



National Certificate of Level-3 in Construction Material Assistant



National Certificate of Level -3 in Construction Material Assistant

CURRICULUM



**NATIONAL VOCATIONAL AND TECHNICAL TRAINING COMMISSION (NAVTTTC)
GOVERNMENT OF PAKISTAN**



National Certificate of Level-3 in Construction Material Assistant



Contents

1. Introduction	4
2. Purpose of the Qualification:.....	4
3. Overall objectives of training program	5
4. Date of Validation	5
5. Entry level of trainees.....	5
6. Minimum qualification for teachers	5
7. Duration of the course:.....	6
8. Description and structure of the course.....	7
9. Overview of the Curriculum.....	9
10. Scheme of Studies	9
11. Detail of Modules	10
National Certificate of Level-3 in Construction Material Assistant	10
11.4. Basic Lab Testing.....	10
11.4.1 Maintain testing tools & equipment.....	10
11.4.2 Operate and maintenance of the testing instrument & equipment.....	19
11.4.3 Conduct laboratory work for testing construction materials.....	25
11.4.4 Process and present test data.....	30
11.4.5 Work in a Team Environment	33



National Certificate of Level-3 in Construction Material Assistant



11.5. Construction Practices-I.....	36
11.5.1: Lay out Building plans	36
11.5.2: Carry out brick work	40
11.5.3: Apply plaster	44
11.5.4: Construct masonry steps and stairs.....	48
11.5.5: Prepare Surface and fix tiles.....	51
11.6. Digital Skills.....	59
11.6.1 Perform computer operations	59
11.6.2 Operate word-processing applications	61
11.6.3 Operate presentation application	65
11.6.4 Operate spreadsheet applications.....	69
11.7. AutoCAD.....	72
11.7.1 Perform Drafting Settings	72
11.7.2 Develop 2D Drawings.....	75
11.7.3 Develop 3D Drawings.....	79
12. List of Tools, Equipment and Consumable	81
13. Members of Curriculum Development Committee	87



National Certificate of Level-3 in Construction Material Assistant



1. Introduction

Materials which are used for construction purposes are known as the engineering materials or building materials or construction materials. A wide range of building materials are available for the construction of rural buildings and structures. The proper selection of materials to be used in a particular building or structure can influence the Safety, original cost, maintenance, ease of cleaning, durability and, of course, appearance. Usually, construction materials are classified into natural construction material (Water, Mud, Stone, Sand, Wood, Leaves, Lime, Fiber and etc.) and artificial construction material (cement, Brick, Tiles, Glass, Metals, Plastic and etc.). It is necessary for the Civil Engineers/Civil Technologist/Lab Engineers/Lab Assistant to have knowledge about materials, properties and their standard testing methods.

Construction Materials Testing have significant role in the life of every human being, though one may not truly sense its importance in our daily routine. Thus, the importance of civil engineering may be determined according to its usefulness in our daily life. Therefore, industry expectations for skilled workforce are also dynamic which can only be managed through setting relevant competency standards in collaboration with the leading industries. Being familiar of this fact, National Vocational & Technical Training Commission (NAVTTTC) developed competency standards for Construction Material Testing Technology under National Vocational Qualifications Framework (NVQF). These competency standards have been developed by a Qualifications Development Committee (QDC) and validated by the Qualifications Validation Committee (QVC) having representation from the leading Construction, Real States & Builder industry of the country.

2. Purpose of the Qualification:

The purpose of this qualification is to set high professional standards for construction Materials Testing technology sector. The specific objectives of developing these qualifications are as under:

- Improve the professional competence of the trainees
- Provide opportunities for recognition of skills attained through non-formal or informal pathways
- Improve the quality and effectiveness of training and assessment for construction Materials Testing industry
- Enable the existing workforce to capacitate themselves in new technologies and methods



National Certificate of Level-3 in Construction Material Assistant



3. Overall objectives of training program

The Construction Material Assistant qualification of level 3 consists of both the theoretical and practical details and having the following Occupations

- | | |
|--|---------|
| 1. Building Materials Assistant | Level 3 |
| 2. Highway Materials Testing Assistant | Level 3 |
| 3. Field Testing Lab Assistant | Level 3 |

It includes the following qualifications as well:

- | | |
|---|---------|
| 1. Certificate in Construction Materials Sampler | Level 2 |
| 2. Certificate in Construction Materials Assistant | Level 3 |
| 3. Certificate in Construction Materials Technician | Level 4 |
| 4. Diploma in Construction Materials Supervisor | Level 5 |

4. Date of Validation

The level 3 of National qualification on construction Materials Assistant has been validated by the Qualifications Development Committee (QDC) members on **06-12-2021 to 10-12-2021** and will remain valid for 10 years

5. Entry level of trainees

The entry for National Certificate level 3, in Construction Material Assistant are

1. A person having National Vocational Certificate level 2, in Construction Material Assistant.

6. Minimum qualification for teachers

- B. Tech in Civil Technology 4 Years
- B.Sc. / B.E. in Civil Engineering 4 Years
- D. A. E. in Civil Technology with 3 Years teaching experience
- Must be able to communicate effectively



National Certificate of Level-3 in Construction Material Assistant



Medium of instruction

English, and Urdu.

7. Duration of the course:

The proposed curriculum is composed of 145 modules that will be covered in 3617 Learning hours. Duration of the course is proposed to be Three years. The total weightage for technical modules is 3617 hours. A total of 1183 hours have been reserved for allied subjects i.e. Islamic studies, English, Mathematics, Physics and Chemistry.

The details of technical modules are given as under:

Level - 2 = 6 months.

Level - 3 = 6 months.

Level - 4 = 1 Year.

Level - 5 = 1 Year.

The overall distribution of contact hours and Credit Hours is given below:

Total.	3617 hours. & 361.7 Credits
Theory.	847 hours (23.42 %)
Practical.	2770 hours (76.58 %)

The distribution of contact hours and credit hours in each level is given below:

Level - 2 = 6 months (16 weeks)

Total.	610 hours. & 61 Credits
Theory.	115 hours (18.85 %)
Practical.	495 hours (81.15 %)

Level - 3 = 6 months (16 weeks)



National Certificate of Level-3 in Construction Material Assistant



Total. 607 hours. & 60.7 Credits
Theory. 121 hours (19.93 %)
Practical. 486 hours (80 .07%)

Level - 4 = 1 Year (16 weeks + 16 Weeks)

Total. 1200 hours. & 120 Credits
Theory. 234 hours (19.5 %)
Practical. 966 hours (80.5 %)

Level - 5 = 1 Year (16 weeks + 16 Weeks)

Total. 1200 hours. & 120 Credits
Theory. 377 hours (31.42 %)
Practical. 823 hours (68.58 %)

8. Description and structure of the course

Following is the structure of the course:

National Qualification Certificate in Construction Material Testing Technology Level 3

11.04 Basic Lab Testing

Module Code	Name of Subjects	Category	Level	Contact Hour			Credit
				Th	Pr	Total	
11.04.1	Maintain testing tools & equipment.	Core	3	9	54	63	6.3
11.04.2	Operate and maintenance of the testing instrument & equipment.	Core	3	12	60	72	7.2
11.04.3	Conduct laboratory work for testing construction materials	Core	3	12	33	45	4.5
11.04.4	Process and present test data	Core	3	8	21	29	2.9
11.04.5	Work in a team Environment	Generic	3	6	12	18	1.8
Total				47	180	227	22.7



National Certificate of Level-3 in Construction Material Assistant



11.05 Construction Practices I

Module Code	Name of Subjects	Category	Level	Contact Hour			Credit
				Th	Pr	Total	
11.05.1	Lay out Building plans	Core	3	6	21	27	2.7
11.05.2	Carry out brick work	Core	3	6	21	27	2.7
11.05.3	Apply plaster	Core	3	6	21	27	2.7
11.05.4	Construct masonry steps and stairs	Core	3	7	21	28	2.8
11.05.5	Prepare Surface and fix tiles	Core	3	10	48	58	5.8
Total				35	132	167	16.7

11.06 Digital Skills

Module Code	Name of Subjects	Category	Level	Contact Hour			Credit
				Th	Pr	Total	
11.06.1	Perform computer operations	Generic	3	3	9	12	1.2
11.06.2	Operate word-processing applications	Generic	3	4	21	25	2.5
11.06.3	Operate spreadsheet applications	Generic	3	3	15	18	1.8
11.06.4	Operate presentation packages	Generic	3	3	15	18	1.8
Total				13	60	73	7.3

11.07 AutoCAD

Module Code	Name of Subjects	Category	Level	Contact Hour			Credit
				Th	Pr	Total	
11.07.1	Perform Drafting Settings	Core	3	6	24	30	3.0
11.07.2	Develop 2d Drawings	Core	3	10	45	55	5.5
11.07.3	Develop 3d Drawings	Core	3	10	45	55	5.5
Total				26	114	140	14.0
Grand Total of Level 3				121	486	607	60.7



National Certificate of Level-3 in Construction Material Assistant



9. Overview of the Curriculum.

Construction Material Assistant (Level-3)

S#	Clusters of Competencies	Numbers of Module	Theory	Practice	Duration
11.04	Basic Lab Testing	5	47	180	227
11.05	Construction Practices I	5	35	132	167
11.06	Digital Skills	4	13	60	73
11.07	AutoCAD	3	26	114	140
	Total	17	121	486	607

10. Scheme of Studies

National Qualification Certificate in “Construction Material Assistant” level-3

Code	Name of Subjects	Category	Contact Hour			Credit	Periods per week		
			Th	Pr	Total		Th	Pr	Total
	Basic Lab Testing	Technical	47	180	227	22.7	3	11	14
	Construction Practices I	Technical	35	132	167	16.7	2	8	10
	Digital Skills	Technical	13	60	73	7.3	1	4	5
	AutoCAD	Technical	26	114	140	14.0	2	7	9
		Allied							
	Total		121	486	607	60.7	8	30	38



11. Detail of Modules

National Certificate of Level-3 in Construction Material Assistant

11.4. Basic Lab Testing

11.4.1 Maintain testing tools & equipment.

Objective: This module covers the skills and knowledge required to create the basic skills of up keeping, selection of tools & equipment for performing the specific material testing jobs and calibration of measuring tools .

