shuttering and alignment techniques for precision placement.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe types of reinforcement bars: mild steel, deformed bars, epoxy-coated bars and fiber-reinforced polymer (FRP) bars. • Explain reinforcement cutting techniques: manual cutting (hacksaws, bolt cutters), machine cutting, plasma cutting and shear cutting. • Describe bending methods: cold bending, hot bending and CNC-controlled bending. • Explain reinforcement tying techniques: binding wire method, welded reinforcement cages and mechanical couplers. • Describe rebar placement patterns: single-layer, double-layer, spiral and grid patterns. • Explain Mivan shuttering system: aluminum formwork assembly, modular design and efficiency benefits. • Describe laser alignment principles: using laser levels for precise rebar positioning and vertical alignment. • Explain the impact of reinforcement detailing on structural integrity and load-bearing capacity. • Describe the role of reinforcement in seismic-resistant and high-rise constructions	• Show how to measure and mark rebar lengths according to structural drawings. • Demonstrate cutting reinforcement bars using manual tools (hacksaws, bolt cutters) and automated machines. • Apply manual bending techniques using rebar bending levers and hydraulic benders. • Operate CNC-controlled bending machines for precision bends. • Shape rebars to required angles and curves based on reinforcement detailing. • Assemble reinforcement structures based on layout plans. • Secure rebar connections using binding wire and mechanical couplers. • Install reinforcement mesh, cages and columns for concrete structures. • Use Mivan shuttering techniques for assembling steel formwork. • Apply laser alignment techniques to ensure accurate reinforcement placement. • Inspect reinforcement structures and adjust before concrete pouring
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	

Tools, Equipment and Other Requirements
Measuring tapes, calipers, steel rulers, hacksaws, bolt cutters, rebar shears, plasma cutters, automated cutting machines, manual bending levers, hydraulic benders, CNC bending machines, binding wires, mechanical couplers, welding equipment, steel and aluminum formwork panels, laser levels, plumb bobs, spirit levels, rebar scanners, load-testing equipment, structural verification instruments, gloves, goggles, hard hats, steel-toe boots and high-visibility vests.

Module 19: Install and Weld Metal Structural Components

Mapped to ICE/CON/N0515, v1.0

Terminal Outcomes:

- Explain types of metal structural components, fabrication techniques and welding processes.
- Demonstrate the ability to measure, cut, install and secure metal structures using appropriate tools and fastening methods.
- Apply different welding techniques, including manual and automated processes, for structural assembly.

Duration: 20:00	**Duration: 30:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe types of metal structural components, including beams, columns, trusses and sheet metal. • Explain metal fabrication techniques such as shearing, punching, rolling and bending. • Describe different welding processes, including Shielded Metal Arc Welding (SMAW), Gas Metal Arc Welding (GMAW), Tungsten Inert Gas (TIG) welding, Submerged Arc Welding (SAW) and Friction Stir Welding (FSW). • Explain the selection and properties of welding materials like mild steel, stainless steel, aluminum and alloys. • Describe heat treatment effects on welded joints and their impact on strength and durability. • Explain robotic welding systems, their programming and benefits in automation. • Describe welding defect detection techniques and corrective measures. • Explain structural reinforcement methods using welded connections. • Describe the importance of metal finishing for corrosion resistance and durability. • Explain welding codes and standards applicable to structural fabrication. • Describe principles of load-bearing metal structures and their assembly. • Explain the integration of welding automation with CAD/CAM software for high-precision fabrication.	• Show how to measure, mark and cut metal sheets and structural sections using hand tools and CNC cutting machines. • Show how to position and secure metal components using clamps, jigs and tack welding. • Show how to drill and fasten structural metal sections using bolts, rivets and welding. • Show how to align and level metal structures using laser-guided tools. • Show how to install temporary supports to hold metal components in place during assembly. • Show how to assemble and install sheet metal for walls, roofing and facade applications. • Show how to secure sheet metal structures using riveting, bolting and welding methods. • Show how to shape and bend sheet metal using hydraulic press brakes and rollers. • Show how to install expansion joints and apply corrosion-resistant coatings like galvanization and powder coating. • Show how to execute welding techniques, including SMAW, GMAW, TIG, SAW and oxy-fuel welding. • Show how to inspect welds for defects such as porosity, cracks and incomplete fusion. • Show how to repair defective welds using grinding, rewelding and filler techniques. • Show how to operate CNC-controlled and robotic welding systems for precision welding. • Show how to program automated welding machines for repetitive production tasks. • Show how to inspect and adjust weld parameters such as heat input, speed and electrode angle.

	• Show how to perform laser welding and friction stir welding for specialized applications. • Show how to integrate automated welding processes with real-time monitoring and quality control systems. • Show how to troubleshoot robotic welding system errors and recalibrate equipment.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Measuring tapes, steel rulers, calipers, marking gauges, clamps, jigs, hacksaws, angle grinders, plasma cutters, oxy-fuel cutting torches, CNC cutting machines, drill presses, riveting tools, hydraulic press brakes, metal rollers, sheet metal benders, SMAW welders, GMAW welders, TIG welders, SAW machines, friction stir welding equipment, laser welding machines, robotic welding systems, welding electrodes, shielding gases, filler metals, galvanization and powder coating equipment, laser levels, spirit levels, welding defect inspection tools, CAD/CAM software, welding helmets, gloves, heat-resistant clothing, safety goggles and steel-toe boots.	

Module 20: Apply Surface Coatings and Treatments

Mapped to ICE/CON/N0516, v1.0

Terminal Outcomes:

- Explain surface preparation methods for coating applications.
- Demonstrate the application of various protective coatings on metal surfaces.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Describe types of surface coatings: organic (paints, varnishes) and inorganic (metallic, ceramic). • Explain surface preparation techniques such as abrasive blasting, wire brushing and chemical cleaning. • Describe methods of applying protective coatings, including spray, dip, brush and electrostatic techniques. • Explain the role of primers and adhesion promoters in coating durability. • Describe corrosion mechanisms and how protective treatments counteract them. • Explain advanced coating technologies such as powder coating, anodizing and electroplating. • Describe thermal spray coatings and their applications in industrial settings. • Explain principles of cathodic protection and its role in metal preservation. • Describe testing methods for coating thickness, adhesion and durability. • Explain environmental considerations in surface treatment processes, including waste management and emission control. • Describe the benefits of automation in coating and treatment applications for precision and efficiency.	• Show how to clean metal surfaces using chemical and mechanical methods to remove rust, grease and contaminants. • Show how to use abrasive blasting, wire brushing and sanding for optimal surface profiling. • Show how to apply etching and priming treatments for better adhesion of coatings. • Show how to inspect surfaces for defects such as pitting, scaling and oxidation before coating. • Show how to mask off areas that should not be coated using tapes, stencils, or temporary coverings. • Show how to apply liquid coatings such as primers, paints and varnishes using spray, brush and dip methods. • Show how to use powder coating techniques for durable and uniform surface finishes. • Show how to apply industrial coatings like epoxy, polyurethane and fluoropolymers for enhanced protection. • Show how to ensure even distribution and proper curing of coatings using heat or UV treatments. • Show how to check coating thickness and adhesion using micrometers and adhesion testers. • Show how to apply galvanization techniques, including hot-dip and electro-galvanization. • Show how to use anodizing for aluminum components to enhance wear and corrosion resistance. • Show how to perform passivation treatments for stainless steel to prevent oxidation. • Show how to apply cathodic protection methods using sacrificial anodes and

	impressed current systems. • Show how to use chemical conversion coatings such as chromating and phosphating. • Show how to apply thermal spraying techniques, including plasma, arc and flame spraying. • Show how to use physical vapor deposition (PVD) and chemical vapor deposition (CVD) for specialized coatings. • Show how to perform electroplating with metals like zinc, nickel and chromium. • Show how to conduct nano-coating applications for enhanced scratch resistance and self-cleaning properties. • Show how to integrate robotic and automated coating systems for precision and efficiency in large-scale production.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Abrasive blasting equipment, wire brushes, sanders, etching solutions, chemical degreasers, priming tools, masking tapes, stencils, air spray guns, dip tanks, powder coating systems, UV curing equipment, industrial ovens, coating thickness gauges, adhesion testers, hot-dip galvanization tanks, electro-galvanization units, anodizing baths, passivation chemicals, sacrificial anodes, cathodic protection systems, thermal spray guns (plasma, arc, flame), PVD/CVD chambers, electroplating tanks, nano-coating applicators, robotic and automated coating systems, safety gear (gloves, respirators, goggles, protective suits).	

