



कौशल विकास और
उद्यमशीलता मंत्रालय
MINISTRY OF
SKILL DEVELOPMENT
AND ENTREPRENEURSHIP



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Model Curriculum

QP Name: 5D BIM Planner – Cost Planning and Monitoring

QP Code: CON/Q2107

Version: 1.0

NSQF Level: 6.0

Model Curriculum Version: 1.0

Construction Skill Development Council of India || Tower 4B, DLF Corporate Park, 201&, 202 4B,
Mehrauli-Gurgaon Rd, DLF Phase 3, Gurugram, Haryana 122002



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Training Parameters

Sector	Construction
Sub-Sector	Real Estate and Infrastructure Construction
Occupation	Building Information Modelling (BIM)
Country	India
NSQF Level	6.0
Aligned to NCO/ISCO/ISIC Code	NCO-2015/2142.9900
Minimum Educational Qualification and Experience	<p>Pursuing first year of 2-year PG program after completing 3-year UG degree</p> <p>OR</p> <p>Completed 4-year UG (in case of 4-year UG with honours/ honours with research)</p> <p>OR</p> <p>Completed 3-Year UG Degree with 1-year relevant experience</p> <p>OR</p> <p>Completed 2 year of diploma after 12th with 2-year relevant experience</p> <p>OR</p> <p>Previous relevant Qualification of NSQF Level 5.5 with 1.5-year relevant experience</p> <p>OR</p> <p>Previous relevant Qualification of NSQF Level 5 with 3-year relevant experience</p>
Pre-Requisite License or Training	NA
Minimum Job Entry Age	21 Years
Last Reviewed On	31/08/2023
Next Review Date	31/08/2026
NSQC Approval Date	31/08/2023
QP Version	1.0
Model Curriculum Creation Date	31/08/2023



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Model Curriculum Valid Up to Date	31/08/2026
Model Curriculum Version	1.0
Minimum Duration of the Course	630 Hours
Maximum Duration of the Course	630 Hours



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Program Overview

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

Training Outcomes

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

- Describe the process of performing 5D project planning.
- Describe the process of performing construction simulation and cost management for 5D projects.
- Describe the process of performing 5D progress tracking and reporting.
- Elucidate ways to manage workplace for safe and healthy work environment.

Compulsory Modules

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

NOS and Module Details	Theory Duration	Practical Duration	On-the-Job Training Duration (Mandatory)	On-the-Job Training Duration (Recommended)	Total Duration
CON/N2103: Perform 5D project planning NOS Version- 1.0 NSQF Level- 6.0	60:00	90:00	60:00	00:00	210:00
Module 1: Introduction to the role of a 5D BIM Planner – Cost Planning and Monitoring	05:00	00:00	00:00	00:00	05:00
Module 2: Process of performing 5D project planning	55:00	90:00	60:00	00:00	215:00
CON/N2105: Perform construction simulation and cost management for 5D projects NOS Version- 1.0 NSQF Level- 6.0	30:00	60:00	30:00	00:00	120:00
Module 3: Process of performing construction simulation and cost management for 5D projects	30:00	60:00	30:00	00:00	120:00
CON/N2122: Perform 5D progress tracking and reporting NOS Version- 1.0 NSQF Level- 6.0	45:00	75:00	60:00	00:00	180:00



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Module 4: Process of performing 5D progress tracking and reporting	45:00	75:00	60:00	00:00	180:00
CON/N9003: Manage health and safety at the workplace NOS Version No. 1.0 NSQF Level -5	15:00	15:00	0:00	00:00	30:00
Module 5: Managing Health and Safety at the Workplace	15:00	15:00	0:00	00:00	30:00
DGT/VSQ/N0103: Employability Skills NOS Version- 1.0 NSQF Level- 5	90:00	00:00	00:00	00:00	90:00
Module 6: Employability Skills	90:00	00:00	00:00	00:00	90:00
Total Duration	240:00	240:00	150:00	00:00	630:00



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Module Details

Module 1: Introduction to the role of a 5D BIM Planner – Cost Planning and Monitoring

Mapped to CON/N 2103, v1.0

Terminal Outcomes:

- Discuss the job role of a 5D BIM Planner – Cost Planning and Monitoring.