Duration: 63 Hours

Theory: 9 Hours

Practice: 54Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Select tools & equipment for specific testing job.	Trainee will be able to: - Identify the tools & equipment. - Prepare the list of tools & equipment for specific testing job. - Collect the tools & equipment from the store. - Clean and lubricate the tools & equipment.	- State Basic measuring units and it's inter-conversion - Identify different Tools and Equipment - Prepare list of the required tools Practical Activity Select tools & equipment for: - slump test of cement concrete - sieve analysis for aggregates - impact value test for coarse aggregates - Vicat apparatus - Le-Chatelier apparatus	Theory-02Hrs Practice-03Hrs Total-05Hrs	Slump cone Apparatus Hand gloves Lab coat Cement Sand Scale Shovel Trowel Sieves Sieve shaker Vicat apparatus Le-Chatelier apparatus	Class room Lab



National Certificate of Level-3 in Construction Material Assistant



	Place tools and equipment at appropriate place.	- Le-Chatelier flask - Plastic limit test apparatus - flash and fire point test apparatus - compacting factor test apparatus - Flow table test apparatus - Vee Bee test apparatus - Casagrande apparatus - Shrinkage test apparatus - flakiness gauge - Marshall stability test apparatus - Skid Resistance /Abrasion value apparatus - bitumen compactor - Standard cement cube molds - Pycnometer - Vernier calipers - Thermometers - Desiccators - Spirit level.		Le-Chatelier flask Plastic limit test apparatus flash and fire point apparatus compacting factor test apparatus Flow table test apparatus Vee Bee test apparatus Casagrande apparatus Shrinkage test apparatus flakiness gauge Marshall stability test apparatus Skid Resistance /Abrasion	
--	---	--	--	--	--



National Certificate of Level-3 in Construction Material Assistant



				value apparatus bitumen compactor Standard cement cube molds Pycnometer Vernier calipers Thermometer Desiccators Spirit level	
LU2. Maintain the tools & equipment.	Trainee will be able to: - Identify the appropriate measuring tools as per material as well as test requirements - Check Physical Condition of Tools & Equipment before use - Perform measurements with the measuring tools such as; measuring tape, measuring jar, metal gauge, Vernier caliper,	- Check Physical Condition of Tools & Equipment before use - Perform maintenance as per standards. Practical Activity - Perform maintenance of slump test of cement concrete - sieve analysis for aggregates - impact value test for coarse aggregates - Vicat apparatus - Le-Chatelier apparatus - Le-Chatelier flask - Plastic limit test apparatus - flash and fire point test apparatus	Theory-02Hrs Practice-18Hrs Total- 20Hrs	Slump cone Apparatus Hand gloves Lab coat Cement Sand Scale Water Shovel Trowel Sieves Sieve shaker Weighing Balance Vicat apparatus	Class room Lab



National Certificate of Level-3 in Construction Material Assistant



	micro meter, weighing balance, pressure gauges and thermometer etc. • Perform routine maintenance as per standards. • Clean the tools & equipment after use. • Place tools and equipment at appropriate place after use.	○ compacting factor test apparatus ○ Flow table test apparatus ○ Vee Bee test apparatus ○ Casagrande apparatus ○ Shrinkage test apparatus ○ flakiness gauge ○ Marshall stability test apparatus ○ Skid Resistance /Abrasion value apparatus ○ bitumen compactor ○ Standard cement cube molds ○ Pycnometer ○ Vernier calipers ○ Thermometers ○ Desiccators ○ Spirit level.		Le-Chatelier apparatus Le-Chatelier flask Plastic limit test apparatus flash and fire point apparatus compacting factor test apparatus Flow table test apparatus Vee Bee test apparatus Casagrande apparatus Shrinkage test apparatus flakiness gauge Marshall stability test apparatus Skid Resistance	
--	---	---	--	--	--



National Certificate of Level-3 in Construction Material Assistant



				/Abrasion value apparatus bitumen compactor Standard cement cube molds Pycnometer Vernier calipers Thermometer Desiccators Spirit level.	
LU3. Calibrate the measuring tools.	Trainee will be able to: - Check the calibration status of the measuring tools as per specified procedure/standards - Perform calibration of measuring tools as per standard procedure. - Report the calibration test result.	- Define Calibration - Explain techniques of calibration - State importance of calibration - State how to Calibrate the measuring tools Practical Activity Perform calibration of: - slump cone apparatus - sieves - sieve shaker - weighing balance - impact value test for coarse aggregates - Vicat apparatus	Theory-03Hrs Practice-27Hrs Total- 30Hrs	Slump cone Apparatus Hand gloves Lab coat Cement Sand Scale Water Shovel Trowel Sieves Sieve shaker Weighing Balance Vicat apparatus	Class room Lab



National Certificate of Level-3 in Construction Material Assistant



		○ Le-Chatelier apparatus ○ Le-Chatelier flask ○ Plastic limit test apparatus ○ flash and fire point test apparatus ○ compacting factor test apparatus ○ Flow table test apparatus ○ Vee Bee test apparatus ○ Casagrande apparatus ○ Shrinkage test apparatus ○ flakiness gauge ○ Marshall stability test apparatus ○ Skid Resistance /Abrasion value apparatus ○ bitumen compactor ○ Standard cement cube molds ○ Pycnometer ○ Thermometers ○ Spirit level.		Le-Chatelier apparatus Le-Chatelier flask Plastic limit test apparatus flash and fire point apparatus compacting factor test apparatus Flow table test apparatus Vee Bee test apparatus Casagrande apparatus Shrinkage test apparatus flakiness gauge Marshall stability test apparatus Skid Resistance	
--	--	---	--	--	--



National Certificate of Level-3 in Construction Material Assistant



				/Abrasion value apparatus bitumen compactor Standard cement cube molds Pycnometer Thermometer Desiccators Spirit level.	
LU4. Follow the standard house-keeping procedures in lab and field	Trainee will be able to: • Arrange the testing tools and equipment at appropriate positions in store. • Protect instrument and equipment from heat, dust and moisture. • Carry and store loose and fluid materials like chemical admixtures as per standard safety practices.	• Describe Storing of tools and equipment at appropriate place • State Inventory Management • Describe Preventive and corrective measures for tools and equipment Practical Activity 1- Perform standard house-keeping procedures for ○ slump cone apparatus ○ sieves ○ sieve shaker ○ weighing balance ○ impact value test for coarse aggregates ○ Vicat apparatus	Theory-02Hrs Practice-06Hrs Total- 08Hrs	Slump cone Apparatus Hand gloves Lab coat Cement Sand Scale Water Shovel Trowel Sieves Sieve shaker Weighing Balance Vicat apparatus Le-Chatelier apparatus	Class room Lab



National Certificate of Level-3 in Construction Material Assistant



	• Identify and label the damaged and out of order tools and equipment. • Maintain the inventory record of tools, instruments and equipment. • Prepare the maintenance log sheet of tools & equipment	○ Le-Chatelier apparatus ○ Le-Chatelier flask ○ Plastic limit test apparatus ○ flash and fire point test apparatus ○ compacting factor test apparatus ○ Flow table test apparatus ○ Vee Bee test apparatus ○ Casagrande apparatus ○ Shrinkage test apparatus ○ flakiness gauge ○ Marshall stability test apparatus ○ Skid Resistance /Abrasion value apparatus ○ bitumen compactor ○ Standard cement cube molds ○ Pycnometer ○ Vernier calipers ○ Thermometers ○ Desiccators ○ Spirit level.		Le-Chatelier flask Plastic limit test apparatus flash and fire point apparatus compacting factor test apparatus Flow table test apparatus Vee Bee test apparatus Casagrande apparatus Shrinkage test apparatus flakiness gauge Marshall stability test apparatus Skid Resistance /Abrasion	
--	--	--	--	--	--



National Certificate of Level-3 in Construction Material Assistant



				value apparatus bitumen compactor Standard cement cube molds Pycnometer Vernier calipers Thermometer Desiccators Spirit level.	
--	--	--	--	--	--



National Certificate of Level-3 in Construction Material Assistant



11.4.2. Operate and maintenance of the testing instrument & equipment.

Objective: This module covers the skills and knowledge required to operate and perform routine maintenance of the testing instruments & equipment required for testing the properties of construction materials.

Duration: 72 Hours

Theory: 12 Hours

Practice: 60 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Perform pre-use checks of laboratory equipment	Trainee will be able to: - Perform set-up of laboratory equipment for the specified job - Perform safety checks in accordance with relevant workplace and instrumental procedures. - Identify faulty or unsafe components and equipment and report to appropriate personnel	- Explain setup of laboratory equipment's - Describe Common sources of faults in the instruments or equipment used - Describe importance of safety work Practical Activity Perform pre use checks for - vicat apparatus - compression testing machine - Marshall stability test apparatus - Skid Resistance /Abrasion value apparatus	Theory-02Hrs Practice-06Hrs Total- 08Hrs	Weighing balance Stopwatch Vicat apparatus Compression testing machine Cement Concrete cubes Marshall stability test apparatus Skid Resistance /Abrasion value apparatus Speedy moisture meter apparatus flash and fire point test apparatus Impact value apparatus Shrinkage test apparatus	Class room Lab



National Certificate of Level-3 in Construction Material Assistant



		- Speedy moisture meter apparatus - flash and fire point test apparatus - Impact value apparatus - Shrinkage test apparatus - Le-Chatelier apparatus - Flakiness and elongation gauge.		Le-Chatelier apparatus Flakiness and elongation gauge. safety Helmets Safety goggles Safety Shoes (Assorted size) Safety Apron Ear Plug Hand gloves Lab coat Face Mask	
LU2. Operate the standard testing instruments & equipment as per standard operating procedure.	Trainee will be able to: - Select the attachment and accessories and check the working conditions as per test requirements. - Clean and lubricate the machine and attachment - Check the working conditions of gauges & meters and make adjustments accordingly. - Select and adjust the loading speed, gauges, and attachments as per requirement	- Describe working condition of testing instruments and equipment used for testing - Explain function of key components of the laboratory equipment. Practical Activity Operate the following apparatus - vicat apparatus - compression testing machine - Marshall stability test apparatus	Theory-04Hrs Practice-21Hrs Total- 25Hrs	Weighing balance Stopwatch Vicat apparatus Compression testing machine Marshall stability test apparatus Skid Resistance /Abrasion value apparatus Speedy moisture meter apparatus flash and fire point test apparatus Impact value apparatus	Class room Lab



National Certificate of Level-3 in Construction Material Assistant



	and standard operating procedure. • Perform operations as per standard operating procedure. • Observe and record readings of gauges/monitors.	○ Skid Resistance /Abrasion value apparatus ○ Speedy moisture meter apparatus ○ flash and fire point test apparatus ○ Impact value apparatus ○ Shrinkage test apparatus ○ Le-Chatelier apparatus ○ Flakiness and elongation gauge.		Shrinkage test apparatus Le-Chatelier apparatus Flakiness and elongation gauge. safety Helmets Safety goggles Safety Shoes (Assorted size) Safety Apron Ear Plug Hand gloves Lab coat Face Mask	
LU3. Conduct routine maintenance of instruments & equipment.	Trainee will be able to: • Identify service faults and report for appropriate maintenance/ repair • Adjust maintenance schedules in accordance with operational requirements • Replace or repair damaged, worn and/or spent components or items	• state importance of periodical maintenance of testing tools, apparatus, instruments and equipment • Describe proper repair and maintenance of tools and equipment for testing • State sources of uncertainty in laboratory equipment operation and their control Practical Activity	Theory-03Hrs Practice-27Hrs Total-30Hrs	Weighing balance Stopwatch Vicat apparatus Compression testing machine Marshall stability test apparatus Skid Resistance /Abrasion value apparatus Speedy moisture meter apparatus flash and fire point test apparatus	Class room Lab



