



Model Curriculum

QP Name: 4D BIM Planner – Planning & Monitoring

QP Code: CON/Q2102

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 Modeling (BIM)
Country	India
NSQF Level	6.0
Aligned to NCO/ISCO/ISIC Code	NCO-2015/2142.9900
Minimum Educational Qualification and Experience	 Pursuing first year of 2-year PG program after completing 3-year UG degree OR Completed 4-year UG (in case of 4-year UG with honours/honours with research) OR Completed 3-Year UG Degree with 1-year relevant experience OR Completed 2 year of diploma after 12th with 2-year relevant experience OR Previous relevant Qualification of NSQF Level 5.5 with 1.5-year relevant experience OR Previous relevant Qualification of NSQF Level 5.5 with 3-year
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
Model Curriculum Valid Up to Date	31/08/2026
Model Curriculum Version	1.0
Minimum Duration of the Course	600 Hours
Maximum Duration of the Course	600 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:

- Describe the process of carrying out planning and scheduling using 4D BIM.
- Elucidate ways to optimise schedule and track project progress using 4D BIM.
- Elucidate ways to manage the workplace for a 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/N2101: Carry out planning and scheduling using 4D BIM NOS Version- 1.0 NSQF Level- 6.0	55:00	95:00	90:00	00:00	240:00
Module 1: Introduction to the role of a 4D BIM Planner - Planning & Monitoring	05:00	00:00	00:00	00:00	05:00
Module 2: Process of carrying out planning and scheduling using 4D BIM	50:00	95:00	90:00	00:00	235:00
CON/N2102: Optimise schedule and track project progress using 4D BIM NOS Version- 1.0 NSQF Level- 6.0	80:00	100:00	60:00	00:00	240:00
Module 3: Process of optimising schedule and track project progress using 4D BIM	80:00	100:00	60:00	00:00	240:00
CON/N9003: Manage health and safety at the workplace NOS Version- 1.0 NSQF Level -5.0	15:00	15:00	00:00	00:00	30:00









Module 4: Managing Health and Safety at the Workplace	15:00	15:00	00:00	00:00	30:00
DGT/VSQ/N0103: Employability Skills (90 Hours) NOS Version- 1.0 NSQF Level- 5.0	90:00	00:00	00:00	00:00	90:00
Module 5: Employability Skills	90:00	00:00	00:00	00:00	90:00
Total Duration	240:00	210:00	150:00	00:00	600:00



Module Details

Module 1: Introduction to the role of a 4D BIM Planner - Planning & Monitoring

Mapped to CON/N2101, v1.0

Terminal Outcomes:

• Discuss the job role of a 4D BIM Planner - Planning & Monitoring.

Duration: 05:00	Duration: 0:00			
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes			
 Describe the size and scope of the construction industry and its subsectors. Discuss the role and responsibilities of a 4D BIM Planner - Planning & Monitoring. Identify various employment opportunities for a 4D BIM Planner - Planning & Monitoring. 				
Classroom Aids				
Training Kit - Trainer Guide, Presentations, Whiteboard, Marker, Projector, Laptop, Video Films				
Tools, Equipment and Other Requirements				
NA				



Module 2: Process of Carrying-out Planning and Scheduling using 4D BIM *Mapped to CON/N2101, v1.0*

Terminal Outcomes:

- Explain the process of determining the project objectives.
- Describe the process of preparing the 4D model.
- Elucidate ways to identify and resolve issues in sequencing.

Duration: 50:00	Duration: 95:00			
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes			
 Duration: 50:00 Theory – Key Learning Outcomes Explain the importance of determining the project objectives and scope before its execution. Explain the importance of Line of Balance and its advantages and application. Elucidate the importance of time management and scheduling in construction projects. Explain the benefits of integrating BIM into project execution planning (4D BIM), e.g. prevention of time and cost inefficiencies on the construction site. State the appropriate software required for 4D/5D integrated scheduling. Explain the use of 4D BIM models to application. 	 Duration: 95:00 Practical – Key Learning Outcomes Demonstrate how to analyse the BIM Execution Plan (BEP). Show how to create a 4D simulation using the BIM project management software and export it to the relevant software. Demonstrate the use of appropriate methods for the easy identification of elements, tasks and resources in the Open BIM software, e.g. custom colour schemes, correct sequences, etc. Demonstrate the process of performing look-ahead analysis using the appropriate features in the BIM software. Demonstrate the use of project management software to review 4D 			
 Explain the use of 4D BIM models to improve construction time management and allocate time and resources relating to work activities. Explain the use of 4D BIM construction for affisient 	 Demonstrate the use of project management software to review 4D sequences in the BIM software to identify relevant issues in real-time. Demonstrate the process of carrying out appropriate documentation concerning the planning and 			
 Describe the process of planning and scheduling various construction activities using 4D BIM. 	scheduling using 4D BIM.			
 Explain how to conduct planned vs actual schedule analysis. 				
 Explain how to identify and prevent problems related to the sequential, spatial and temporal aspects of the construction process. 				