Duration: 05:00	Duration: 00:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none">• Describe the size and scope of the construction industry and its sub-sectors.• Discuss the role and responsibilities of a 5D BIM Planner – Cost Planning and Monitoring.• Identify various employment opportunities for a 5D BIM Planner – Cost Planning and Monitoring.	
Classroom Aids	
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films	
Tools, Equipment and Other Requirements	
NA	



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Module 2: Process of Performing 5D Project Planning

Mapped to CON/N2103, v1.0

Terminal Outcomes:

- Elucidate ways to plan 5D projects.
- Describe the process of carrying out relevant documentation.

Duration: 55:00	Duration: 90:00
<p>Theory – Key Learning Outcomes</p> <ul style="list-style-type: none"> • Elucidate the importance and practice of quantity surveying in the construction industry. • Explain the benefits of using 5D BIM solutions in comparison to traditional cost panning methods, e.g. minimizing human error. • List the appropriate software required for generating 4D/5D integrated cost loaded scheduling • Describe risk visualization with 5D BIM Modelling to improve design decisions • Describe 5D project planning process, i.e. mapping of model elements to cost items, element-based cost analysis, budgeting and preparation of bill of quantities, 5D scheduling, productivity rates and resource planning, using the BIM management software. 	<p>Practical – Key Learning Outcomes</p> <ul style="list-style-type: none"> • Show how to analyse the relevant drawings and determine the BIM construction requirements and coordinate with the BIM Coordinator to get further clarification, as required. • Demonstrate the process of carrying out the required pre-planning concerning the scope of the quantities to be quantified. • Demonstrate the use of smart automated scheduling feature in the BIM Management software to carry out 5D cost-loaded scheduling. • Demonstrate how to import or export from the relevant sources, e.g. project management software used by the organization. • Show how to extract the quantities from the BIM model. • Demonstrate how to generate the complete Bill of Quantities (BOQ) and cost estimations as per the requirement during the lifecycle of construction projects. • Demonstrate the process of carrying out appropriate documentation concerning the 5D project planning, ensuring the relevant stakeholders can access the documents.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Revit, ArchiCAD, Navisworks, Desktop	



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Module 3: Process of Performing Construction Simulation and Cost Management for 5D Projects

Mapped to CON/N2105, v1.0

Terminal Outcomes:

- Describe the process of performing 5D construction simulation.
- Describe the process of performing cost management for 5D project.

Duration: 30:00	Duration: 60:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Describe the process of automated BOQ extraction. • List the appropriate software required for understanding integrated 4D/5D BIM workflows. • Explain how to develop a budget and link to costs with the BIM model. • Explain the use of 5D modelling to improve collaboration among project stakeholders. • Explain conceptual modelling and cost planning with the use of 5D software solutions to generate cost and material estimates. • Describe BOQ/quantity take-off, cost estimation, tendering, and BIM scheduling and simulation. • Explain 5D cost management activities, i.e. cost estimation, creation of cost database, cost data mapping, creation of detailed budgets, cost and resource database, integration of custom cost database, etc. • Describe cost optimization - advanced analysis and optimization, cash flow analysis, and resource management, allocation and levelling. • Explain the 5D construction simulation. 	<ul style="list-style-type: none"> • Demonstrate how to create and export 5D simulations using the appropriate software. • Show how to compare 5D simulations to evaluate different time and cost scenarios and forecast cash flow. • Demonstrate the process of performing the resource look-ahead analysis. • Demonstrate the process of performing cash flow analysis, advanced analysis and cost optimization. • Demonstrate the process of performing element-based cost analysis. • Demonstrate the process of carrying out budgeting and preparing the Bill of Quantities (BOQ). • Show how to prepare the company cost databases (using centralized cost DB). • Demonstrate the process of carrying out smart automated 5D scheduling. • Demonstrate how to conduct critical path method and analysis.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Revit, ArchiCAD, Navisworks, Desktop	



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Module 4: Process of Performing 5D Progress Tracking and Reporting Mapped to CON/N2122, v1.0

Terminal Outcomes:

- Describe the process of performing 5D progress tracking and reporting.