National Certificate of Level-3 in Construction Material Assistant



	- Lubricate the moving parts and tightening of screws etc. - Clean instruments and equipment using recommended cleaning agents and techniques - Store instruments and equipment in accordance with workplace and/or manufacturer requirement - Update maintenance records in accordance with workplace procedures	Conduct maintenance of: - vicat apparatus - compression testing machine - Marshall stability test apparatus - Skid Resistance /Abrasion value apparatus - Speedy moisture meter apparatus - flash and fire point test apparatus - Impact value apparatus - Shrinkage test apparatus - Le-Chatelier apparatus - Flakiness and elongation gauge.		Impact value apparatus Shrinkage test apparatus Le-Chatelier apparatus Flakiness and elongation gauge. safety Helmets Safety goggles Safety Shoes (Assorted size) Safety Apron Ear Plug Hand gloves Lab coat Face Mask	
LU4. Maintain the record.	Trainee will be able to: - Fill in the maintenance details in the equipment log book. - Report information on unsafe and faulty equipment to the authorities.	State workplace procedures for recording maintenance data and reporting results Practical Activity Maintain laboratory record for vicat apparatus and compression testing machine.	Theory-02Hrs Practice-03Hrs Total- 05Hrs	Weighing balance Stopwatch Vicat apparatus Compression testing machine Cement Concrete cubes Safety Helmets Safety goggles Safety Shoes (Assorted size)	Class room Lab



National Certificate of Level-3 in Construction Material Assistant



				Safety Apron Ear Plug Hand gloves Lab coat Face Mask	
LU5. Conduct work safely.	Trainee will be able to: • Select, fit and use appropriate personal protective equipment (PPE) • Follow workplace procedures when carrying out work tasks • Keep all work areas clean and free from obstacles • Maintain workplace standards of personal hygiene • Safely store, transport and dispose of hazardous materials and dangerous goods	• State different type of PPE's used for testing • Explain storing and handling technique of testing tools and equipment used in laboratory. Practical Activity Conduct work safely	Theory-01Hrs Practice-03Hrs Total- 04Hrs	Weighing balance Stopwatch Vicat apparatus Compression testing machine Cement Concrete cubes Marshall stability test apparatus Skid Resistance /Abrasion value apparatus Speedy moisture meter apparatus flash and fire point test apparatus Impact value apparatus Shrinkage test apparatus Le-Chatelier apparatus Flakiness and elongation gauge. safety Helmets	Class room Lab



National Certificate of Level-3 in Construction Material Assistant



				Safety goggles Safety Shoes (Assorted size) Safety Apron Ear Plug Hand gloves Lab coat Face Mask	
--	--	--	--	---	--



National Certificate of Level-3 in Construction Material Assistant



11.4.3. Conduct laboratory work for testing construction materials

Objective: This module covers the skills and knowledge required to conduct laboratory tests to confirm the acceptability of construction materials, expected to obtain reliable test results safely and efficiently. The unit of competency does not cover calibration of equipment, interpretation or analysis of results or troubleshooting equipment problems.

Duration: 45 Hours

Theory: 12 Hours

Practice: 33 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Plan the preparatory activities for laboratory tests.	Trainee will be able to: - Identify hazards and workplace controls associated with the sample preparation, test methods, reagents and equipment. - List and arrange required equipment and materials. - Plan work sequences for optimum efficiency and safety	- State different types of tools, instruments and equipment used for determining compressive strength of concrete. - State purpose and principles of construction materials tests. - Describe Pre-use checks for operating test equipment Practical Activity: Prepare a plan for determining - Compressive strength of concrete specimen - skid resistance test - flash and fire point test	Theory-02Hrs Practice-06Hrs Total- 08Hrs	Standard cement cube molds tamping rod Brushes Compression testing machine Cylindrical metal container skid resistance test flash and fire point test impact value apparatus Vee Bee test. Safety Shoes (Assorted size) Safety Apron Ear Plug Face Mask Safety Helmets	Class room Lab



National Certificate of Level-3 in Construction Material Assistant



		• impact value apparatus • Vee Bee test.		Safety goggles Hand gloves Lab coat	
LU2. Prepare samples/test pieces	Trainee will be able to: • Retrieve samples / test pieces from storage and record their general appearance. • Check the accuracy and completeness of accompanying labels and documentation to ensure traceability • Compare samples / test pieces with test specifications, record observations and report discrepancies • Prepare samples / test pieces in accordance with appropriate test method	• Describe procedure to prepare concrete sample • Describe procedure to prepare bitumen sample Practical Activity: Prepare concrete samples and bitumen sample.	Theory-03Hrs Practice-09Hrs Total- 12Hrs	Standard cement cube molds tamping rod Brushes Compression testing machine Cylindrical metal container Safety Shoes (Assorted size) Safety Apron Ear Plug Face Mask Safety Helmets Safety goggles Hand gloves Lab coat	Class room Lab
LU3. Check equipment before use	Trainee will be able to: • Set-up the required laboratory equipment for the specified job	• Explain working of compression testing machine, skid resistance machine, flash and fire point apparatus, impact	Theory-04Hrs Practice-06Hrs Total- 10Hrs	Standard cement cube molds tamping rod Brushes Compression testing machine	Class room Lab



National Certificate of Level-3 in Construction Material Assistant



	- Perform pre-use and safety checks in accordance with relevant instrumental procedures. - Identify faulty or unsafe components and equipment and report to appropriate personnel - Check calibration status of instruments and report any out-of-calibration items to appropriate personnel	value apparatus and Vee Bee apparatus. - State purpose of compression testing machine, skid resistance machine, flash and fire point apparatus, impact value apparatus and Vee Bee apparatus - Check working condition of testing instruments Practical Activity Check the following instruments before use: - Compression testing machine - skid resistance machine - flash and fire point apparatus - impact value apparatus - Vee Bee apparatus		Cylindrical metal container skid resistance test flash and fire point test impact value apparatus Vee Bee test. Safety Shoes (Assorted size) Safety Apron Ear Plug Face Mask Safety Helmets Safety goggles Hand gloves Lab coat	
LU4. Perform laboratory tests	Trainee will be able to: Conduct tests in accordance with test method and workplace procedures	- State the purpose and principles of construction materials tests - Enlist steps for performing compression test	Theory-02Hrs Practice-09Hrs Total- 11Hrs	Standard cement cube molds tamping rod Brushes Compression testing machine	Class room + Lab



National Certificate of Level-3 in Construction Material Assistant



	- Record data and observations in lab sheets in accordance with workplace procedures - Perform calculations as set out in test method - Compare calculated results with expected values and report atypical results promptly to appropriate personnel - Prepare the technical/administrative records and test reports in the specified lab format/sheets in accordance with workplace procedures	Practical Activity Perform compression test on concrete and bitumen specimen		Cylindrical metal container Safety Shoes (Assorted size) Safety Apron Ear Plug Face Mask Safety Helmets Safety goggles Hand gloves Lab coat	
LU5. Conduct work safely.	Trainee will be able to: - Select, fit and use appropriate personal protective equipment (PPE) - Follow workplace procedures when carrying out work tasks - Keep all work areas clean and free from obstacles	- Enlist different type of PPE's used for testing of cement, concrete - State storing and handling technique of testing tools and equipment Practical Activity Conduct work safely	Theory-01Hrs Practice-03Hrs Total- 04Hrs	Standard cement cube molds tamping rod Brushes •Compression testing machine •Cylindrical metal container skid resistance test flash and fire point test	Class room + Lab



National Certificate of Level-3 in Construction Material Assistant



	• Safely store, transport and dispose of hazardous materials and dangerous goods in accordance with environmental procedures • Care for and store equipment, used test pieces and back-up samples in accordance with workplace procedures			impact value apparatus Vee Bee test. Safety Shoes (Assorted size) Safety Apron Ear Plug Face Mask Safety Helmets Safety goggles Hand gloves Lab coat	
--	--	--	--	---	--



National Certificate of Level-3 in Construction Material Assistant



11.4.4. Process and present test data

Objective: This module covers the skills and knowledge required to record and store data, performs simple calculations of scientific quantities, evaluates formulae and performs scientific calculations, present and interprets information in tables and graphs and keeps accurate records.

Duration: 29 Hours

Theory: 08 Hours

Practice: 21 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Record and check data	Trainee will be able to: - Enter original measurement data and observation into laboratory information system or record sheets as required. - Record identities of equipment used, reference standards, methods, standard solutions, operator and necessary information to ensure the traceability of measurement. - Check data to identify transcription errors or atypical entries. - Rectify errors in data using documented procedures.	- State data entering procedure for determining fineness modulus of course and fine aggregates - Enlist steps to check error in data Practical Activity Record and check data for determining fineness modulus of course and fine aggregates, flakiness and elongation index, Marshall stability test, soundness test and plastic limit test.	Theory-02Hrs Practice-03Hrs Total- 05Hrs	Pencil, Eraser, Sharpner, Calculator	Class room+ Lab



National Certificate of Level-3 in Construction Material Assistant



LU2. Calculate scientific quantities	Trainee will be able to: - Calculate scientific quantities using given formulae and data and estimate uncertainties - Ensure calculated quantities are consistent with estimations and expectations - Report all calculated quantities using the appropriate units and correct number of significant figures	Perform simple calculations involving scientific quantities, with or without calculator or computer software. Such as; decimals, fractions, ratios, proportions and percentages, unit conversion, use of significant figures and rounding off. Practical Activity Calculate scientific quantities	Theory-02Hrs Practice-06Hrs Total-08Hrs	Pencil, Eraser, Sharpner, Calculator	Class room + Lab
LU3. Present data	Trainee will be able to: - Present data in clearly labelled tables, charts and graphs using given formats and scales. - Report all data using the appropriate units and number of significant figures	Prepare and present data in the form of tables, graphs, pie charts, bar charts and control charts. Practical Activity Present data in tabular form	Theory-01Hrs Practice-06Hrs Total- 07Hrs	Pencil, Eraser, Sharpner, Calculator	Class room + Lab
LU4. Interpret data	Trainee will be able to: Interpret significant features of tables, charts and graphs, including gradients, intercepts, maximum	Recognize obvious features and trends in data, including: maximum and minimum values spread of data increasing/decreasing data and rate of change etc	Theory-02Hrs Practice-03Hrs Total- 05Hrs	Pencil, Eraser, Sharpner, Calculator	Class room + Lab



National Certificate of Level-3 in Construction Material Assistant



	and minimum values, and limit lines • Verify the accuracy of transcription of measurement data and processed results. • Recognise and report trends in data	Practical Activity Perform interpretation of data			
LU5. Keep records	Trainee will be able to: • File and store data in accordance with documented procedures • Maintain the confidentiality of data in accordance with documented procedures and code of conduct.	• Maintain records and maintaining security of data. Practical Activity Record data in required format	Theory-01Hrs Practice-03Hrs Total- 04Hrs	Pencil, Eraser, Sharpner, Calculator	Class room+ Lab



National Certificate of Level-3 in Construction Material Assistant



11.4.5. Work in a Team Environment

Objective: This module covers the skills and knowledge required to gather, interpret and convey information in response to workplace requirements. It also identifies role and responsibility as a member of a team.