Classroom Aids

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

Tools, Equipment and Other Requirements

Revit, ArchiCAD, Navisworks, Desktop



Module 3: Process of Optimizing Schedule and Tracking Project Progress using 4D BIM

Mapped to CON/N2102, v1.0

Terminal Outcomes:

- Describe the process of performing schedule optimization.
- Elucidate ways to track project progress.

Duration: 80:00	Duration: 100:00			
Theory – Key Learning Outcomes	Practical – Key Learning Outcomes			
 Duration: 80:00 Theory – Key Learning Outcomes Describe the process of monitoring construction progress using BIM Management software. State the appropriate software required for 4D BIM scheduling. Explain resource allocation and levelling using the BIM software. Explain how to conduct LOB and flowline analysis. List traditional quantity-based and element-based progress input. Explain how to identify the out-of-sequence work and appropriate 	 Duration: 100:00 Practical – Key Learning Outcomes Demonstrate the process of performing advanced analysis. Demonstrate the process of carrying out resource allocation and levelling using the BIM management software. Show how to generate Line of Balance (LOB) analysis, collecting, measuring, and presenting facts relating to time, cost and completion in the construction project. Demonstrate the process of performing flowline analysis concerning the scheduling of construction activities 			
 Sequence work and appropriate corrective measures to be taken. Explain how to prepare and extract detailed 4D task reports using relevant management software. Elucidate the importance and process of conducting schedule comparison. Describe planned vs. actual analysis. Describe look-ahead analysis. Explain the use of BIM for communication, coordination and decision making. 	 Show how to monitor the progress of the construction project using 4D BIM software. Demonstrate the use of BIM Collaboration Format (BCF) to exchange information concerning design issues in the BIM model or for updating progress with the relevant experts and stakeholders for resolution. Prepare sample 4D task reports with the help of BIM software, including the appropriate details. Demonstrate the process of carrying out resource monitoring using 4D/5D BIM management software. Show how to track the Key Performance Indicators (KPIs) and 			



carry out executive reporting.

Classroom Aids

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

Tools, Equipment and Other Requirements

Revit, ArchiCAD, Navisworks, Desktop



Module 4: 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			
 Theory - Key Learning Outcomes 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 	 Practical – Key Learning Outcomes 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. 			
 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. 				



Training Kit - Trainer Guide, Projector/LED Monitor, Computer/ Laptop, Presentations, Black/ Whiteboard, Marker, Projector, Video

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







Module 5: Employability Skills

Mapped to NOS 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, 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
- 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
- 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

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



Module 6: On-the-Job Training

Mapped to 4D BIM Planner - Planning & Monitoring

Mandatory Duration: 150:00

Recommended Duration: 00:00

Location: On-Site

Terminal Outcomes

- Explain the importance of determining the project objectives and scope before its execution.
- Explain the benefits of integrating BIM into project execution planning (4D BIM), e.g. prevention of time and cost inefficiencies on the construction site.
- Create a 4D simulation using the BIM project management software and export it to the relevant software.
- Perform look-ahead analysis using the appropriate features in the BIM software.
- Carry out appropriate documentation concerning the planning and scheduling using 4D BIM.
- Carry out resource allocation and levelling using the BIM management software.
- Prepare the 4D task reports with the help of BIM software, including the appropriate details.











Annexure

Trainer Requirements

Trainer Prerequisites							
Minimum Educational	Specialisation	Releva Experi	ant Industry ience	Training Experience		Remarks	
Qualification		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 "4D BIM Planner - Planning & Monitoring", mapped to QP: "CON/Q2102, 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%.			







Assessor Requirements

Assessor Prerequisites							
Minimum Educational	Specialization	on Relevant Industry Experience		ecialization Relevant Industry Training/Assessment Experience Experience		g/Assessment nce	Remarks
Qualification		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 "4D BIM Planner - Planning & Monitoring", mapped to QP: "CON/Q2102, 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%.	



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



- 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 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 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.











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).
(M) TLO	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.





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

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