Module 21: Install Energy-Efficient Metal Cladding Systems

Mapped to ICE/CON/N0517, v1.0

Terminal Outcomes:

- Explain the principles of metal cladding installation and its role in energy efficiency.
- Demonstrate the preparation of surfaces for metal cladding installation.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the properties and types of metal cladding materials, including aluminum, zinc, copper and steel. • Describe principles of thermal insulation and energy efficiency in building envelopes. • Explain advanced insulation technologies such as vacuum insulation panels (VIPs) and phase-change materials. • Describe the importance of air and vapor barriers in preventing condensation and thermal bridging. • Explain installation methods for different metal cladding systems, including standing seam, interlocking panels and cassette systems. • Describe the role of cool roofing and solar reflective coatings in energy-efficient buildings. • Explain techniques for integrating solar panels into metal cladding systems. • Describe the impact of ventilated façades on energy performance and indoor comfort. • Explain the use of advanced tools such as laser levels, thermal imaging cameras and BIM software for precision installation. • Discuss environmental sustainability considerations in metal cladding, including recyclability and embodied carbon reduction.	• Show how to inspect and prepare the substrate by cleaning and leveling surfaces before installation. • Show how to select appropriate metal cladding materials based on project specifications. • Demonstrate how to measure and mark the installation area using laser leveling tools. • Show how to cut and shape metal panels using mechanical and automated cutting tools. • Demonstrate the application of primers and protective coatings to metal surfaces before installation. • Show how to install metal cladding panels using direct fixing, rail systems, or concealed fasteners. • Demonstrate integration of insulation materials such as mineral wool, polyurethane foam, or vacuum-insulated panels (VIP). • Show how to ensure airtight sealing of joints using high-performance sealants, tapes and thermal breaks. • Demonstrate the application of vapor barriers and breather membranes to prevent condensation and thermal bridging. • Show how to apply reflective coatings and surface treatments for solar heat reduction. • Demonstrate integration of ventilated façade systems to improve thermal comfort and air circulation. • Show how to install photovoltaic (PV) cladding systems for renewable energy generation. • Conduct thermal imaging tests to identify and rectify insulation gaps or heat leaks. • Demonstrate the installation of pre-

	fabricated modular metal cladding systems for faster construction. • Use 3D laser scanning and BIM (Building Information Modeling) for precise placement and material optimization. • Demonstrate how to install self-healing and nano-coated metal cladding for durability and reduced maintenance. • Show how to integrate smart building sensors into metal cladding for real-time thermal performance monitoring. • Demonstrate proper drainage and water management techniques by incorporating weep holes and flashing systems.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Laser leveling tools, mechanical and automated cutting tools, measuring tape, air spray guns, thermal imaging cameras, insulation materials (mineral wool, polyurethane foam, VIPs), sealants, tapes, thermal breaks, vapor barriers, breather membranes, photovoltaic (PV) panels, 3D laser scanners, BIM software, nano-coating applicators, drainage and flashing tools, safety gear (gloves, respirators, goggles, protective suits).	

Module 22: Prepare, Pour and Cure Concrete Structures

Mapped to ICE/CON/N0518, v1.0

Terminal Outcomes:

- Explain the process of preparing, mixing, pouring, compacting and curing concrete structures.
- Read and interpret construction drawings for concrete specifications and reinforcement details.
- Demonstrate proper material selection, batching and mixing techniques for concrete.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the properties and classification of different types of concrete, including normal, high-strength and self-compacting concrete. • Describe the components of concrete mixtures and their roles, including cement, aggregates, water and admixtures. • Explain the principles of mix design, including water-cement ratio, workability and slump testing. • Describe traditional and modern methods of concrete placement, including pumping and slip-form techniques. • Explain the importance of proper compaction in eliminating air pockets and increasing concrete strength. • Describe different curing techniques and their impact on concrete strength and durability. • Explain the impact of weather conditions on concrete setting and how to mitigate issues like shrinkage and cracking. • Describe technological advancements in concrete construction, including high-performance concrete (HPC) and geopolymer concrete. • Explain the use of non-destructive testing methods such as ultrasonic pulse velocity (UPV) and rebound hammer for assessing concrete quality. • Discuss environmental considerations in concrete production, including the use of recycled aggregates and carbon capture technologies.	• Demonstrate how to analyze structural blueprints to determine concrete specifications and reinforcement details. • Show how to calculate the quantity of concrete required based on mix proportions and structural dimensions. • Demonstrate the selection of appropriate cement, aggregates and admixtures based on project specifications. • Measure and batch materials using weigh batching and volumetric batching methods. • Show how to mix concrete manually, mechanically, or using ready-mix concrete (RMC) plants for uniform consistency. • Demonstrate slump, workability and consistency testing before pouring concrete. • Show how to transport and place concrete using wheelbarrows, pumps, or conveyors for efficient placement. • Demonstrate pouring concrete in layers to avoid segregation and cold joints. • Apply self-compacting concrete (SCC) technology for vibration-free placement. • Show how to embed reinforcement bars, anchor bolts and conduits while placing concrete. • Demonstrate proper compaction using needle vibrators, surface vibrators and form vibrators. • Show how to apply traditional curing methods such as ponding, wet covering and water spraying. • Demonstrate the application of curing compounds and self-curing additives for moisture retention. • Show how to implement steam curing

	and accelerated curing methods for precast concrete elements. • Demonstrate the use of non-destructive testing methods (UPV and rebound hammer) to assess concrete quality.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Concrete mixers, weigh batching and volumetric batching equipment, slump test apparatus, measuring tape, wheelbarrows, concrete pumps, laser leveling tools, vibrators (needle, surface and form), curing compounds, plastic sheets, wet burlap, thermal sensors, UPV testers, rebound hammers, safety gear (gloves, goggles, protective suits, respirators).	

Module 23: Perform Concreting for Structural Elements

Mapped to ICE/CON/N0519, v1.0

Terminal Outcomes:

- Explain the process of constructing reinforced concrete structural elements, including floors, beams, columns and walls.
- Demonstrate the use of insulated concrete formwork (ICF) for efficient construction.
- Apply high-performance concrete (HPC) techniques to enhance structural integrity and durability.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the structural behavior and load-bearing capacity of reinforced concrete elements. • Describe the properties of concrete and reinforcement materials used in floors, beams, columns and walls. • Explain techniques for installing insulated concrete formwork (ICF) and its advantages in thermal efficiency. • Describe different types of formwork and best practices for constructing walls, floors, beams and columns. • Explain the role of reinforcement in preventing tensile failures and improving durability. • Describe the principles of concrete pouring, leveling and finishing for smooth and strong surfaces. • Explain compaction techniques to eliminate voids and enhance strength. • Discuss curing methods and their impact on the long-term performance of structural elements. • Explain advanced concreting techniques, including self-compacting concrete (SCC) and high-performance concrete (HPC). • Describe the use of non-destructive testing (NDT) such as ultrasonic testing and core sampling to verify concrete quality.	• Show how to prepare formwork and reinforcement layout as per structural design. • Demonstrate the placement of reinforcement bars, mesh, or fiber reinforcement for strength and crack resistance. • Show how to mix and pour concrete with appropriate workability and slump control. • Demonstrate the compaction of concrete using mechanical vibrators to eliminate air pockets. • Show how to level and finish concrete surfaces using trowels, screeds, or power floaters. • Demonstrate the assembly of insulated concrete formwork (ICF) for wall construction. • Show how to properly place reinforcement bars within ICF systems. • Demonstrate the process of pouring concrete into ICF frameworks, ensuring uniform flow and consolidation. • Show how to remove excess air using vibration techniques to prevent voids and segregation. • Demonstrate curing techniques for ICF concrete to enhance thermal efficiency. • Show how to install temporary supports and scaffolding for beams and columns. • Demonstrate the fixing of reinforcement cages inside beam and column formworks. • Show how to pour concrete in layers while ensuring even distribution around reinforcements. • Demonstrate the monitoring of alignment

	and positioning using plumb bobs and laser levels. • Show how to apply curing techniques such as wet hessian cloth or membrane curing for beams and columns. • Demonstrate the mixing of high-performance concrete (HPC) using silica fume, fly ash, or polymer additives. • Show the use of self-compacting concrete (SCC) for enhanced workability and reduced segregation. • Demonstrate the implementation of post-tensioning techniques for improved structural stability. • Show how to conduct non-destructive testing (NDT) such as ultrasonic testing and core sampling to assess concrete strength and uniformity.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Concrete mixers, weigh batching equipment, slump test apparatus, rebar cutting and bending tools, vibrators (needle, surface and form), screeds, power floaters, trowels, laser leveling tools, insulated formwork panels, curing compounds, plumb bobs, ultrasonic testers, core sampling drills, scaffolding materials, safety gear (helmets, gloves, goggles, protective boots).	