Duration: 18 Hours

Theory: 06 Hours

Practice: 12 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Obtain & convey Workplace information	Trainee will be able to: - Assess the Specific and relevant information from the appropriate sources - Convey the information using the appropriate medium and ideas. - Use appropriate non- verbal communication. - Identify appropriate lines of communication with supervisors and colleagues. - Use the defined workplace procedures for the location and storage of information. - Inform coworkers and superiors about any deviation	- Describe the importance of effective communication - Capable convey the message in the specified format. - Capable to interpret the work-related documents Practical Activity Obtain and convey health safety on construction site	Theory-02Hrs Practice-03Hrs Total- 05Hrs	Notebook Pen	Class room + Lab



National Certificate of Level-3 in Construction Material Assistant



	Carry out Personal interaction clearly and concisely.				
LU2. Participate in workplace meetings and discussions	Trainee will be able to: - Express your own opinions - Listen other's point of view without interruption. - Follow the protocols in the courteous manner - Put simple questions about workplace procedures and matters concerning working conditions of employment.	- Describe the different mode of communication - Explain importance of creating cooperative work environment Practical Activity Participate in workplace meetings and discussions on construction site.	Theory-02Hrs Practice-03Hrs Total- 05Hrs		Class room + Lab
LU3. Identify own role and responsibility within team	Trainee will be able to: - Identify the individual role and responsibilities within the team environment. - Recognize the roles and responsibility of other team members. - Report relationships within team and external to team are identified - Share report with co-workers	- Explain Role and objective of team - Capable to demonstrate the team work. - Capable to identify team role and individual task. Practical Activity Identify own role and responsibility within team	Theory-01Hrs Practice-03Hrs Total- 04Hrs		Class room + Lab



National Certificate of Level-3 in Construction Material Assistant



LU4. Support the co-workers	Trainee will be able to: • Hand over the required materials and tools timely to interfacing team • Work together with co-workers in a synchronized manner. • Address the problems of co-worker effectively • Report to immediate boss (if required)	• Describe the importance of supporting co-workers facing problems • Plan work and organize required resources in coordination with team Practical Activity Support the co-workers on construction site	Theory-01Hrs Practice-03Hrs Total- 04Hrs		Class room + Lab
------------------------------------	---	--	--	--	------------------



11.5. Construction Practices-I

11.5.1: Lay out Building plans

Objective: This competency standard covers the skills and knowledge required to Plan and prepare, Identify and indicate site boundaries, Set out first line for building alignment, Set out right angled corners, Install other building lines, Check building lines for square, Clean-up work place

Duration: 27 Hours

Theory: 6 Hours

Practice: 21 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Plan and prepare	Trainee will be able to: - Obtain work instructions, including plans, specifications, quality requirements and operational details, and apply relevant information for planning and preparation. - Follow safety (OHS) requirements in accordance with safety plans and policies. - Identify and implement signage and barricade requirements. - Select tools and equipment to carry out tasks consistent with job requirements, and check serviceability, and any faults.	- Explain site and equipment safety (OHS) requirements - Explain Job safety analysis (JSA) and safe work method statements - State Construction plan, symbols and construction terminology - Describe processes for interpreting engineering drawings and sketches Practical activity: Interpret lay out of a 5 Marla house and prepare materials and equipment.	Theory-01Hrs Practical-03Hrs Total- 04Hrs	Pencil Eraser Notebook	Class Room



National Certificate of Level-3 in Construction Material Assistant



	- Calculate material quantity requirements in accordance with plans, specifications and quality requirements. - Handle material safely appropriate to the work application				
LU2. Identify and indicate site boundaries.	Trainee will be able to: - Locate survey pegs at corners of site in accordance with job drawing. - Set string lines accurately into position to identify site boundary markings in accordance with site plan	- Application and requirements for line, level and plumb in construction projects - Define site boundaries - State purpose of boundary lines - Basic construction processes Practical activity: Mark boundaries of given lay out in college ground.	Theory-01Hrs Practical-03Hrs Total- 04Hrs	Theodolite Auto level Spirit level Ledgers Timber Nails String line Pegs Hurdles Measuring tape Signage	Class Room and college ground
LU3. Set out first line for building alignment.	Trainee must be able to: - Identify boundary line from site drawing for setting out. - Identify approximate position and length of line at each end for hurdle location in accordance with site plan - Install pegs and hurdles/profiles in accordance with job drawing	- Describe processes for setting out - Explain Types of setting out equipment's - State characteristics of setting out devices. - Define building coordinates Practical activity:	Theory-01Hrs Practical-03Hrs Total- 04Hrs	Theodolite Auto level Spirit level Ledgers Timber Nails String line Pegs Hurdles Measuring tape Signage	Class Room and college ground



National Certificate of Level-3 in Construction Material Assistant



	Mark location for line accurately with nails on hurdles/ profiles according to job drawing and specifications	Set out lines for alignment in college ground.			
LU4. Set out right angled corners.	Trainee must be able to - Identify corner of building on set building line and mark with peg in accordance with job drawing. - Set up right angle to line from corner peg using triangulation principles. - Install hurdles/ profiles and set taut line to right angled alignment. - check the right angle for accuracy using the 3:4:5 method	- Explain various setting out techniques - State 3:4:5 Method - Describe triangulation principle Practical activity: Set out right angled corners from corner peg using triangulation principles in college ground.	Theory-01Hrs Practical-03Hrs Total- 04Hrs	Theodolite Auto level Spirit level Ledgers Timber Nails String line Pegs Hurdles Measuring tape Signage	Class Room and college ground
LU5. Install other building lines.	Trainee must be able to - Install hurdles for remaining building lines in accordance with job drawing - Mark measurements for remaining building lines - Install nails on hurdle for remaining building lines in accordance to site drawing.	- Define string lines - Define building lines Practical activity: Set string lines in position for remaining building lines in college ground.	Theory-01Hrs Practical-03Hrs Total- 04Hrs	Theodolite Auto level Spirit level Ledgers Timber Nails String line Pegs Hurdles Measuring tape Signage	Class Room and college ground



National Certificate of Level-3 in Construction Material Assistant



	Set taut string lines into position to nailed location on hurdles				
LU6. Check building lines for square	Trainee must be able to - Inspect diagonal measurements for square - adjust lines to provide square - Check measurements for accuracy.	Basic mathematical techniques associated with setting out Practical activity: Check all building lines to provide a square relationship.	Theory-0.5Hrs Practical-03Hrs Total- 3.5Hrs	Theodolite Auto level Spirit level Ledgers Timber Nails String line Pegs Hurdles Measuring tape Signage	Class Room and college ground
LU7. Clean up work place	Trainee must be able to - Clean work area and dispose of waste in accordance with work specifications. - Clean, maintain and store tools plant and equipment in accordance with Workplace practices.	- Explain the need for store in a project - Describe classification of stores-stock - Describe use of PPE's Practical activity: Clean the area and tools and store it in proper storage area in lab.	Theory-0.5Hrs Practical-03Hrs Total- 3.5Hrs	safety Helmets Safety goggles Safety Shoes (Assorted size) Safety Apron Ear Plug Hand gloves Lab coat Face Mask	



National Certificate of Level-3 in Construction Material Assistant



11.5.2: Carry out brick work

Objective: This competency standard covers the skills and knowledge required to lay and construct brick and masonry buildings.

Duration: 27 Hours

Theory: 6 Hours

Practice: 21 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Plan work	Trainee will be able to: - Receive the instructions from Supervisor - Check serviceability of tools and equipment - Identify risk associated with job to be done. - Select and wear appropriate PPEs. - Calculate material quantity in accordance with specifications.	- Define brick work - State types of bricks - Explain the importance of PPE's - Describe unsafe act and unsafe conditions Practical activity: Calculate the materials and tools required in constructing straight brick wall	Theory-02Hrs Practical-06Hrs Total- 08Hrs	Pencil Eraser Notebook Calculator	Class Room
LU2. Set out brickwork/ block work.	Trainee will be able to: - Select brick as per job requirement - Develop work platform in accordance with workplace requirements. - Identify location and structural details of brickwork/ block work from plans.	- State Characteristics and applications of materials used in brick work construction - Explain type's brick bond. - Define mortar - State various mortar materials. Practical activity:	Theory-02Hrs Practical-06Hrs Total- 08Hrs	Brick Buggies and Brick Grabs, Dumpy Levels, Hammers (Bricks, Club and Scotch), Jointing Tools, Line Blocks and Line Pins	Class Room and construction lab



National Certificate of Level-3 in Construction Material Assistant



	Set out base brickwork construction, according to dimension and specification.	Lay brick work/ block work for a straight wall in college ground.		Margin Or Raking Tools, Masonry Saws, Masonry Squares, Measuring Tapes Mortar Boards, Plumb Rules, Profiles Shovels, Spirit Levels, Straight Edges String Lines, Trowels, Wheelbarrow Cement Water Safety Helmets Safety Goggles Safety Shoes (Assorted Size) Safety Apron Ear Plug Hand Gloves	
--	--	---	--	---	--



National Certificate of Level-3 in Construction Material Assistant



				Lab Coat Face Mask	
LU3. Install damp proof course	Trainee must be able to: • Prepare mortar mix for bricks/blocks • Determine brick work/ block work gauge • Prepare set out rod. • Level base brickwork/block work for laying DPC •	• Define DPC • State surface requirement for placing DPC. • Describe materials used as DPC. • State various method to place DPC Practical activity: Install DPC above brick wall in college ground.	Theory-1.5Hrs Practical- 06Hrs Total- 7.5Hrs	Brick Buggies and Brick Grabs, Dumpy Levels, Hammers (Bricks, Club and Scotch), Jointing Tools, Line Blocks and Line Pins Margin Or Raking Tools, Masonry Saws, Masonry Squares, Measuring Tapes and Rules, Mortar Boards, Plumb Rules, Profiles Shovels, Spirit Levels,	Class Room and construction lab



National Certificate of Level-3 in Construction Material Assistant



				Straight Edges String Lines, Trowels, Wheelbarrow Cement Water Damp Proof Course Safety Helmets Safety Goggles Safety Shoes (Assorted Size) Safety Apron Ear Plug Hand Gloves Lab Coat Face Mask	
LU4. Clean up	Trainee must be able to • Work area is cleaned and waste disposed of, reused or recycled in accordance with work specifications. • Tools plant and equipment are cleaned, checked for faults and maintained and stored in accordance with workplace practices.	• Explanation of purpose of maintaining and cleaning equipment and tools. Practical activity: Set out right angled corners from corner peg using triangulation principles in college ground.	Theory-0.5Hrs Practical-03Hrs Total- 3.5Hrs	Brick Buggies and Brick Grabs, Brooms Buckets Safety Helmets Safety Goggles Safety Shoes (Assorted Size) Safety Apron Ear Plug	Class Room and construction lab



National Certificate of Level-3 in Construction Material Assistant



				Hand Gloves Lab Coat Face Mask	
--	--	--	--	--------------------------------------	--

11.5.3: Apply plaster

Objective: This competency standard covers the skills and knowledge required to prepare for work, mortar mix, and scaffolding and perform plastering work.