Duration: 45:00	Duration: 75:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> Explain the benefit of using BIM for managing construction projects, e.g. real-time insights into project progress and cost. List the appropriate software required for understanding integrated 4D/5D BIM workflows. Describe the architectural, structural, installation systems modelling, etc. Describe the building systems, specifications and construction methods. Describe lifecycle management of BIM models. Discuss the relevant industry standards and codes. Explain the importance and process of 5D progress tracking. Explain the 5D reporting requirements. Explain the use of relevant project management software. 	<ul style="list-style-type: none"> Demonstrate how to monitor the construction progress using the 5D BIM software. Demonstrate the process of performing resource monitoring to ensure their optimum utilization with increased productivity. Demonstrate the process of performing continuous quality control and construction quality assurance. Show how to track and maintain the installation status of the project. Show how to conduct an analysis of the impact of progress on cash flow. Demonstrate how to generate confirmed interim payment certificates of the performed works. Show how to generate a confirmation of the exact amount of work performed. Show how to prepare detailed 5D task reports with cash-flow monitoring using relevant project management software. Demonstrate the process of carrying out schedule comparisons, and conducting planned vs actual analysis. Demonstrate the process of performing earned value analysis. Show how to prepare a work breakdown structure report. Demonstrate how to update the actual cost against the relevant activities. Demonstrate the process of performing executive and business intelligence (BI)



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	<p>reporting, with the tracking of key performance indicators (KPIs).</p> <ul style="list-style-type: none">• Show how to generate change orders, and time and cost impact on the project.
Classroom Aids	
Training Kit (Trainer Guide, Presentations). Whiteboard, Marker, Projector, Laptop	
Tools, Equipment and Other Requirements	
Revit, ArchiCAD, Navisworks, Desktop	



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Module 5: Managing Health and Safety at the Workplace

Mapped to CON/N9003, v1.0

Terminal Outcomes:

- Explain the importance of ensuring health and safety at the workplace.
- Discuss how to manage workplace emergencies.
- Demonstrate the use of Personal Protective Equipment (PPE).

Duration: 15:00	Duration: 15:00
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes
<ul style="list-style-type: none"> • Explain the importance of health and safety at work. • Discuss the regulations relevant to health and safety at work. • Explain the selection of appropriate PPE according to the nature of work. • Discuss the importance of regular cleaning and sanitization at work. • Explain the importance of regular workplace safety audits. • Discuss the common health and safety hazards at the workplace and the appropriate preventive measures. • Discuss the benefits of providing comprehensive training to personnel on emergency procedures. • Explain the importance of the availability of an updated first-aid kit and functioning emergency equipment at work. • Discuss the appropriate measures to be taken during different workplace emergencies. • Explain the documentation and reporting requirements concerning workplace emergencies. 	<ul style="list-style-type: none"> • Demonstrate how to use the appropriate PPE according to the nature of work. • Demonstrate the use of relevant emergency equipment, e.g. use of fire extinguishers to extinguish different types of fire. • Demonstrate how to provide first aid for different types of injuries or medical emergencies.
Classroom Aids:	
Training Kit - Trainer Guide, Projector/LED Monitor, Computer/ Laptop, Presentations, Black/ Whiteboard, Marker, Projector, Video	



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Tools, Equipment, and Other Requirements

Safety Gloves, Face Mask, Soap/ Hand Sanitizer, Safety goggles, Fire Extinguishers, Sand buckets, Fire prevention kit, First Aid box, Safety Tags, Safety Notice Board



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Module 6: Employability Skills

Mapped to DGT/VSQ/N0103, v1.0

Duration: 90:00

Key Learning Outcomes

Introduction to Employability Skills Duration: 3 Hours

After completing this programme, participants will be able to:

1. Outline the importance of Employability Skills for the current job market and future of work
2. List different learning and employability related GOI and private portals and their usage
3. Research and prepare a note on different industries, trends, required skills and the available opportunities

Constitutional values – Citizenship Duration: 1.5 Hours

4. 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
5. Demonstrate how to practice different environmentally sustainable practices