Module 24: Carryout Reinforced Concrete Works

Mapped to ICE/CON/N0520, v1.0

Terminal Outcomes:

- Prepare and set up materials, tools and formwork required for reinforced concrete.
- Install, secure and align reinforcement materials in accordance with structural drawings and specifications.
- Handle, mix, place and compact fiber-reinforced concrete (FRC) as per standard procedures.
- Apply reinforcement enhancement techniques such as post-tensioning, shear reinforcement and mesh placement.
- Inspect and verify compliance of reinforcement layout before concreting to ensure structural quality and safety.

Duration: 20:00	**Duration: 30:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain properties and applications of steel bars, wire mesh and various fiber types (steel, glass, synthetic, natural). • Describe bar cutting, bending, tying and lapping principles and their roles in structural strength. • Explain the importance of spacing, bar cover, alignment and factors affecting crack resistance and durability. • Describe the methodology for mixing, placing, pouring and compacting fiber-reinforced concrete. • Explain applications, advantages and limitations of FRC in slabs, beams and foundations. • Explain post-tensioning systems, shear reinforcement, welded wire mesh use and reinforcement for joints and corners. • Identify common defects in reinforced concrete works and corrective measures. • Explain safety guidelines for handling reinforcement materials, tools and vibration equipment. • Demonstrate understanding of measurement accuracy and interpretation of structural drawings. • Explain the importance of teamwork, communication, risk mitigation and adherence to environmental and ethical practices.	• Select and arrange reinforcement materials such as bars, mesh, spacers, chairs, and fibers as per job requirements. • Measure, cut, and prepare reinforcement bars and mesh using appropriate tools. • Install shuttering and temporary supports for RC elements like beams, slabs, and columns. • Position reinforcement bars according to structural drawings and maintain correct spacing. • Tie reinforcements using binding wire ensuring stability and structural continuity. • Fix stirrups, spacers, and chairs to maintain required concrete cover and alignment. • Install reinforcement mesh or cages for slabs, columns, and beams following layout requirements. • Apply mechanical couplers and lapping techniques for extending bars. • Select suitable fiber types and proportions for FRC. • Mix, pour, and place fiber-reinforced concrete using manual or mechanical methods. • Compact FRC using vibrators to eliminate air voids and ensure uniform distribution. • Apply post-tensioning procedures with correct tools and safety measures. • Use welded wire mesh and additional reinforcement for joints, corners, and crack resistance.

	• Install shear reinforcement in beams and columns. • Conduct final inspection of reinforcement layout to ensure compliance before concreting.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Concrete grinders, power washers, chisels, hammer drills, bonding agents, epoxy injection kits, crack sealants, nano-concrete materials, polymer-modified concrete, self-healing concrete additives, trowels, screeds, mechanical mixers, protective coatings, respirators, gloves and safety gear.	

Module 25: Repair and Restore Concrete Surfaces

Mapped to ICE/CON/N0521, v1.0

Terminal Outcomes:

- Demonstrate techniques for inspecting and assessing damaged concrete surfaces.
- Show the application of traditional and advanced repair methods for restoring concrete integrity.
- Demonstrate the use of nano-concrete technology for surface repairs.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the types and causes of concrete damage, including cracking, spalling and surface wear. • Describe the properties of cementitious and polymer-based repair materials. • Explain techniques for assessing structural damage in concrete. • Describe methods of crack repair, including epoxy injection, routing and sealing. • Explain the principles of nano-concrete technology and its applications in concrete restoration. • Describe the advantages of self-healing concrete and nano-modified repair materials. • Explain the importance of surface preparation for effective adhesion of repair materials. • Describe different types of concrete coatings and finishing techniques for durability and aesthetics. • Explain the tools and equipment used for repairing and refinishing concrete surfaces. • Discuss factors affecting the longevity of repaired concrete surfaces and methods to enhance durability.	• Show how to inspect concrete surfaces for cracks, spalling, erosion and other defects. • Demonstrate how to identify causes of concrete deterioration such as water ingress, chemical exposure, or structural stress. • Show how to clean damaged areas using mechanical or chemical methods to remove loose material. • Demonstrate how to mark and outline repair zones according to structural repair plans. • Show how to mix and apply cementitious repair mortar for minor surface damages. • Demonstrate patch repairs using rapid-setting concrete for small cracks and voids. • Show the application of bonding agents and primers to enhance adhesion before repairs. • Demonstrate the use of formwork and shuttering techniques for deep repairs and re-casting damaged sections. • Show how to mix and apply nano-concrete materials for enhanced durability and crack resistance. • Demonstrate the use of self-healing concrete mixtures infused with nano-particles for micro-crack sealing. • Show how to reinforce repaired areas with nano-coatings to improve water resistance and longevity. • Demonstrate the application of advanced polymer-modified concrete for enhanced surface performance. • Show how to inject epoxy or polyurethane sealants into deep cracks for structural reinforcement.

	• Demonstrate the application of flexible sealants for expansion joints and surface movement cracks. • Show how to grind and smooth repaired areas to match surrounding surfaces. • Demonstrate the use of high-performance coatings and resurfacing compounds for final finishing.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Concrete grinders, power washers, chisels, hammer drills, bonding agents, epoxy injection kits, crack sealants, nano-concrete materials, polymer-modified concrete, self-healing concrete additives, trowels, screeds, mechanical mixers, protective coatings, respirators, gloves and safety gear.	

Module 26: Construct and Install Precast Concrete Structures

Mapped to ICE/CON/N0522, v1.0

Terminal Outcomes:

- Demonstrate the process of manufacturing precast concrete elements.
- Show safe handling and transportation of precast components.
- Demonstrate the correct installation techniques for precast concrete structures.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain different types of precast concrete elements, including panels, beams, slabs and columns. • Describe the properties of precast concrete and its advantages over in-situ concrete. • Explain formwork design and casting techniques for precast manufacturing. • Describe methods of reinforcement placement and curing in precast production. • Explain handling and lifting procedures for heavy precast elements. • Describe the principles of alignment, leveling and joining in precast installation. • Explain different types of precast connection systems, including grouted and mechanical joints. • Discuss quality control measures to assess strength, durability and finish of precast elements. • Describe tools and machinery used for installing and securing precast components. • Explain safety procedures related to lifting, transportation and installation of precast structures.	• Show how to prepare and assemble formwork for casting precast concrete components. • Demonstrate the process of mixing and pouring concrete into molds, ensuring proper vibration to remove air pockets. • Show how to use high-performance concrete mixes for strength and durability. • Demonstrate different curing techniques such as steam curing to enhance early strength. • Show how to demold precast components safely without causing surface damage. • Demonstrate the correct method of lifting and moving precast components using cranes, slings and lifting anchors. • Show how to properly stack and secure precast elements during transportation. • Demonstrate the use of protective coverings and supports to prevent damage during handling. • Show how to follow weight distribution guidelines to maintain load balance during transit. • Demonstrate how to position precast elements using laser alignment and precision measurement tools. • Show how to secure precast components using dowels, grout, or mechanical connections. • Demonstrate post-installation finishing, including joint sealing and surface treatments. • Show how to ensure structural alignment and level adjustments before final fixing. • Demonstrate how to inspect precast components for cracks, voids, or dimensional deviations. • Show how to verify reinforcement

	placement and curing compliance before installation. • Demonstrate testing procedures for assessing the load-bearing capacity of installed precast structures. • Show how to document installation procedures and maintain records for compliance.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Concrete mixers, precast molds, vibrators, steam curing systems, demolding tools, lifting cranes, slings, protective covers, laser levels, grout applicators, joint sealants, finishing tools, measuring tapes, safety harnesses and PPE kits.	