Duration: 27 Hours

Theory: 6 Hours

Practice: 21 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Prepare for work	Trainee will be able to: - Select the tools as per job requirement - Select and wear the PPEs relevant to Job. - Identify risk associated with job to be done. - Calculate material quantity in accordance with specifications - Erect barricades, hoardings, signage in the hazardous areas. - Plan task sequence	- State importance of Occupational Health and Safety (OHS) Regulations - Explain the importance of PPE's - Describe unsafe act and unsafe conditions - Describe procedure for estimation of materials Practical Activity - Prepare work for plastering straight wall - Calculate material for plastering straight wall.	Theory-01Hrs Practical-06Hrs Total- 07Hrs	Eraser Pencil Sharpener Ruler Notepad Calculator	Class Room lab



National Certificate of Level-3 in Construction Material Assistant



LU2. Prepare mortar mix	Trainee will be able to: • Prepare the mixing machines for mixing of mortar as per the job requirement. • Mix materials as per job requirement • Transport mortar mix as per the job requirement.	• Define mortar • Describe mortar types • State materials used in mortar mix • Explain importance of mortar ratio Practical Activity Prepare mortar mix	Theory-01Hrs Practical-03Hrs Total- 04Hrs	Mixing Bucket Mortar pan Shovel Spade Water Cement Sand PPE's	Class Room Lab
LU3. Prepare scaffolding	Trainee will be able to: • Prepare scaffolds components as per the job requirement. • Erect and assemble scaffolds components as per the job requirements. • Dismantle scaffolding as per the job requirement. • Store or stockpile components following standard procedures.	• Explain scaffolding • Describe types of scaffolding • State importance of scaffolding • State materials used in scaffolding • Describe procedure to assemble scaffolding • Describe procedure to dismantle scaffolding • State importance of storing components as per specification Practical Activity Prepare scaffolding	Theory-02Hrs Practical-06Hrs Total- 08Hrs	Scaffold wrench Podger Scaffold Hammer Scaffolding tool belt and holders Safety lanyards Magnetic levels Measuring tape PPE's	Class Room Lab



National Certificate of Level-3 in Construction Material Assistant



LU4. Perform plastering work	Trainee will be able to: • Prepare the surface to be plastered as per the job requirement. • Prepare cement slurry as per the job requirement • Apply mortar mix as per the job requirement • Cure the plastered surfaces as per the job requirement.	• Define plaster • State types of plaster • Describe procedure to prepare plaster • Describe procedure to apply plaster • Define curing • Explain importance of curing • State different curing methods • Practical Activity • Perform plastering work for a straight wall	Theory-02 Hrs Practical-06 Hrs Total- 08 Hrs	Measuring tape Mason hammer Hawk Window trowel Measuring tape Mason thread Plumb bob Leveling tools (water level, spirit level) Bucket trowel Mixing bucket Snips Mortar pan Wooden float Steel float Shovel Spade Wire brush	Class Room Lab
-------------------------------------	---	---	--	--	-------------------



National Certificate of Level-3 in Construction Material Assistant



				Screeds (wooden/st eel) PPE's	
--	--	--	--	--	--



National Certificate of Level-3 in Construction Material Assistant



11.5.4: Construct masonry steps and stairs

Objective: This module covers the knowledge and skills required to construct masonry steps, stairs and wing walls for different types and styles of buildings. It includes planning, types and styles of buildings. Set out and installation of the masonry.

Duration: 28 Hours

Theory: 7 Hours

Practice: 21 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Prepare for work.	Trainee will be able to: - Select the tools as per job requirement - Select and wear the PPEs relevant to Job. - Identify risk associated with job to be done. - Calculate material quantity in accordance with specifications - Erect barricades, hoardings, signage in the hazardous areas. - Plan task sequence	- State importance of Occupational Health and Safety (OHS) Regulations - Explain the importance of PPE's - Describe unsafe act and unsafe conditions - Describe procedure for estimation of materials - Explain stairs and its types Practical Activity - Prepare work for construction of masonry steps - Calculate material for masonry steps	Theory-01 Hr Practical-06 Hrs Total- 07 Hrs	Pencil Eraser Scale Sharpener Notepad Personal protective equipment's	Class Room and Construction lab



National Certificate of Level-3 in Construction Material Assistant



LU2. Set out brickwork/ block work.	Trainee will be able to: • Select brick as per job requirement • Develop work platform in accordance with workplace requirements. • Check location and relative level of prepared footing from job drawings and specifications. • Calculate rise and fall of steps.	• Describe brickwork construction • State importance of brick staircases • Describe procedure for set out brick work Practical Activity Set out brickwork/ block work for stairs.	Theory-03 Hr Practical-06 Hrs Total- 09 Hrs	Mason hammer Measuring tape Mason thread Plumb bob Leveling tools (water level, spirit level) Bucket Mortar pan Wooden float Shovel Spade Wire brush Screeds (wooden/steel)	Class Room and Construction lab
LU3. Lay bricks forming steps and wing walls	Trainee will be able to: • Identify design and profile of steps • Prepare mortar mix to required specifications. • Construct base brickwork to specifications • Apply mortar • Set the first riser brick in place • Level and flush the brick • Set the brick on tread	• Explain components of stair • Define wing wall • State components of wing wall • Describe processes for construction of masonry stairs. • Workplace and equipment safety requirements Practical Activity Lay bricks forming steps and wing walls	Theory- 03 Hr Practical-09 Hrs Total- 12 Hrs	Mason hammer Pointing towels Measuring tape Mason thread Plumb bob Leveling tools (water level, spirit level) Bucket Mortar pan Wooden float Steel float Shovel Spade Wire brush	Class Room and Concrete lab



National Certificate of Level-3 in Construction Material Assistant



	• Carry out joints according to work specifications. • Clean brick/block faces free of mortar			Screeds Margin or raking tools Profiles Shovels Spirit levels Straight edges String lines Trowels Wheelbarrows	
--	---	--	--	--	--



National Certificate of Level-3 in Construction Material Assistant



11.5.5: Prepare Surface and fix tiles

Objective: This module covers the knowledge and skills required to prepare surface and fix tiles.

Duration: 58 Hours

Theory: 10 Hours

Practice: 48 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Prepare for work	Trainee will be able to: - Receive the instructions from Supervisor - Check serviceability of tools and equipment - Select the tools as per job requirement - Select and wear the PPEs relevant to Job. - Identify risk associated with job to be done. - Calculate material quantity in accordance with specifications - Plan task sequence	- Describe purpose of surface preparation - Explain types of surface preparation materials. - Describe finishing materials. - State processes for the calculation of material requirements, quality requirements - Define tiles - State types of tiles - Explain classification of tiles Practical activity: Calculate the materials and tools required for surface preparation and tile fixing in lab.	Theory-1.5 Hrs Practical-03 Hrs Total- 4.5 Hrs	Pencil Eraser Notebook	Class Room



National Certificate of Level-3 in Construction Material Assistant



LU2. Prepare materials for tiling application	Trainee will be able to: - Check floor and wall tiling materials to ensure they are suitable and meet specifications. - Carry out material preparation to satisfy the requirements of the specified application process.	- Explain types of materials used for fixing tiles. - Define adhesives. - Describe properties of adhesives. - Describe processes for preparation of fixing materials. Practical activity: Prepare materials for tiling application in lab.	Theory-01 Hrs Practical-03 Hrs Total- 04 Hrs	Shovels Spatulas Sponges Bucket	Class Room and construction lab
LU3. Prepare underlay and sheeting substrate	Trainee must be able to: - Provide assistance with underlay preparation under supervision. - Finish substrate surface to specification, with joints flush and sealed.	- Definition of substrate. - Describe importance of substrate - State types of substrates - State various materials used as substrate Practical activity: Place underlay and sheeting substrate in lab	Theory-01 Hrs Practical-03 Hrs Total- 04 Hrs	Shovels Spatulas Sponges Bucket	Class Room and construction lab
LU4. Prepare render substrate surface	Trainee must be able to: - Detach safely surface-mounted construction units and attachments. - Clean surfaces of substrate structure to remove all loose material.	- State procedure to prepare substrate surface. - Define rendering. - Define curing. - Define splash coat. Practical activity	Theory-01 Hrs Practical-03 Hrs Total-04 Hrs	Shovels Spatulas Sponges Bucket	Class room and construction lab



National Certificate of Level-3 in Construction Material Assistant



	• Mix proportion of materials for splash coat as per instructions ready for application to wet surface. • Prepare horizontal and vertical surrounds for tiling process in accordance with type of tile and specified finish. • Mix proportion of materials for render coat as per instructions ready for application. • Scratch, render, cure and dry Surface in accordance with specifications for tile application.	Prepare render substrate surface in lab.			
LU5. Cut tiles as required.	Trainee must be able to: • Cut tiles without jagged or damage to tile surfaces or finish, in accordance with workplace procedures and manufacturer recommendations. • Cut by hand or machine recess hole or curve to shape and size and to specified tolerance.	• Explain procedure to cut the tiles. • State methods of tile cutting • Describe edges requirements • Define Recess holes Practical activity Cut tiles as required in lab.	Theory-01 Hrs Practical-09 Hrs Total 10 Hrs	Tile cutters Measuring tape	Class room and construction lab



National Certificate of Level-3 in Construction Material Assistant



	Form a miter by edging tile jolly so that biscuit is not exposed at the joint in accordance with workplace procedures and manufacturer recommendations.				
LU6. Fix wall tiles	Trainee must be able to: - Prepare and apply mortar and/or adhesive to tile surface in accordance with manufacturer recommendations. - Prepare and fix tiles with pad tiles set to level alignment. - Check horizontal joint for straightness, and check tile edges and surface alignment for conformity. - Fix tiles to alignment maintaining designed pattern to specification. - Cut bottom course and fix to create a rake or square corner in accordance with drawings and specification.	- Describe procedure to fix tiles. - Describe procedure to check alignment Practical activity Fix wall tiles in lab.	Theory-01 Hrs Practical-06 Hrs Total- 07 Hrs	Brooms, Brushes, Buckets Caulking guns, Concrete mixers Ladders, Levelling equipment, Measuring tapes and rules, mortar boards power sanders Sanding blocks, scrapers, shovels, spacers and wedges Spatulas, sponges, straight edges, string lines Trowels wheelbarrows, wire brushes,	Class Room and construction lab



National Certificate of Level-3 in Construction Material Assistant



	• Fix splayed, manufactured, formed coves in accordance with drawings and specifications. • Finish vertical tiles plumb and true to square corners. • Maintain Joints straight and uniform in width with due allowance for tolerance of tile sizes. • Build in control joints, in accordance with specifications and manufacturer recommendations. • Make miter joints, maintaining glazing on miter without damage to tile surfaces or finish and maintaining uniformity of miter in accordance with company procedures and manufacturer recommendations			wooden floats Work platforms Tile cutters and scribes trowels	
LU7. Apply tiles on external corners.	Trainee must be able to: • Check setting out for plumb, level and check square be within specified tolerance.	• Explain Setting out techniques of tiles for external corners Practical activity Apply Tiles to external corners in lab	Theory-01 Hrs Practical-06 Hrs Total 07 Hrs	Brooms, Brushes, Buckets Caulking guns, Concrete mixers	Class Room and construction lab