Becoming a Professional in the 21st Century Duration: 5 Hours

6. Discuss relevant 21st century skills required for employment
7. Highlight the importance of practicing 21st century skills like Self-Awareness, Behaviour 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
8. Create a pathway for adopting a continuous learning mindset for personal and professional development

Basic English Skills Duration: 10 Hours

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

Career Development & Goal Setting Duration: 4 Hours

12. Create a career development plan
13. Identify well-defined short- and long-term goals

Communication Skills Duration: 10 Hours

14. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette
15. Write a brief note/paragraph on a familiar topic



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16. Explain the importance of communication etiquette including active listening for effective communication
17. Role play a situation on how to work collaboratively with others in a team

Diversity and Inclusion Duration: 2.5 Hours

18. Demonstrate how to behave, communicate, and conduct appropriately with all genders and PwD
19. Discuss the significance of escalating sexual harassment issues as per POSH act

Financial and Legal Literacy Duration: 10 Hours

20. Discuss various financial institutions, products, and services
21. Demonstrate how to conduct offline and online financial transactions, safely and securely and check passbook/statement
22. Explain the common components of salary such as Basic, PF, Allowances (HRA, TA, DA, etc.), tax deductions
23. Calculate income and expenditure for budgeting
24. Discuss the legal rights, laws, and aids

Essential Digital Skills Duration: 20 Hours

25. Describe the role of digital technology in day-to-day life and the workplace
26. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
27. Demonstrate how to connect devices securely to internet using different means
28. Follow the dos and don'ts of cyber security to protect against cyber crimes
29. Discuss the significance of displaying responsible online behavior while using various social media platforms
30. Create an e-mail id and follow e-mail etiquette to exchange e-mails
31. Show how to create documents, spreadsheets and presentations using appropriate applications
32. utilize virtual collaboration tools to work effectively

Entrepreneurship Duration: 7 Hours

33. Explain the types of entrepreneurship and enterprises
34. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
35. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
36. Create a sample business plan, for the selected business opportunity

Customer Service Duration: 9 Hours

37. Classify different types of customers
38. Demonstrate how to identify customer needs and respond to them in a professional manner
39. Discuss various tools used to collect customer feedback
40. Discuss the significance of maintaining hygiene and dressing appropriately



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Getting ready for apprenticeship & Jobs Duration: 8 Hours

41. Draft a professional Curriculum Vitae (CV)
42. Use various offline and online job search sources to find and apply for jobs
43. Discuss the significance of maintaining hygiene and dressing appropriately for an interview
44. Role play a mock interview
45. List the steps for searching and registering for apprenticeship opportunities



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On-the-Job Training

Mapped to 5D BIM Planner – Cost Planning and Monitoring

Mandatory Duration: 150:00	Recommended Duration: 00:00
Location: On-Site	
Terminal Outcomes <ul style="list-style-type: none">• Explain the benefits of using 5D BIM solutions in comparison to traditional cost panning methods, e.g. minimizing human error.• Carry out the required pre-planning concerning the scope of the quantities to be quantified.• Carry out 5D scheduling using the smart automated scheduling feature in the BIM software.• Generate the complete Bill of Quantities (BOQ) and cost estimations as per the requirement during the lifecycle of construction projects.• Carry out appropriate documentation concerning the 5D project planning, ensuring the relevant stakeholders can access the documents.• Compare 5D simulations to evaluate different time and cost scenarios and forecast cash flow.• Perform cash flow analysis, advanced analysis and cost optimization.	



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Annexure

Trainer Requirements

Trainer Prerequisites						
Minimum Educational Qualification	Specialisation	Relevant Industry Experience		Training Experience		Remarks
		Years	Specialization	Years	Specialization	
ITI/12th	Any domain	13	Building information modelling (BIM)	0	-	
Diploma in Engineering	Civil Engineering/ Mechanical Engineering/ Manufacturing/ Mathematics/ Physics degree	10	Building information modelling (BIM)	0	-	
Graduate	Civil Engineering/ Mechanical Engineering	8	Building information modelling (BIM)	0	-	

Trainer Certification	
Domain Certification	Platform Certification
Certified for Job Role “5D BIM Planner – Cost Planning and Monitoring”, mapped to QP: “CON/Q2107, v1.0”, 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, v2.0”. The minimum accepted score as per MEPSC guidelines is 80%.