Module 27: Cut, Shape and Install Sheet Metal Structures

Mapped to ICE/CON/N0523, v1.0

Terminal Outcomes:

- Demonstrate the interpretation of technical drawings and preparation of sheet metal materials.
- Show how to cut and shape sheet metal components accurately.
- Demonstrate assembly and joining techniques for sheet metal structures.
- Show the correct installation and finishing of sheet metal structures.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain different types of sheet metals, including aluminum, stainless steel and galvanized sheets. • Describe the properties of various sheet metals and their applications in construction. • Explain blueprint reading and interpretation for fabrication processes. • Describe measurement techniques and tools used in sheet metal work. • Explain different cutting methods, including manual, mechanical and CNC-based techniques. • Describe bending and forming techniques using press brakes and rollers. • Explain various joining methods such as welding, riveting, soldering and bolting. • Discuss fastening systems and adhesive bonding for sheet metal structures. • Explain finishing techniques, including polishing, coating and rust prevention. • Describe handling, storage and safety precautions in sheet metal fitting	• Show how to read and interpret technical drawings and blueprints for sheet metal fabrication. • Demonstrate how to measure and mark metal sheets using scribers, calipers and templates. • Show how to select appropriate sheet metal materials based on project requirements. • Demonstrate proper surface preparation, including cleaning and deburring before fabrication. • Show how to cut sheet metal using hand tools such as snips, shears and hacksaws. • Demonstrate the use of CNC plasma, laser, or waterjet cutting machines for precision cutting. • Show how to bend and form sheet metal using press brakes and rolling machines. • Demonstrate the use of jigs, molds and templates for shaping curved and complex components. • Show how to align and position sheet metal components according to specifications. • Demonstrate mechanical fastening techniques using rivets, bolts and screws. • Show welding techniques such as TIG, MIG and spot welding for joining sheet metal parts. • Demonstrate soldering and brazing techniques for non-ferrous sheet metal joints. • Show how to secure sheet metal panels onto structural frames using adhesive bonding or fasteners. • Demonstrate the application of surface treatments such as galvanizing, powder coating, or anti-rust sprays.

	• Show how to inspect and test fabricated sheet metal components for alignment and durability. • Demonstrate minor repairs and adjustments for proper fitting of sheet metal structures.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Sheet metal snips, shears, hacksaws, calipers, scribers, CNC cutting machines, plasma cutters, press brakes, rolling machines, welding equipment (TIG, MIG, spot welding), rivet guns, soldering and brazing kits, fastening tools, surface treatment materials, measuring tapes, safety gloves, eye protection and PPE kits.	

Module 28: Assemble and Fabricate Sheet Metal Structures Using Advanced Techniques

Mapped to ICE/CON/N0524, v1.0

Terminal Outcomes:

- Demonstrate the preparation of sheet metal components for assembly.
- Show the assembly of sheet metal structures using traditional and advanced techniques.
- Demonstrate quality control measures for structural integrity and alignment.
- Show the optimization of automated welding and assembly systems.

Duration: 05:00	**Duration: 45:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the principles of sheet metal assembly and fabrication. • Describe different types of welding techniques, including MIG, TIG, spot welding and robotic welding. • Explain mechanical fastening methods such as riveting, bolting and clinching. • Describe adhesive bonding technologies for metal-to-metal and composite joining. • Explain the functioning and applications of robotic and automated welding systems. • Discuss laser alignment and precision measurement techniques in metal assembly. • Describe non-destructive testing (NDT) methods for evaluating joint integrity. • Explain metal properties and their impact on welding and joining methods. • Describe quality control parameters and troubleshooting in automated metal fabrication.	• Show how to measure, mark and cut sheet metal parts according to specifications. • Demonstrate the removal of burrs, rust and surface contaminants for proper fitting. • Show how to align and position components using jigs, clamps and fixtures. • Demonstrate the selection of appropriate joining methods based on material type and application. • Show how to use mechanical fastening methods such as riveting, bolting and clinching. • Demonstrate adhesive bonding techniques for non-welded assembly. • Show manual welding techniques such as MIG, TIG and spot welding. • Demonstrate the integration of robotic welding systems for precision and efficiency in large-scale assembly. • Show how to check for dimensional accuracy and fitment before final joining. • Demonstrate the use of laser alignment tools and digital measurement techniques. • Show how to reinforce joints with additional support structures when required. • Demonstrate non-destructive testing (NDT) techniques such as ultrasonic or X-ray inspection. • Show how to set up and calibrate robotic welding equipment for automated operations. • Demonstrate monitoring of real-time data and adjusting settings for quality control.

	• Show how to apply AI-assisted welding techniques to enhance precision and reduce material wastage. • Demonstrate troubleshooting of common issues in automated welding and assembly processes. •
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Jigs, clamps, fixtures, MIG and TIG welding machines, spot welding equipment, riveting and bolting tools, adhesive bonding kits, robotic welding systems, laser alignment tools, precision measuring instruments, ultrasonic and X-ray NDT tools, safety gear and PPE kits.	

Module 29: Apply Surface Treatments and Coatings to Sheet Metal

Mapped to ICE/CON/N0525, v1.0

Terminal Outcomes:

- Demonstrate the preparation of sheet metal surfaces for coating applications.
- Show the application of protective coatings to sheet metal.
- Ensure uniform application and proper curing of coatings.
- Enhance sheet metal properties using advanced nanotechnology-based coatings.

Duration: 05:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the principles of surface treatment and coating applications for sheet metal. • Describe different types of coatings, including paint, powder coat, anodized finishes and electroplating. • Explain the properties of nanocoatings and their advantages over conventional coatings. • Describe surface preparation techniques such as chemical cleaning, sandblasting and etching. • Explain different coating application methods, including spray, dip, electrostatic and roll-coating. • Discuss curing methods such as air drying, baking and UV exposure and their impact on coating durability. • Explain various testing methods for coating adhesion, wear resistance and environmental exposure. • Describe safety precautions for handling coating chemicals and operating application equipment. • Explain the maintenance and reapplication of protective coatings over time.	• Demonstrate the cleaning and removal of dirt, grease and oxides from metal surfaces. • Show the use of mechanical, chemical, or abrasive methods for surface preparation. • Demonstrate the application of primers and base coatings to enhance adhesion. • Show how to ensure proper surface roughness and profile before coating. • Demonstrate traditional coating methods such as painting, powder coating and anodizing. • Show the application of nanocoatings for enhanced properties like hydrophobicity and UV resistance. • Demonstrate electroplating and galvanizing to improve corrosion resistance. • Show how to coat metal surfaces with heat-reflective and self-cleaning materials. • Demonstrate the use of spray guns, dip-coating systems and automated coating equipment. • Show how to control coating thickness and uniformity for functional and aesthetic purposes. • Demonstrate the curing process using air drying, baking, or UV exposure. • Show how to inspect finished coatings for defects such as bubbles, cracks, or uneven layers. • Demonstrate the application of nano-polymer coatings for improved chemical and mechanical resistance. • Show the use of anti-fingerprint and self-healing coatings for high-traffic surfaces. • Demonstrate the integration of conductive coatings for electromagnetic

	shielding applications. • Show how to test coated surfaces for adherence, wear resistance and environmental durability.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Surface cleaning equipment, sandblasters, chemical etching tools, spray guns, dip-coating tanks, electrostatic coating systems, powder coating booths, UV curing lights, adhesion testers, thickness gauges, environmental testing chambers, safety gear and PPE kits.	

Module 30: Ensure Quality Control and Precision in Sheet Metal Fabrication

Mapped to ICE/CON/N0526, v1.0

Terminal Outcomes:

- Explain the principles and importance of quality control in sheet metal fabrication.
- Demonstrate the process of measuring and verifying dimensions using precision tools.
- Show how to conduct visual and non-destructive testing (NDT) for defect detection.
- Explain precision techniques used for accurate sheet metal fabrication.

Duration: 10:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the principles of quality control in sheet metal fabrication. • Describe different types of measurement tools such as calipers, micrometers, laser scanners and CMM. • Explain non-destructive testing (NDT) methods, including ultrasonic, X-ray and dye penetrant testing. • Discuss common defects in sheet metal fabrication, such as micro-cracks, porosity and material stress. • Explain precision cutting techniques such as CNC, laser and waterjet cutting. • Describe the role of AI-based inspection systems for real-time defect detection. • Discuss industry standards and compliance requirements such as ISO 9001 and ASME. • Explain documentation and reporting procedures for quality control records. • Describe corrective and preventive action (CAPA) methodologies in metalworking.	• Show how to measure and verify sheet metal dimensions using calipers, micrometers and CMM. • Show how to check sheet metal parts for specified tolerances and geometric accuracy. • Show how to inspect edges, bends and weld joints for consistency. • Show how to adjust fabrication processes based on measurement deviations. • Show how to visually inspect sheet metal surfaces for scratches, dents and corrosion. • Show how to conduct ultrasonic, X-ray and dye penetrant testing for weld integrity. • Show how to detect micro-cracks, porosity and structural weaknesses. • Show how to use thermal imaging techniques to assess material stress and defects. • Demonstrate the calibration and maintenance of CNC cutting, bending and punching machines. • Demonstrate how to use laser and waterjet cutting for precision edge finishing. • Demonstrate the use of AI-based quality inspection systems for real-time defect detection. • Demonstrate how to optimize robotic welding processes to reduce defects and rework. • Show how to record inspection data and deviations in digital quality logs. • Show how to analyze production reports to identify process improvements.