National Certificate of Level-3 in Construction Material Assistant



	- Check external corners to ensure surface intersections are straight. - Fix curved bead angle trim or tiles so that external return and bead are square and measurements are accurate to junction with tiles and set out, where applicable. - Fix tiles with minimum voids in tile bed while maintaining fully bedded alignment to specifications. - Keep corner square within specified tolerance and finish to specifications.			Ladders, Levelling equipment, Measuring tapes and rules, mortar boards power sanders Sanding blocks, scrapers, shovels, spacers and wedges Spatulas, sponges, straight edges, string lines Trowels wheelbarrows, wire brushes, wooden floats Work platforms Tile cutters and scribes trowels	
LU8. Apply tiles on internal corners	Trainee must be able to: Check internal corner to ensure surfaces are flat and intersection is straight.	Explain Setting out techniques of tiles for internal corners Practical activity Apply tiles to internal corners in lab	Theory-01 Hrs Practical-06 Hrs Total- 07 Hrs	Brooms, Brushes, Buckets Caulking guns, Concrete mixers Ladders, Levelling equipment,	Class Room and construction lab



National Certificate of Level-3 in Construction Material Assistant



	• Cut tiles where required and fix one wall to maintain alignment in accordance with set out and specifications. • Cut tiles where required and fixed abutting adjacent wall tiles to line, set out and specifications. • Make joints for abutting tiles are made in accordance with designed margin for grouting or for expansion joint, where applicable, to specifications. • Install coved tile or trim to coved internal wall or wall and floor junctions. • Install coved tile or trim so that line is straight and, where applicable, aligned with set out. • Fix tiles to cove tile or trim and finish to alignment and specifications.			Measuring tapes and rules, mortar boards power sanders Sanding blocks, scrapers, shovels, spacers and wedges Spatulas, sponges, straight edges, string lines Trowels wheelbarrows, wire brushes, wooden floats Work platforms Tile cutters and scribes trowels	
--	--	--	--	---	--



National Certificate of Level-3 in Construction Material Assistant



LU9. Perform grout wall tile face	Trainee must be able to: • Clean and prepare joints to receive grout according to manufacturer specifications. • Mix and apply grout in accordance with workplace and manufacturer specifications and to meet job requirements. • Clean and polish tiles with dry cloth to specifications, removing all dust from surface and joints.	• Define grouting • Explain grouting materials and its characteristics • State methods of grouting Practical activity: Perform grouting on wall tiles in lab.	Theory-01 Hrs Practical-06 Hrs Total- 07 Hrs	Broom Brush Sponge Trowel Spatula Dry and wet cloth Pointed grouter Cement mortar (with and without additives)	Class Room and construction lab
LU10. Perform Clean up.	Trainee must be able to • Clean work area, and dispose of, reuse or recycle waste in accordance with work specifications. • Clean tools plant and equipment, check for faults and maintain & store in accordance with workplace practices	• Describe procedure for maintaining and cleaning equipment and tools. Practical activity: Clean the area and check tools and equipment	Theory-0.5 Hrs Practical-03 Hrs Total- 3.5 Hrs	Brooms Brushes Buckets PPE's	Class Room and construction lab



11.6. Digital Skills

11.6.1 Perform computer operations

Objective: The aim of this module to get knowledge, skills and understanding to Operate Computer Functions (General).

Duration: 12 Hours

Theory: 3 Hours

Practice: 09 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Set up the computer for use	The trainee will be able to: 1. Identify physical components of computer 2. Identify peripheral devices of the computer 3. Connect all components of computer 4. Follow procedures to turn on the computer system	• Basic parts of a computer • Definition of computer • Definition of Drives • Computer component Practical activity: Turn on computer and identify its components.	Theory-01 Hrs Practical-03 Hrs Total- 04 Hrs	White board Multimedia Internet Computer system	Class Room/ Simulated environme nt
LU2. Organize files in folder	The trainee will be able to: 1. Create folders/subfolders with suitable names 2. Save files in relevant folders.	• Importance of organizing files and folders on suitable locations • Procedure to save the files • Procedure to restore deleted folder and files Practical activity:	Theory-01 Hrs Practical-03 Hrs Total- 04 Hrs	White board Multimedia Internet Computer system PPEs	



National Certificate of Level-3 in Construction Material Assistant



	3. Rename and move folders in different drives. 4. Move folders and files using drag and drop techniques 5. Save folders and files on different media 6. Search for folders/subfolders and files using appropriate tool bars 7. Delete Folder files • Restore deleted folder files	Organize files in folder			
LU3. Shut down computer system	The trainee will be able to: 1. Save any work to be retained 2. Close open application programs correctly 3. Shut down computer 4. Switch off any unused peripheral devices • Ensure computer safety	• Peripheral devices Practical activity: Shutting down computer system to ensure computer safety	Theory-01 Hrs Practical-03 Hrs Total- 04 Hrs	White board Multimedia Internet Computer system Safety manuals	Shut down computer system



National Certificate of Level-3 in Construction Material Assistant



11.6.2 Operate word-processing applications

Objective: This module covers the skills and knowledge required to apply workplace health and safety (WHS) practices, create documents, customize basic settings to meet page layout conventions, Format documents, Create tables, Add images and Print documents.

Duration: 25Hours

Theory: 4Hours

Practice: 21Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Apply workplace health and safety (WHS) practices	Trainee will be able to: • Use workplace ergonomic work practices and strategies • Organize work area to ensure an ergonomic work environment	• Explain ergonomic work practices and strategies • Explain ergonomic work environment Practical activity Perform health and safety practices in lab	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	Tools C.P.U Key board Mouse Data cables Printer Multimedia MS Word	Class room and Lab
LU2. Create documents	Trainee will be able to: • Open word-processing application, create document and add data according to information requirements • Use document templates as required • Use simple formatting tools when creating the document	• Describe formatting styles and their effect on formatting, readability and appearance of documents • Differentiate between word Document and Template Practical activity Perform task of creating CV, Application, letter, memo, job letter, test result on MS Word,	Theory-01 Hrs Practice-03 Hrs Total- 04 Hrs	Tools C.P.U Key board Mouse Data cables Multimedia MS Word	Class room and Lab



National Certificate of Level-3 in Construction Material Assistant



	Save document to directory				
LU3. Customize basic settings to meet page layout conventions	Trainee will be able to: - Adjust page layout to meet information requirements - Open and view different toolbars - Change font format to suit document purpose - Change alignment and line spacing according to document information requirements - Modify margins to suit the document purpose	- Explain adjustment of page layout - Describe function of toolbars - Explain procedure of alignment and line spacing in a document Practical activity Perform followings for above documents. - Perform basic settings of page layout in MS Word using computer - Perform paragraph settings - Arrange all open documents	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	Tools C.P.U Key board Mouse Data cables Multimedia MS Word	Class room and Lab
LU4. Format documents	Trainee will be able to: - Use formatting features and styles as required - Highlight and copy text from another area in the document/other document - Insert headers and footers to incorporate necessary data - Save document in another file format	- Explain formatting features - Describe procedure of inserting headers and footers Practical activity Perform formatting of above documents as final document in MS word using Computer	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	Tools C.P.U Key board Mouse Data cables Multimedia MS Word	Lab



National Certificate of Level-3 in Construction Material Assistant



	Save and close document to a storage device				
LU5. Create tables	Trainee will be able to: - Insert standard table into document - Change cells to meet information requirements - Insert and delete columns and rows as necessary - Use formatting tools according to style requirements	- Explain procedure of adding table to the document - Explain method of formatting table to the document Practical activity Perform task of creating table and formatting/ editing on MS word	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	Tools C.P.U Key board Mouse Data cables Multimedia MS Word	Lab
LU6. Add images	Trainee will be able to: - Insert appropriate images into document and customize as necessary - Position and resize images to meet document formatting needs	- Explain procedure of adding images to the document - Describe method to position and resize the image in a document Practical activity Perform task of adding image and formatting for size, position, effects for MS Word	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	Tools C.P.U Key board Mouse Data cables Multimedia MS Word	
LU7. Print documents	Trainee will be able to: - Preview document in print preview mode - Select basic print settings	- Explain procedure to preview document in print preview mode - State basic print settings Practical activity	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	C.P.U Key board Mouse Data cables Multimedia	Class room and Lab



National Certificate of Level-3 in Construction Material Assistant



	• Print document according to requirement.	Perform activity of printing above document		MS Word Printer	
--	--	---	--	--------------------	--



11.6.3 Operate presentation application

Objective: This unit describes the skills and knowledge required to create presentations, customize basic settings, Format presentations, Add, slide show effects, and Print presentation and notes. It applies to individuals in the workplace using fundamental knowledge of power point presentations under direct supervision or with limited responsibility.

Duration: 18Hours

Theory: 3Hours

Practice: 15Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Create presentations using MS Power Point	Trainee will be able to: • Insert Slides with different Layouts according to requirements of presentation. • Insert text, tables, images, etc. according to the requirement. • Apply a set of effects to animate the slide according to requirement. • Apply Slide Transitions on Slides according to requirement. • Apply Sound Effects on Objects/text/images according	• Define presentation • Describe different types of presentations • Describe procedure of applying styles to presentation Practical activity Create presentation using MS power point	Theory-01Hrs Practice-03 Hrs Total- 04 Hrs	Duster Pencils Eraser Sharpener Tools C.P.U Key board Mouse Data cables LCD Printer USB Multimedia Power Point	Class room and Lab



National Certificate of Level-3 in Construction Material Assistant



	to requirement.				
LU2. Customize basic settings	Trainee will be able to: - Adjust display to meet user requirements - Open and view different toolbars to view options - Ensure font settings are appropriate for the presentation purpose - View multiple slides at once	- Describe toolbars of a presentation application - State fonts used MS Power Point Practical activity Perform customizing basic setting to a presentation using power point	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	Duster Pencils Eraser Sharpener Tools C.P.U Key board Mouse Data cables LCD Printer USB Multimedia Power Point	Class room and Lab
LU3. Format presentations	Trainee will be able to: - Add objects to meet presentation requirement. - Import objects and modify presentation - Modify slide layout, including text and colors, to meet presentation requirements - Use formatting tools as required - Duplicate slides within and across a presentation	- Explain formatting tools - Enlist procedure to import objects for presentation purpose. Practical activity Perform formatting of above created presentation on power point	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	Duster Pencils Eraser Sharpener Tools C.P.U Key board Mouse Data cables LCD Printer USB Multimedia Power Point	Class room and Lab



National Certificate of Level-3 in Construction Material Assistant



	• Reorder sequence of slides • Delete slides • Save presentation in another format • Save presentation to the appropriate storage device and folder				
LU4. Add slide show effects	Trainee will be able to: • Apply multimedia effects into presentation as required • Add slide transition effects to presentation • Test presentation for overall effect • Use onscreen navigation tools to start and stop slide show.	• Explain procedure to add slide transition effects to presentation • Enlist onscreen navigation tools in slides Practical activity Add slide show effects on above prepared presentations	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	Duster Pencils Eraser Sharpener Tools C.P.U Key board Mouse Data cables LCD Printer USB Multimedia Power Point	Lab
LU5. Print presentation	Trainee will be able to: • Select appropriate print format for presentation • Select preferred slide orientation	• State print formats for presentation • Describe procedure to add notes in a presentation Practical activity	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	Duster Pencils Eraser Sharpener Tools C.P.U Key board	Lab