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Assessor Requirements

Assessor Prerequisites						
Minimum Educational Qualification	Specialization	Relevant Industry Experience		Training/Assessment Experience		Remarks
		Years	Specialization	Years	Specialization	
ITI/12th	Any domain	13	Building information modelling (BIM)	0	-	
Diploma in Engineering	Civil Engineering/ Mechanical Engineering/ Manufacturing/ Mathematics/ Physics degree	10	Building information modelling (BIM)	0	-	
Graduate	Civil Engineering/ Mechanical Engineering	8	Building information modelling (BIM)	0	-	

Assessor Certification	
Domain Certification	Platform Certification
Certified for Job Role “5D BIM Planner – Cost Planning and Monitoring”, mapped to QP: “CON/Q2107, v1.0”, Minimum accepted score is 80%	Certified for the Job Role: “Assessor (Vet and Skills)”, mapped to the Qualification Pack: “MEP/Q2701, v2.0”, with a minimum score of 80%.



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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:

- Batches assigned to the assessment agencies for conducting the assessment on SIP
- The batch allocation Matrix prepared for each month based on previous months' performance of AAs, which determines the quantum of Assessment which can be allocated to each AA for a month
- Post allocation of assessment, Assessment agencies send the assessment confirmation to SSC
- Assessment agency deploys the ToA certified Assessor for executing the assessment
- SSC monitors the assessment process.

2. Testing Environment:

- A combination of Theory and practical/demonstration test is deployed to assess knowledge and Skill respectively of Learners.
- Assessment is conducted at Training center in in-person/offline mode
- For Skill assessment, environment is simulated to create a realistic Working Environment that should replicate the key features of the workplace. In job roles, where it is difficult to replicate the same, the OJT assessment is implemented.
- During the practical task, trainees are assessed on their workmanship, quality of finished product, time management, etc., based on the performance criteria (PC), knowledge and understanding and their professional and soft skills as specified in the qualification pack.
- Knowledge assessment is done through closed ended questions up to level 4 and from level 5 onwards, it is mixture of open ended and closed ended questions

3. Assessment Quality Assurance levels/Framework

- Assessment criteria is developed for each QP which acts as a guide for developing question set/banks
- Sample questions aligned with Assessment criteria for each QP are developed by SSC and validated by industry
- Taking reference of Assessment criteria and Sample Questions, AAs create the question bank which is further validated by SSC
- Questions are mapped to the specified assessment criteria
- It is mandatory that Assessor and Trainer must be ToA certified & ToT Certified respectively
- Continuous Monitoring through virtual and In-person mode are conducted to ensure the assessment is conducted as per stipulated process



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- Process and Technical audit of assessment batches by quality team are conducted to avoid the 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

4. Types of evidence or evidence-gathering protocol:

- Post Assessment, the evidences are uploaded by Assessor to assessment agency and further assessment agency to SSC as per stipulated TAT
- Evidences are broadly the photographic and video graphic in nature
- Assessment agencies upload the evidence on SIP and detailed evidence on SSC digital platform (ZoHO)
- Evidences are; NOS wise-Geotagged photographs and videos of Theory Test & Practical Tasks, Attendance sheet, result summary sheet, group photographs.

5. Method of verification or validation:

- The process and technical audit of assessment batches are done by SSC
- 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 are matching with respect to summary sheet submitted by AAs
- Under detailed technical audit for sample of batches, the knowledge and skill assessment results for each candidate is checked in technical aspect.
- All the evidences of batches are preserved on server of SSC digital platform

On the Job:

- On job training (OJT), candidates undergo training and learning 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 CSDCI. 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 of company under which candidates undergo on job training.



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References

Glossary

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



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Acronyms and Abbreviations

Term	Description
QP	Qualification Pack
NSQF	National Skills Qualification Framework
NSQC	National Skills Qualification Committee
NOS	National Occupational Standards
CSDCI	Construction Skill development Council of India
MCQ	Multiple Choice Question
EHS	Environment Health and Safety