	• Show how to ensure compliance with industry standards such as ISO 9001 and ASME. • Show how to implement corrective actions for recurring fabrication issues.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Calipers, micrometers, coordinate measuring machines (CMM), laser scanners, ultrasonic testing equipment, X-ray inspection systems, dye penetrant testing kits, thermal imaging cameras, CNC machines, laser and waterjet cutters, robotic welding systems, AI-based inspection software and digital quality control logs.	

Module 31: Assemble Aluminium Formwork Systems

Mapped to ICE/CON/N0527, v1.0

Terminal Outcomes:

- Explain the process of preparing and organizing aluminium formwork components.
- Demonstrate the assembly of aluminium formwork panels into modular units.
- Explain the use of automated tools for precise alignment and positioning.
- Show how to secure and reinforce aluminium formwork structures for stability.

Duration: 05:00	**Duration: 15:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the fundamentals of aluminium formwork (Mivan shuttering) systems. • Describe the components and interlocking mechanisms of modular aluminium formwork. • Discuss the principles of alignment and positioning in formwork assembly. • Explain the tools and equipment used for assembling aluminium panels. • Describe laser-guided and automated alignment techniques. • Explain hydraulic and pneumatic adjustment methods for precise positioning. • Discuss pre-installation checks for formwork stability and reinforcement spacing. • Explain the importance of modular assembly for efficient site installation.	• Demonstrate how to inspect and sort formwork panels based on design specifications. • Show how to transport and position panels using mechanical lifting aids. • Demonstrate how to align formwork panels according to layout drawings. • Show how to ensure interlocking and secure connections between panels. • Demonstrate how to align panels using manual and mechanical positioning techniques. • Show how to connect panels using locking pins, wedges and tie rods for stability. • Demonstrate how to verify interlocking mechanisms to prevent misalignment. • Show how to ensure proper joint sealing to prevent concrete leakage. • Demonstrate how to operate laser alignment systems for vertical and horizontal accuracy. • Show how to adjust formwork panels using hydraulic and pneumatic positioning tools. • Demonstrate how to integrate digital levelling sensors for real-time monitoring. • Show how to ensure proper spacing for reinforcement bars and concrete pouring. • Demonstrate how to inspect completed formwork modules for alignment accuracy. • Show how to adjust panel spacing to accommodate reinforcement bars. • Demonstrate how to verify that all fasteners and support systems are securely attached. • Show how to verify panel dimensions,

	surface finish and locking mechanisms before assembly. • Demonstrate how to inspect automated alignment and positioning tool calibration for precision. • Show how to conduct a trial assembly to check panel fitment before final installation.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Laser alignment systems, hydraulic and pneumatic positioning tools, digital levelling sensors, mechanical lifting aids, locking pins, wedges, tie rods, precision measuring instruments and trial assembly kits.	

Module 32: Install and Secure Aluminium Formwork on Construction Sites

Mapped to ICE/CON/N0528, v1.0

Terminal Outcomes:

- Explain the principles and benefits of Mivan aluminium formwork technology.
- Demonstrate the process of site preparation and positioning formwork panels.
- Show how to assemble and secure Mivan aluminium formwork components.
- Explain the importance of applying treatments and reinforcements to formwork.
- Demonstrate the process of inspecting and finalizing aluminium formwork installation.

Duration: 05:00	**Duration: 45:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the principles of Mivan aluminium formwork technology and its advantages over conventional shuttering. • Describe the different components of Mivan formwork, including panels, beams, decks, kickers, pins and wedges. • Explain the methods for handling, assembling and securing aluminium formwork panels. • Discuss techniques for alignment, leveling and bracing to ensure structural stability. • Explain the application and benefits of form release agents to prevent concrete adhesion. • Describe troubleshooting methods for common issues like deflection, leakage, or misalignment. • Explain the integration of service conduits and embedded components within the formwork. • Discuss procedures for final inspection and necessary adjustments before pouring concrete. • Explain the operation and usage of mechanized lifting tools for positioning aluminium panels.	• Show how to prepare the site by ensuring clean, level and stable ground conditions. • Show how to transport and handle Mivan aluminium panels using safe lifting techniques. • Show how to position formwork panels accurately according to construction drawings and alignment marks. • Show how to interlock panels securely using tie rods, pins, wedges and props. • Show how to install formwork supports, kicker plates and braces for stability. • Show how to ensure proper vertical and horizontal alignment using laser-guided tools. • Show how to apply release agents to prevent concrete adhesion to aluminium panels. • Show how to check and reinforce joints and panel connections to prevent leakage. • Show how to integrate service conduits, openings and inserts within the formwork system. • Show how to verify the rigidity and strength of the installed formwork before concrete pouring. • Show how to conduct final alignment checks and adjustments using precision measuring tools. • Show how to confirm compliance with construction drawings and load-bearing requirements. • Show how to check panel-to-panel connections, tie rods and bracing systems for stability. • Show how to use laser alignment tools to

	ensure proper verticality and leveling. • Show how to verify the sealing of form joints to prevent concrete leakage and misalignment.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Mivan aluminium formwork panels, tie rods, pins, wedges, kicker plates, laser alignment tools, measuring tapes, precision levels, mechanical lifting tools, bracing systems, safety harnesses, form release agents and inspection gauges.	

Module 33: Perform Concrete Pouring and Removal of Aluminium Framework

Mapped to ICE/CON/N0529, v1.0

Terminal Outcomes:

- Explain the steps for preparing formwork before concrete pouring.
- Demonstrate the process of executing concrete pouring operations.
- Explain curing methods and the importance of monitoring concrete strength.
- Show how to safely remove aluminium formwork without damaging the concrete structure.

Duration: 20:00	**Duration: 30:00**
Theory – Key Learning Outcomes	**Practical – Key Learning Outcomes**
• Explain the properties of self-compacting concrete (SCC) and traditional concrete mixtures. • Describe the methods of concrete pouring, flow control and vibration techniques. • Discuss the importance of uniform compaction and air pocket removal for structural strength. • Explain different curing processes, including moist curing, membrane curing and steam curing. • Describe stripping time considerations for walls, slabs, beams and columns based on concrete strength. • Explain safe dismantling techniques to avoid concrete surface damage or cracking. • Discuss the use of hydraulic jacks, lever bars and extractors for formwork removal. • Describe common concrete defects such as honeycombing, cracks and uneven finishes. • Explain post-removal surface treatment and finishing techniques for a smooth appearance.	• Show how to inspect and ensure formwork is secured, aligned and free from gaps before pouring. • Show how to apply form release agents to prevent concrete adhesion to aluminium panels. • Show how to check for installed reinforcements, service conduits and embedded components. • Show how to assess concrete mix consistency and workability before pouring. • Show how to pour concrete uniformly using pumps or direct discharge, ensuring proper flow. • Show how to use vibrators (mechanical or needle) to remove air pockets and enhance strength. • Show how to monitor concrete consistency, setting time and surface level during pouring. • Show how to cover and protect freshly poured concrete from premature drying and shrinkage. • Show how to apply moist curing methods or chemical curing compounds for strength development. • Show how to conduct early-stage strength tests to determine safe removal timing. • Show how to monitor form stability and alignment during concrete vibration. • Show how to check concrete strength and curing progress before dismantling the formwork. • Show how to loosen and remove panels, tie rods and bracings in a sequence to avoid damage. • Show how to use panel extractors,

	hydraulic jacks, or manual tools to detach formwork. • Show how to inspect concrete surfaces for defects and carry out necessary touch-ups.
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
Concrete pumps, mechanical vibrators, form release agents, hydraulic jacks, lever bars, panel extractors, curing compounds, water sprayers, strength testing kits and precision measuring tools.	

On-the-Job Training

Mapped to Construction Fabricator, v 1.0

All the On-the-Job Training Program must be conducted only at On-Site of relevant Industry. The details mentioned below are NOS wise Terminal Outcomes of OJT Period.