National Certificate of Level-3 in Construction Material Assistant



	• Preview slides on print mode • Print selected slides	Perform printing of presentation and notes		Mouse Data cables LCD Printer USB Multimedia Power Point Printer	
--	--	--	--	---	--



National Certificate of Level-3 in Construction Material Assistant



11.6.4 Operate spreadsheet applications

Objective: This module covers the skills and knowledge required to create spreadsheet, customize basic settings, Format spread sheet, incorporate object and chart in spreadsheet and Print spreadsheet

Duration: 18Hours

Theory: 3 Hours

Practice: 15 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU1. Create spreadsheet using MS Excel	Trainee will be able to: • Create worksheet as per given data • Apply formulas according to the requirement • Correct formulas when error messages occur • Edit columns and rows within the spreadsheet • Use the auto-fill function to add data where required	• Explain procedure of creating file on excel • Describe OPERATORS and functions used in formula in spreadsheet Practical activity Create a spreadsheet in excel having formulas for plane and geometrical figures. Also perform basic editing.	Theory-01Hrs Practice-03 Hrs Total- 4 Hrs	Tools C.P.U Key board Mouse Data cables Multimedia Microsoft Excel	Class room and Lab
LU2. Customize basic settings	Trainee will be able to: • Adjust page layout to meet user requirements or special needs • Open and view different toolbars • Change font settings	• Describe toolbars of a spreadsheet • Describe font setting, layout settings and view options setting for excel. Practical activity	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	Tools C.P.U Key board Mouse Data cables Multimedia	Class room and Lab



National Certificate of Level-3 in Construction Material Assistant



	• Change alignment options and line spacing according to spreadsheet formatting features • Format cell to display different styles as required • Modify margin sizes to suit the purpose of the spreadsheets • View multiple spreadsheets concurrently	Perform page setting, font settings, and arrange multiple sheet view in spreadsheet		Microsoft Excel	
LU3. Format spreadsheet	Trainee will be able to: • Use formatting features as required • Copy selected formatting features from another cell in the spreadsheet or from another active spreadsheet • Use formatting tools as required within the spreadsheet • Align information in a selected cell as required • Insert headers and footers using formatting features	• Describe options of cell formatting, use format painter, insert header & footer. • save file in different formatting in spreadsheet Practical activity Perform options of cell formatting, use format painter, insert header & footer, save file in different formatting in spreadsheet	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	Tools C.P.U Key board Mouse USB/Hard drive Data cables Multimedia Microsoft Excel	Class room and Lab



National Certificate of Level-3 in Construction Material Assistant



	• Save spreadsheet as another file type • Save to storage device and close spreadsheet				
LU4. Incorporate object and chart in spreadsheet	Trainee will be able to: • Import an object into an active spreadsheet • Manipulate imported object by using formatting features • Create a chart using selected data in the spreadsheet • Display selected data in a different chart • Modify chart using formatting features	• Explain method to create a chart of a selected data in spreadsheet Practical activity Incorporate object and chart in spreadsheet for scores, test results	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	Tools C.P.U Key board Mouse Data cables Multimedia Microsoft Excel	Class room and Lab
LU5. Print spreadsheet	Trainee will be able to: • Preview spreadsheet in print preview mode • Print spreadsheet or selected part of spreadsheet	• Explain printing options in MS Excel Practical activity Perform printing of in different layout and styles spreadsheet	Theory-0.5 Hrs Practice-03 Hrs Total- 3.5 Hrs	Tools C.P.U Key board Mouse Data cables Printer Multimedia Microsoft Excel	Class room and Lab



11.7. AutoCAD

11.7.1 Perform Drafting Settings

Objective: This module covers the knowledge and skills required to create two dimensional drawings by using various tools and commands, create & modify objects and drawings in AutoCAD to meet specific targets.

Duration: 30 Hours

Theory: 6 Hours

Practice: 24 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1 Set up user interface for require specifications	Trainee will be able to: - Load the AutoCAD software. - Set the units, Limits, coordinate system, Workspace, and Object Snap Settings. - Set up the grid, snap, ortho, tracking settings. - Save AutoCAD drawing files in different file formats (DWG, DWT).	- Basic Drawing Settings - Software Installing - Unit Setting - Co. Ordinates setting - Setting OSNAP - Ortho, tracking settings. - Saving a file of CAD - Printing a file of CAD Practical Activity Perform Set up user interface for require specifications to unit and coordinates setting	Theory-02Hrs Practice-06Hrs Total- 08Hrs	Auto CAD C.P.U Key board Mouse Data cables Multimedia	Class Room + Computer Lab
LU-2 Perform formation of entities- line, line	Trainee will be able to: Setup user interface settings for required specifications	Use Direct distance entry system for drawing lines	Theory-02Hrs Practice-12Hrs Total- 14Hrs	Auto CAD C.P.U Key board Mouse	Class Room + Computer Lab



National Certificate of Level-3 in Construction Material Assistant



type, text, layers, points, dimensioning.	• Load centre line, dashed line, border, dot. • Create layer with lines, colours, weight. • Format text styles & multiline styles. • Format dimension styles. • Format point styles.	• Set U.C.S for different situations • Understanding Basic Commands • Angles and lines setting in AutoCAD • Creating layer and its setting • Loading of centre line and borders • Formatting text style • Formatting Dimension style • Formatting point style Practical Activity Perform exercise formation of entities- line, line type, text, layers, layer, points, dimensioning in Auto CAD Software		Data cables Multimedia	
LU-3 Create templates of sheets sizes A2, A3 & A4 having geometrical figures in 2D.	Trainee will be able to: • Setup user interface settings for required specifications • Format the line, line type, text, layers, points.	• Defining templates • Different geometrical figures • Setting up user interface to given specification • Formatting different lines, text, layers etc.	Theory- 2Hrs Practice-6Hrs Total- 8Hrs	Auto CAD C.P.U Key board Mouse Data cables Multimedia	Class Room + Computer Lab



National Certificate of Level-3 in Construction Material Assistant



	• Draw rectangle with line command by adopting coordinates- rectangular (absolute & relative). • Draw, polygons, ellipse & circle. • Create title block layout for sheets sizes A2, A3 & A4. • Use Design centre for inserting styles in new file.	• Prepare ellipse or polygons • Title block creating • Inserting style and manage different styles • Saving & printing the aid file Practical Activity Create templates of sheets sizes A2, A3 & A4 having geometrical figures in 2D as shown below			
--	--	--	--	--	--



11.7.2 Develop 2D Drawings

Objective: This competency standard deal with learning the competencies needed to create 2D drawings by using various tools and commands in computer. You can create and modify objects and drawings in CAD software to meet specific intentions according to job requirements. Your underpinning knowledge will be sufficient to provide you the basis for your work.

Duration: 55 Hours

Theory: 10 Hours

Practice: 45Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1 Perform basic settings for AutoCAD.	Trainee will be able to: - Setup drawing interface for required specifications - Create formation of entities- line, line type, layers. - Create styles- text, points, multi-lines	- Setting up different commands and tools. - Modify commands and tools. - HATCHING concepts in AutoCAD. - Zooming options - Features of Tools palettes window and their application - Design centre feature- Scale and paper sizes - Multi line formation Practical Activity Perform by “AutoCAD” software basic settings command, modify, Zooming option	Theory-03Hrs Practice-06Hrs Total- 09Hrs	Auto CAD C.P.U Key board Mouse Data cables Multimedia	Computer Lab
LU-2 Execute draw commands objects.	Trainee will be able to: Draw construction lines.	Commands and tools.	Theory- 02Hrs Practice-12Hrs	Auto CAD C.P.U Key board	Computer Lab



National Certificate of Level-3 in Construction Material Assistant



	• Draw lines with precision as per standards. • Draw curves with precision as per standards. • Hide the construction lines layer.	• Describe and use modify commands and tools. • Lines precision • Curve with Precision • Layer with its hide command • Construction of line • Multi Lines Practical Activity Execute by “AutoCAD” software draw lines, multi lines, and construction line and layer commands.	Total- 14Hrs	Mouse Data cables Multimedia	
LU-3 Perform application of Modify tools / commands to delete whole or part of surplus entities.	Trainee will be able to: • Apply FILLET & TRIM, ERASE, BREAK commands to delete whole or part of surplus entities in given scenario. • Apply CHAMFER, EXTEND & FILLET to modify corners. • Apply SCALE, LENGTHEN, STRETCH for multiple purposes.	• Apply draw commands and tools. • Use modify commands and tools. • HATCHING concepts in AutoCAD. • Use zooming options • Features of Tools palettes window and their application • Design centre feature Scale and paper sizes • Fillet & extend command • Chamfer command	Theory-02Hrs Practice-06Hrs Total- 08Hrs	Auto CAD C.P.U Key board Mouse Data cables Multimedia	Computer Lab



National Certificate of Level-3 in Construction Material Assistant



		Practical Activity Execute by “AutoCAD” software commands Fillet, extend, chamfer, Tools palettes window and Design centre feature Scale with different paper sizes.			
LU-4 Change properties of objects to meet set standards.	Trainee will be able to: - Apply ROTATE to rotate & MOVE to move objects. - Use OFFSET, MIRROR, ARRAY & copy to create multiple objects. - Modify properties by SCALE, EXPLODE, PEDIT, JOIN for multiple purposes.	- Rotate command - Move and Shift Command - Mirror & Array command - Modify object with its properties - Scale command - Edit & P. edit command - Join & Explode command Practical Activity Practice on Auto CAD Software to Change properties of objects by rotate, move, shift, mirror, array, join, explode and scale command to meet set standards.	Theory-01Hrs Practice-06Hrs Total- 07Hrs	Auto CAD C.P.U Key board Mouse Data cables Multimedia	Computer Lab
LU-5 Assign symbols to specified materials	Trainee will be able to Set the scale factors for hatching patterns.	- Defining symbols - Hatching of Symbols - Hatching of specified area - Osnap on / off	Theory-01Hrs Practice-09Hrs Total- 10Hrs	Auto CAD C.P.U Key board Mouse Data cables	Computer Lab



National Certificate of Level-3 in Construction Material Assistant



	- Select specified area / object on drawing. - Apply the hatch to the area.	- Edit properties of objects. - Lettering command - Line & Multi line command - Circle and arc command Practical Activity Practice to assigning symbols for specified materials using Auto CAD Software.		Multimedia	
LU-6 Modify drawing objects using properties option.	Trainee will be able to: - Perform inquiry commands to get area & distance of object. - Observe the objects properties- location, linear & angular measurements, and other drafting formations. - Modify the objects properties- location, linear & angular measurements, and other drafting formations	- Extend command - Trim Command - Stretch command - Break and scale drawn items. - Joining of lines - Changing layer colour Practical Activity Practice to Modify drawing objects using properties option on Auto CAD Software by using changing layer command option.	Theory-01Hrs Practice-06Hrs Total- 07Hrs	Auto CAD C.P.U Key board Mouse Data cables Multimedia	Computer Lab



National Certificate of Level-3 in Construction Material Assistant



11.7.3 Develop 3D Drawings

Objective: This module covers the knowledge and skills required to create 3- Dimensional Models by using various tools and commands in AutoCAD software, demonstrate skills to modify 3D objects and models and present a rendered 3D Model final outcome.