ICE/CON/N0501	**Identify Construction Building Materials and Components**
Mandatory OJT duration (in Hours)	**30:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Identify and classify construction materials (metals, non-metals, aggregates, concrete, wood, polymers) at an actual construction site. • Inspect materials for defects such as cracks, deformation, corrosion, improper curing, and dimensional inaccuracies. • Verify material specifications using datasheets, IS codes, labels, and supplier documentation. • Handle and store materials safely using site equipment like trolleys, forklifts, and racks. • Recognize structural components (beams, columns, trusses, panels) from drawings and match them with site materials. • Assist in site-level documentation of received materials, recording shortages and quality deviations. • Coordinate with storekeepers and site engineers for material issuance, tagging, stacking, and traceability.	
ICE/CON/N0503	**Plan and Execute Masonry Layouts and Foundations**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in laying bricks/blocks maintaining alignment, plumb, joints, and mortar consistency. • Mix and place mortar as per instruction ensuring workable mix and proper joint thickness. • Support construction of corners, openings, and reinforcement zones. • Identify defects such as bulging, misalignment, and uneven joints during execution.	
ICE/CON/N0530	**Construct Masonry Walls and Blocks**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in laying bricks/blocks maintaining alignment, plumb, joints, and mortar consistency. • Mix and place mortar as per instruction ensuring workable mix and proper joint thickness. • Support construction of corners, openings, and reinforcement zones. • Identify defects such as bulging, misalignment, and uneven joints during execution.	

ICE/CON/N0504	**Construct and Assemble Masonry Staircases**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in marking staircase dimensions including rise, tread, landing, and slope. • Support installation of formwork and reinforcement for masonry staircases. • Handle masonry units for step formation and alignment. • Maintain accuracy in levels and layout of staircase geometry.	
ICE/CON/N0505	**Apply Plastering and Finishing Techniques**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in surface preparation (dusting, slurry application, cleaning) prior to plastering. • Handle tools such as trowels, floats, and screeds for basic plaster application. • Maintain even thickness and smooth finish in plaster through guided practice. • Identify surface defects such as cracks, hollowness, and uneven patches.	
ICE/CON/N0506	**Install and Maintain Masonry Paving Systems**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in surface preparation (dusting, slurry application, cleaning) prior to plastering. • Handle tools such as trowels, floats, and screeds for basic plaster application. • Maintain even thickness and smooth finish in plaster through guided practice. • Identify surface defects such as cracks, hollowness, and uneven patches.	
ICE/CON/N0507	**Implement Advanced Construction Masonry Techniques**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Observe and assist in techniques such as cavity walls, reinforced masonry, and composite masonry. • Handle special blocks (AAC, CLC, hollow) and observe their installation patterns. • Support preparation of reinforcement cages in enhanced masonry applications. • Maintain quality checks as instructed during advanced masonry work.	

ICE/CON/N0508	**Prepare and Construct Timber Frameworks**
Mandatory OJT duration (in Hours)	**05:00**

Terminal Outcomes:

During the OJT period, the candidate will be able to:

- Interpret timber framework drawings by identifying dimensions, members, joints, and support details as per site requirements.
- Select appropriate timber sections based on grade, moisture content, straightness, and load-bearing requirements.
- Carry out measurement and marking using appropriate tools (tape, square, chalk line, spirit level) to prepare layout for frames.
- Cut and shape timber components accurately using saws, chisels, planes, and power tools as applicable.
- Assemble timber framework members using nails, screws, dowels, brackets, and joinery techniques as per PC requirements.
- Install vertical and horizontal structural studs maintaining plumb, level, and alignment using levelling tools.
- Ensure structural stability by fitting braces, noggings, and stiffeners as per instructions.
- Inspect and correct defects such as warping, misalignment, gaps, improper connections, and surface damage.

ICE/CON/N0509	**Construct Wooden Frames for Structural Elements**
Mandatory OJT duration (in Hours)	**05:00**

Terminal Outcomes:

During the OJT period, the candidate will be able to:

- Read construction drawings for wooden frames used in doors, windows, partitions, beams, and structural supports.
- Identify and select suitable timber (size, species, treatment, load rating) required for structural framing.
- Prepare frame components (studs, head plates, sill plates, jambs, braces) by cutting and planning to the required dimensions.
- Perform accurate joinery techniques such as lap joints, butt joints, mortise-tenon, and screw-fastened joints according to specifications.
- Assemble wooden frames ensuring dimensional accuracy, squareness, and rigidity using clamps and measuring tools.
- Install frames at site locations with correct anchoring to masonry, RCC, or metal structures using fasteners and brackets.
- Align and level frames vertically and horizontally using spirit levels, laser levels, plumb bobs, and wedges.
- Check for structural stability by ensuring proper support, bracing, and load path continuity.
- Apply surface preparation (sanding, edge finishing, priming) where required prior to finishing or installation.
- Conduct quality checks for uniform gaps, joint strength, verticality, alignment, and absence of surface defects.

ICE/CON/N0510	**Install Interior Wooden Partitions and Panels**
Mandatory OJT duration (in Hours)	**10:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in measuring and marking for interior wood partition layout. • Handle wooden boards, studs, frames, and fasteners safely on-site. • Support installation of wooden panels ensuring alignment and joinery correctness. • Observe and assist in acoustic, fire-resistant, and decorative panel installation techniques.	
ICE/CON/N0511	**Assemble and Dismantle Shuttering for Concreting**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in measuring, cutting, and assembling timber shuttering components. • Support installation of formwork for slabs, beams, and columns. • Apply release agents under supervision to prevent concrete sticking. • Help dismantle shuttering components safely without damaging concrete..	
ICE/CON/N0512	**Construct and Install Wooden Structural Features**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in fabrication of wooden frames, beams, and supports as per drawings. • Handle joinery components like dowels, adhesives, screws, and brackets. • Support installation of load-bearing wood structures on-site. • Participate in inspection of wooden components for warping, cracks, or defects.	
ICE/CON/N0513	**Plan and Execute Metal Fabrication**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Interpret basic fabrication drawings under supervision. • Assist in cutting, bending, drilling, and grinding metal components. • Observe CNC, plasma, and laser-cutting operations in real settings. • Support pre-welding preparation including surface cleaning and alignment.	

ICE/CON/N0514	**Cut, Bend and Assemble Reinforcement Bars**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in bar cutting, bending, and tying using site tools. • Identify rebar codes, diameters, spacing, and bar bending schedules. • Support assembling reinforcement cages for beams, slabs, and columns. • Follow safety practices during rebar handling.	
ICE/CON/N0515	**Install and Weld Metal Structural Components**
Mandatory OJT duration (in Hours)	**10:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in positioning and aligning structural steel elements on-site. • Observe welding operations (MIG/TIG/Arc) and support the welder. • Handle tools for grinding, clamping, and surface preparation. • Conduct basic post-weld inspection for continuity and defects.	
ICE/CON/N0516	**Apply Surface Coatings and Treatments**
Mandatory OJT duration (in Hours)	**10:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in cleaning, sanding, and preparing metal surfaces for coating. • Observe and support application of primer, anti-rust coatings, and protective paints. • Maintain tools and storage conditions for coating materials. • Identify coating defects like blistering, peeling, or uneven thickness.	
ICE/CON/N0517	**Install Energy-Efficient Metal Cladding Systems**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in installation of insulated metal cladding panels. • Support alignment, joint sealing, and fastening of cladding systems. • Identify thermal insulation materials and their handling procedures. • Perform basic sealing tasks to improve building envelope efficiency.	
ICE/CON/N0518	**Prepare, Pour and Cure Concrete Structures**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in batching, mixing, and transporting concrete on site. • Support placement of concrete ensuring even spreading and compaction. • Observe curing techniques such as ponding, covering, and continuous wetting. • Identify segregation, honeycombing, and bleeding defects.	

ICE/CON/N0519	**Perform Concreting for Structural Elements**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in pouring concrete for slabs, beams, columns, and foundations. • Support vibrating and compacting concrete using mechanical equipment. • Monitor workability and maintain placement sequence. • Report quality deviations during concreting operations.	
ICE/CON/N0520	**Carry Out Reinforced Concrete Works**
Mandatory OJT duration (in Hours)	**10:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in placing rebar and preparing reinforcement zones. • Support formwork preparation, cleaning, and alignment before concrete placement. • Observe concreting sequence in RC works for structural components. • Help in executing curing and protection of RC structures.	
ICE/CON/N0521	**Repair and Restore Concrete Surfaces**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in identifying cracks, spalling, and surface defects. • Support application of repair mortars, bonding agents, and patch materials. • Help in chiseling, cleaning, and preparing damaged surfaces for repair. • Observe restoration techniques such as micro-concreting or grouting.	
ICE/CON/N0522	**Construct and Install Precast Concrete Structures**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in lifting, placing, and aligning precast elements. • Support grouting, anchoring, and final positioning at the site. • Handle lifting tools, cranes, and rigging equipment safely under supervision. • Inspect joint connections and surface finishes.	
ICE/CON/N0523	**Cut, Shape and Install Sheet Metal Structures**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in cutting, bending, and shaping sheet metals as per design. • Support installation of sheet metal ducts, panels, or cladding. • Handle precision tools for measuring, marking, and alignment. • Inspect sheet metal structures for accuracy and finish.	

ICE/CON/N0524	**Assemble and Fabricate Sheet Metal Structures Using Advanced Techniques**
Mandatory OJT duration (in Hours)	**10:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in assembling precision sheet metal components. • Observe advanced fabrication tools such as CNC laser, waterjet, or robotics. • Perform basic fastening using rivets, bolts, welds, and adhesives. • Inspect fabricated assemblies for tolerance compliance.	
ICE/CON/N0525	**Apply Surface Treatments and Coatings to Sheet Metal**
Mandatory OJT duration (in Hours)	**10:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in applying protective coatings to sheet metal surfaces. • Support surface preparation using grinding, sanding, and cleaning. • Learn spray, brush, and dip-coating techniques. • Inspect treated surfaces for uniformity and defects.	
ICE/CON/N0526	**Ensure Quality Control and Precision in Sheet Metal Fabrication**
Mandatory OJT duration (in Hours)	**05:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in dimensional inspection using calipers, micrometers, gauges. • Support quality control checks during fabrication workflows. • Identify defects such as warping, thickness variation, and misalignment. • Document findings and report deviations to supervisors.	
ICE/CON/N0527	**Assemble Aluminium Formwork Systems**
Mandatory OJT duration (in Hours)	**10:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in sorting and preparing aluminium formwork panels. • Support assembly of components using pins, wedges, and tie rods. • Perform alignment checks using levels, laser devices, and plumb tools. • Handle formwork safely following site protocols.	
ICE/CON/N0528	**Install and Secure Aluminium Formwork on Construction Sites**
Mandatory OJT duration (in Hours)	**10:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in positioning and securing panels as per layout. • Support installation of walers, props, braces, and safety support. • Conduct joint sealing and alignment corrections. • Participate in final inspection of installed formwork.	

ICE/CON/N0529	**Perform Concrete Pouring and Removal of Aluminium Formwork**
Mandatory OJT duration (in Hours)	**10:00**
Terminal Outcomes:	
During the OJT period, the candidate will be able to: • Assist in concrete pouring for Mivan formwork with proper vibration. • Observe curing and safety practices specific to aluminium systems. • Support systematic dismantling without damaging panels. • Clean, inspect, and stack panels for further use.	

Annexure

Trainer Requirements

Minimum Educational Qualification	Specialization	Relevant Industry Experience		Preferable Training Experience	
		Years	Specialization	Years	Specialization
Post Graduation	Civil Engineering	2	Site Execution (Civil Work)	1	Site Execution (Civil Work)
OR					
Graduation	Civil Engineering	4	Site Execution (Civil Work)	1	Site Execution (Civil Work)
OR					
Diploma	Civil Engineering	6	Site Execution (Civil Work)	1	Site Execution (Civil Work)

Trainer Certification	
Domain Certification	**Platform Certification**
Recommended that the Trainer is certified for the Job Role: *"Construction Fabricator"*, mapped to the Qualification Pack: "ICE/CON/Q0501, v1.0". The minimum accepted score is 80%.	Recommended that the Trainer is certified for the Job Role: *"Trainer (VET and skills)"*, mapped to the Qualification Pack: "MEP/Q2601, v3.0". The minimum accepted score is 80%.

Assessor Requirements

Minimum Educational Qualification	Specialization	Relevant Industry Experience		Preferable Training Experience	
		Years	Specialization	Years	Specialization
Post Graduation	Civil Engineering	2	Site Execution (Civil Work)	1	Site Execution (Civil Work)
OR					
Graduation	Civil Engineering	4	Site Execution (Civil Work)	1	Site Execution (Civil Work)
OR					
Diploma	Civil Engineering	6	Site Execution (Civil Work)	1	Site Execution (Civil Work)

Assessor Certification	
Domain Certification	**Platform Certification**
Recommended that the Assessor is certified for the Job Role: *"Construction Fabricator"*, mapped to the Qualification Pack: "ICE/CON/Q0501, v1.0". The minimum accepted score is 80%.	Recommended that the Assessor is certified for the Job Role: *"Assessor (VET and skills)"*, mapped to the Qualification Pack: "MEP/Q2701, v3.0". The minimum accepted score is 80%.

Assessment Strategy

This section includes the processes involved in identifying, gathering and interpreting information to evaluate the Candidate on the required competencies of the program.

1. **Assessment System Overview:**

   Assessment is done through ICES affiliated Assessment Agencies. Assessors are trained & certified by ICES after Training of Assessor (ToA) program. Assessments are conducted to gauge and assess the trainee's skill and knowledge competency in the specified areas.

   The assessment will have both theory, practical and viva components as per ratio specified in each NOS for **Construction Fabricator** job role.

   During the practical task, trainees are assessed on their workmanship, quality of finished product and time management. They will be graded for all their assessments based on the approved assessment strategy which is signed off by ICES. The Assessor submits an assessment plan to ICES prior to assessments.

   The assessment plan contains the following information:

   - What will be assessed, i.e. the competency based on each NOS based on theory, practical and viva questions
   - How assessment will occur i.e. methods of assessment
   - When the assessment will occur
   - Duration of assessment
   - Where the assessment will take place i.e. context of the assessment (workplace/simulation)
   - The criteria for decision making i.e. those aspects that will guide judgments
   - Where appropriate, any supplementary criteria are used to make a judgment on the level of performance.

   ICES will be monitoring thoroughly the complete Assessment process.

2. **Testing Environment:**

   - Training partner shares the batch start date and end date, number of trainees and the job role.
   - Assessment will be fixed for a day after the end date of training. It could be next day or later. Assessment will be conducted at the training venue/test center only.
   - The knowledge/theory assessments are conducted with proper seating arrangements with enough space between the candidates to prevent mal practicing.
   - Question set for Theory and Practical will be distributed to each candidate by the Assessor.
     - Theory testing will include MCQ type questions, pictorial questions etc. which will test the trainee on his theoretical knowledge of the subject.
     - Practical assessments will be conducted in the approved test centers. The training provider will ensure adequate tools and materials are available to conduct the practical test.
     - Viva Testing will be conducted during or post to the practical assessment by the assessor concerned. This Viva Assessment is applicable to understand the outcomes from OJT attended by the concerned candidate.
   - One (1) Assessor is eligible to conduct assessments of a batch of maximum 30 candidates.

- The assessment must comprise of two components, namely:
  - Knowledge assessment (Theory and Viva assessment)
  - Skill assessment (Practical / Hands-on Skill assessment)

3. Mode of assessment

- Demonstration/Practical Performance /Skill Assessment
- Synoptic multiple-choice question test for Theory Assessment
- Viva for Knowledge Assessment (Applicable to note the outcomes from OJT only)

4. Performance/skill assessment:

- The performance/skill assessment will be conducted through demonstration/practical
- For the practical test trainees are assessed through a given task, which they have to complete correctly for them to be marked as passed.
- The assessment is conducted in a simulated working environment. Due to this fact, the assessors must note that the naturally occurring evidence of competence is unavailable or infrequent. Simulation must be undertaken in a Realistic Working Environment which provides an environment that replicates the key characteristics of the workplace in which the skill to be assessed is normally employed.

5. Knowledge Assessment:

- The knowledge assessments are conducted through Theory (written) Test and Viva Test
- Synoptic test is used for this. It is an MCQ (Multiple Choice Question) test which is prepared externally and externally marked, meaning by agency having no link with training partners.
- The Viva test will be conducted by the assessor in the oral mode considering the communication and domain understanding of skills of trainees.
- The assessment strategy, weightage and duration of assessment for **Construction Fabricator** is summarized below

Assessment Type	Formative or Summative	Strategies	Weightage	Duration (hours)
Knowledge	Summative	MCQ	30	1 hour
Knowledge	Summative	Viva	10	1 hour
Skill	Summative	Structured practical Task	60	7 hours

6. Assessment Quality Assurance levels/Framework

- ICES has developed assessment criteria framework for each Qualification pack as per National Occupational Standards. The criteria framework includes weightages/marks for each criterion under knowledge and skill. The criteria ensure quality assurance as they ensure valid, consistent and fair assessments at all locations. Issued to the affiliated Assessment body. The Assessment Body develops questions based on ICES's approved assessment criteria.
- The training partner will intimate the time of arrival of the assessor and time of leaving the venue. Random spot checks/audit may be conducted by ICES to monitor assessment.
- Continuous Monitoring through virtual and In-person mode are conducted to ensure the assessment is conducted as per stipulated process
- Process and Technical audit of assessment batches by quality team are conducted to avoid errors in assessment process
- A well -defined comprehensive framework of NON-COMPLIANCE MATRIX is defined and implemented to identify the non-compliance made by assessor and AA and punitive actions are taken correspondingly.