Duration: 55 Hours

Theory: 10 Hours

Practice: 45 Hours

Learning Unit	Learning Outcomes	Learning Elements	Duration	Materials Required	Learning Place
LU-1 Develop 3D Objects	Trainee will be able to: • Setup & save 3D Drawing Interface for required specifications • Setup 3D User Interface settings for required specifications • Create 3D Objects with given measurements	• Defining 3D Drawings • Importance of 3D Drawings • Types of 3D Drawings • Set up and interface for 3D Drawings • Creating 3D Drawings • Modifying 3D Drawings Practical Activity Practice to Develop 3D Objects using 2D editing tools as given below.	Theory-04Hrs Practice15Hrs Total- 19Hrs	Drawing Sheets Duster A4-Papers Soft wares Tools C.P.U Key board Mouse Data cables LCD Printer USB Multimedia	Computer Lab
LU-2 Manipulate 3D Objects Using 3D Editing Tools	Trainee will be able to: • Modify 3D Objects in line with the requirements • Make customized 3D Models according to the requirements of the given job	• 3D Navigate Control- functions • Camera setting • Importance of scene creation. • PRESET views such as isometric, top, bottom, front, left, etc. • Modifying 3D Drawing	Theory-03Hrs Practice12Hrs Total- 15Hrs	Drawing Sheets Duster A4-Papers Soft wares Tools C.P.U Key board Mouse	Computer Lab



National Certificate of Level-3 in Construction Material Assistant



	• Convert 3D Face Objects into Single Mesh Objects	• 3D Editing with editing tools • Describe Perspective projection and parallel projection • Describe walk and Constrained Orbit. Practical Activity Practice to Develop 3D Objects using 3D editing tools as given below.		Data cables LCD Printer USB Multimedia	
LU-3 Render 3D Model	Trainee will be able to: • Apply material to required 3D Model as per given specifications • Apply lights to get the requisite scene of required 3D model • Assign cameras to execute different views of required 3D Model • Render and print the 3D model according to required size and orientation	• Defining Rendering • Rendering importance • Rendering command with their application • 3D model material specification • 3D model light requisition scene • Assigning camera with commands • 3D Model orientation Practical Activity Practice to Render different 3D Models using Auto CAD.	Theory- 3Hrs Practice 18Hrs Total- 21Hrs	Drawing Sheets Duster A4-Papers Soft wares Tools C.P.U & LCD Key board Mouse Data cables Printer, USB Multimedia	Computer Lab



12. List of Tools, Equipment and Consumable

07: AutoCAD

S#	Tools and Equipment	S#	Consumable Material
1	Computer latest model with Server		Printer papers
2	Computer latest model work stations		Printer Toner
3	Laptop computer		USB
4	Net working		Printing Paper Roles
5	UPS 2000 Watt with batteries		Plotter Toner
6	Multimedia Projector		
7	Scanner for A-3 paper		
8	Printer LaserJet		
9	USB Sticks		
10	Computer Chair (will be added in furniture portion) without arm rest – 5 legs base		
11	Computer Table (will be added in furniture portion) 2½ x 2 x 2½		
12	License software for education Latest Versions: Auto CAD M.S Office Antivirus Microsoft windows		
13	Plotter		

08: Construction Practices I			
S#	Tools and Equipment	S#	Consumable Material
1.	Brick Making Machine	1.	Sand
2.	Brick Molds	2.	Sand Dust
3.	Hand roller	3.	cement
4.	Thermometer	4.	self-tapping screws
5.	Umbrella with stand	5.	soft sheet nails
6.	PPEs	6.	Wall board adhesive



National Certificate of Level-3 in Construction Material Assistant



7.	Calculator	7.	Distemper
8.	Stone masonry instruments	8.	Knotting & Lashing Rope
9.	Scissor	9.	Lime
10.	Mason Trowel	10.	Paint
11.	Pointing Trowel	11.	Bitumen
12.	Troweling Blades	12.	Polythene Sheet
13.	Hammer	13.	Polythene Role for DPC Bricks
14.	Hammer Forged steel rectangle head	14.	
15.	Lump hammers	15.	Chalk
16.	Hammers (bricks, club and scutch)	16.	Luminous Slip
17.	Sledge hammers	17.	Stone Crush
18.	Air compressors and hoses	18.	Lime beds
19.	Bevels	19.	Pencil,
20.	hand/power saws	20.	Eraser,
21.	Core cutting saw	21.	Sharpener,
22.	Jig saws	22.	Drawing sheet,
23.	Masonry saws	23.	Acoustic underlay material, adhesives
24.	Wet and dry diamond saws	24.	Caulking compound, cement mortar (with and without additives)
25.	Marking equipment	25.	Clouts, cornice adhesive, crack suppression membrane
26.	Measuring tapes and rules,	26.	Fixings and fasteners
27.	Metallic Tape 100 feet (30m)	27.	Patching materials, plasterboard nails, pre-mixed and mixed fillers
28.	Steel Tape- Slide Lock, Automatic Returns, Metallic / plastic case, 5-meter, Graduation on both side in feet & meter	28.	Lime Color (Different)
29.	Measuring scale,	29.	Tile Bond
30.	Nail guns	30.	Tile Spacer (Different Sizes)
31.	Protractors	31.	Brick Ballast
32.	squares (combination/tri)	32.	Road Metals



National Certificate of Level-3 in Construction Material Assistant



33.	steel squares and fences	33.	Thermophore for Joints 2" & 1" thick
34.	string lines	34.	Water Stopper for Concrete (Plastic)
35.	Line blocks and line pins	35.	Barrel bolts, Cabin hooks closers, Dead bolts, Flash bolts, flashings, handles hinges (butt and parliament), Latches, locks, Metal, Night latches, Passage sets, Timber.
36.	builders' lines	36.	Windows may include: All size windows, Casement, Double hung, Glazed sliding doors, curved and bay, Hopper, Straight and sliding
37.	static lines		
38.	Compass		
39.	Corner Float and float Blades		
40.	Steel float Set (Small, medium, large) Wooden Handle		
41.	Wooden Float (Small, medium, large) Wooden Handle		
42.	Groove Cutter		
43.	Cement sheet cutters		
44.	Tile cutters		
45.	Edger		
46.	Brooms		
47.	Polishers		
48.	Hand Grinders		
49.	Power grinders		
50.	Vibrator		
51.	Vibrating Rod		
52.	Form work		
53.	Molds		
54.	Workability test apparatus		
55.	Core cutting machine		
56.	Hand Drill Machines with drills		
57.	Power drill machines with drills		



National Certificate of Level-3 in Construction Material Assistant



58.	Sheet plate		
59.	Plate bar		
60.	Plate rod		
61.	Adjustable base plates		
62.	Channels		
63.	Forgings area		
64.	Casting platform		
65.	Furnace		
66.	Wheel Barrow:		
67.	Bucket		
68.	Paint Scraper Set		
69.	Potien Filler Knife Set		
70.	Chisel Set (9"-12"-18")		
71.	Plumb Bob		
72.	plumb rules		
73.	Straight Edge		
74.	Shovels with handle		
75.	Kassi (Plies) with handle		
76.	Spirit Level (Aluminum 2 ft. length)		
77.	torpedo levels		
78.	Dumpy Level		
79.	Pick Axe		
80.	Tray (Galvanized Iron, 14 SWG) SET		
81.	Pointing Tray		
82.	Striker for vertical joint (pointing)		
83.	Striker for horizontal joint (pointing)		
84.	Bamboo (10 feet)		
85.	Bamboo (15 feet)		



National Certificate of Level-3 in Construction Material Assistant



86.	Battens (5'x3½"x2½")		
87.	Shesham Wood Planks (7'x7"x1½")		
88.	Mortar Pan -GI Sheet (20 SWG) Size, 45 cm dia		
89.	mortar boards		
90.	Adjustable Wrench Set- * Hardened Steel, tempered and chrome plated, * Set include 8" (20cm), 12" (30cm), 18" (45cm)		
91.	Mixing Spoon Set- heavy gauge stainless steel, 150mm, 200mm, and 250mm long, round bottom		
92.	Concrete mixers		
93.	Elevators		
94.	Forklifts		
95.	jointing tools		
96.	Margin or raking tools		
97.	materials hoists		
98.	Cantilevered hoists (materials only with maximum capacity of 500kg)		
99.	Wall Scaffolds		
100.	scaffold belts		
101.	scaffolding planks		
102.	bracket scaffolds (tank and formwork)		
103.	prefabricated scaffolds		
104.	braces		
105.	small petrol or diesel engines and compressors,		
106.	Bolsters		
107.	brick buggies		
108.	brick grabs		
109.	Bends and hitches		
110.	box spanners		
111.	Couplers and accessories		
112.	Fiber ropes		



National Certificate of Level-3 in Construction Material Assistant



113.	Gin wheels		
114.	guard rails		
115.	Ledgers		
116.	Mesh guards		
117.	mid rails		
118.	modular and prefabricated components		
119.	Safety nets		
120.	Stairs or ladders		
121.	Standards		
122.	steel and aluminum tubes (pipes)		
123.	transoms		
124.	Wire nips		
125.	Pallet trolleys		
126.	profiles		
127.	Brushes		
128.	Caulking guns		
129.	Electrical leads		
130.	Hose and water sprays		
131.	Nippers		
132.	Pointed grouters		
133.	power screwdrivers		
134.	sanders		
135.	Rags		
136.	rubber mallets		
137.	Sanding blocks		
138.	spacers and wedges		
139.	Spatulas		
140.	sponges, squeegees		



National Certificate of Level-3 in Construction Material Assistant



141.	wire brushes,		
142.	Work platforms		
143.	scribes		

13. Members of Curriculum Development Committee

The following members participated in the Curriculum development Committee:

S#	Name	Designation	Organization
1	Engr. Azhar Iqbal Shad	Chief Instructor (Civil)	GCT Raiwnd Road, LHR
2	Mr. Imtiaz Ahmed Awan	Sr. Instructor (Civil)	GCT Rasul (Mandi Bahauddin)
3	Mr. Muhammad Amjad Rafique	Sr. Instructor (Civil)	GCT Rasul (Mandi Bahauddin)
4	Mr. Nadeem Zaigham	Sr. Instructor (Civil)	GCT Raiwnd Road, LHR
5	Mr. Tahir Mahmood	Sr. Instructor (Civil)	GTTI Mughalpura Lahore
6	Engr. Norheen Amina	Consultant	Allied Engineering Services Lahore
7	Engr. Hira Ishtiaq	Consultant.	Allied Engineering Services Lahore
8	Engr. Habiba Mohsin	Design Engineer	JERS Engineering Consultants Lahore
9	Engr. Rebab Maria Mahmood	Site Engineer	IMC Lahore/ Industry
10	Engr. Arsalan Hameed Khan	Assistant Manager (Project)	Planning & Project department Lahore Waste Management Company.
11	Engr. Muhammad Usamn Hayder	Project Manager	Muzaffar Sons Construction Private Lahore
12	Engr. Inayat-ur-Rehman	DACUM, Facilitator	Peshawar
13	Mr. Muhammad Ishaq	Director HR	NAVTTTC, Islamabad