- The capacity building sessions are conducted regularly for assessors and assessment agencies to update them about best practices in assessment

7. Types of evidence or evidence-gathering protocol:

- Evidence in the form of answer sheets in case of knowledge assessments (Theory only) is collected.
- For Practical and Viva assessments videos and photographs are prepared as evidence. These are submitted by the assessor to the assessment agency. ICES does random checks of the same with the participant/ trainee's ID and ascertains authenticity and validity of assessments.
- Post Assessment, the evidence are uploaded by Assessor to assessment agency and further assessment agency to ICES as per stipulated TAT
- Evidence are broadly photographic and video graphics in nature (Geo-Tagged)
- Results along with evidence to be submitted to ICES by the concerning Assessment Agency in the prescribed format and on Digital Format and Physical Format (As required)
- Results to be uploaded on SIDH and other relevant portals for collective data management.

8. Method of verification or validation:

- The process and technical audit of assessment batches are done by Awarding Body
- Attendance of each candidate is verified and it is ensured that only those candidates are assessed by assessors who are meeting the stipulated minimum percentage of attendance
- The result of each candidate is verified; it is verified that that result on SIP is matched with respect to summary sheet submitted by AAs
- Under detailed technical audit for sample batches, the knowledge and skill assessment results for each candidate are checked in technical aspect.
- All the evidence of batches are preserved on server of Awarding Body digital platform

9. On the Job:

- On job training (OJT), candidates undergo training and leaning at actual workplace for a fixed period of time and a certain weightage of assessment is allocated out of total skill weightage of Qualification Pack for undergoing OJT as stipulated by ICES. This OJT score and assessors' end point score are combined to arrive at final Marking/grading of trainees' skill test. The OJT score is determined by Supervisor / Engineer / other authorized head of departments of relevant industry under which candidates undergo on job training.
- The Assessment is subject to take place only after submission of OJT data (in case of STT only) approved by concerned industry and training provider.
- The Hard copy of the OJT report (on trainings, outcomes, exposures learnt and feedback certified by Supervisor / Engineer / other authorized head of departments of relevant industry) will be submitted to the Assessor by the concerned candidate on the Assessment date only, failing which the candidate may not be allowed for attending the Assessment.
- As OJT is mandatory for this QP, the TP should ensure the correct submission of all relevant reports pertaining to OJT of each trained candidate. The Assessment agency is responsible for collecting all the relevant information and submit the same to ICES in future (if required).

References

Glossary

Term	Description
Sector	Sector is a conglomeration of different business operations having similar business and interests. It may also be defined as a distinct subset of the economy whose components share similar characteristics and interests.
Sub-sector	Sub-sector is derived from a further breakdown based on the characteristics and interests of its components.
Occupation	Occupation is a set of job roles, which perform similar/ related set of functions in an industry.
Job role	Job role defines a unique set of functions that together form a unique employment opportunity in an organisation.
Occupational Standards (OS)	OS specify the standards of performance an individual must achieve when carrying out a function in the workplace, together with the Knowledge and Understanding (KU) they need to meet that standard consistently. Occupational Standards are applicable both in the Indian and global contexts.
Performance Criteria (PC)	Performance Criteria (PC) are statements that together specify the standard of performance required when carrying out a task.
National Occupational Standards (NOS)	NOS are occupational standards which apply uniquely in the Indian context
Qualifications Pack (QP)	QP comprises the set of OS, together with the educational, training and other criteria required to perform a job role. A QP is assigned a unique qualifications pack code.
Unit Code	Unit code is a unique identifier for an Occupational Standard, which is denoted by an 'N'
Unit Title	Unit title gives a clear overall statement about what the incumbent should be able to do.
Description	Description gives a short summary of the unit content. This would be helpful to anyone searching on a database to verify that this is the appropriate OS they are looking for.
Scope	Scope is a set of statements specifying the range of variables that an individual may have to deal with in carrying out the function which have a critical impact on quality of performance required.
Knowledge and Understanding (KU)	Knowledge and Understanding (KU) are statements which together specify the technical, generic, professional and organisational specific knowledge that an individual needs in order to perform to the required standard.
Organisational Context	Organisational context includes the way the organisation is structured and how it operates, including the extent of operative knowledge managers have of their relevant areas of responsibility.
Technical Knowledge	Technical knowledge is the specific knowledge needed to accomplish specific designated responsibilities.
Core Skills/ Generic Skills (GS)	Core skills or Generic Skills (GS) are a group of skills that are the key to learning and working in today's world. These skills are typically needed in any work environment in today's world. These skills are typically needed in any work environment. In the context of the OS, these include communication related skills that are applicable to most job roles.
Electives	Electives are NOS/set of NOS that are identified by the sector as contributive to specialization in a job role. There may be multiple electives within a QP for each specialized job role. Trainees must select at least one elective for the successful completion of a QP with Electives.
Options	Options are NOS/set of NOS that are identified by the sector as additional skills. There may be multiple options within a QP. It is not mandatory to select any of the options to complete a QP with Options.

Acronyms and Abbreviations

Acronym	Description
NOS	National Occupational Standard(s)
NSQF	National Skills Qualification Framework
QP	Qualification Pack
TVET	Technical and Vocational Education and Training
MSDE	Ministry of Skill Development and Entrepreneurship
NCVET	National Council for Vocational Education and Training
NSDC	National Skill Development Corporation
ICES	Integrated Council for Entrepreneurship and Skilling (erstwhile The Institution of Civil Engineers Society)
AB	Awarding Body
AA	Assessment Agency
TP	Training Partner
TC	Training Centre
ITI	Industrial Training Institute
ISCO	International Standard Classification of Occupations
NCO	National Classification of Occupations
NCrF	National Credit Framework
NEP	New Education Policy
Q-File	Qualification File
MC	Model Curriculum
PC	Performance Criteria
KU	Knowledge and Understanding
GS	Generic Skills
PMKVY	Pradhan Mantri Kaushal Vikas Yojana
DDUGKY	Deen Dayal Upadhyaya Grameen Kaushalya Yojana
STT	Short Term Training
RPL	Recognition of Prior Learning
NAPS	National Apprenticeship Promotion Scheme
NQR	National Qualification Register
OJT	On the Job Training
NSQC	National Skill Qualification Committee
IS	Indian Standard
BBS	Bar Bending Schedule
RCC	Reinforced Cement Concrete
AAC	Autoclaved Aerated Concrete

CLC	Cellular Lightweight Concrete
PVC	Polyvinyl Chloride
HDPE	High-Density Polyethylene
GI	Galvanized Iron
MS	Mild Steel
SS	Stainless Steel
FRP	Fiber Reinforced Plastic
HSS	High-Speed Steel
MDF	Medium Density Fibreboard
HDF	High Density Fibreboard
WBP	Waterproof Boiling Proof (Plywood Grade)
MR	Moisture Resistant
CP	Commercial Plywood
LVL	Laminated Veneer Lumber
OSB	Oriented Strand Board
CNC	Computer Numerical Control
MIG	Metal Inert Gas Welding
TIG	Tungsten Inert Gas Welding
SMAW	Shielded Metal Arc Welding
GMAW	Gas Metal Arc Welding
GTAW	Gas Tungsten Arc Welding
FCAW	Flux Cored Arc Welding
NDT	Non-Destructive Testing
UT	Ultrasonic Testing
RT	Radiographic Testing
PT	Penetrant Testing
MT	Magnetic Particle Testing
W/C Ratio	Water–Cement Ratio
OPC	Ordinary Portland Cement
PPC	Pozzolanic Portland Cement
ISMC	Indian Standard Medium Channel
ISMB	Indian Standard Medium Beam
ISJB	Indian Standard Junior Beam
CIS	Cast-in-Situ
PCC	Plain Cement Concrete
AFS	Aluminium Formwork System
WTF	Wall Tie Fixture
DFC	Deck Formwork Component

TFP	Tie Rod Fixing Pin
EHS	Environment, Health and Safety
SOP	Standard Operating Procedure
PPE	Personal Protective Equipment
TRA	Task Risk Assessment
JSA	Job Safety Analysis
QA	Quality Assurance
QC	Quality Control
HIRA	Hazard Identification and Risk Assessment
HPT	High Potential Task
BOQ	Bill of Quantities
DPR	Detailed Project Report
CAD	Computer-Aided Design
DWG	Drawing File Format
CL	Center Line
FGL	Finished Ground Level
FFL	Finished Floor Level
DL	Datum Level
RL	Reduced Level