



National Vocational Certificate level-3, in (Construction Materials Assistant)



Competency Standards

National Vocational and Technical Training Commission
(NAVTTTC) Government of Pakistan



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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



3. Core competencies of the Qualification

The construction Materials Testing Technology qualifications of level 3 consists 20% Theory and 80% Practical. The Core competencies of this qualification are as follows:

11.04 Basic Lab Testing

No.	Name of Occupations and Competency Standards	Level	Contact Hour		
			Th	Pr	Total
11.04.1	Maintain testing tools & equipment.	3	9	54	63
11.04.2	Operate and maintenance of the testing instrument & equipment.	3	12	60	72
11.04.3	Conduct laboratory work for testing construction materials	3	12	33	45
11.04.4	Process and present test data	3	8	21	29
11.04.5	Work in a team Environment	3	6	12	18
Total			47	180	227

11.05 Construction Practices I

No.	Name of Occupations and Competency Standards	Level	Contact Hour		
			Th	Pr	Total
11.05.1	Lay out Building plans	3	6	21	27
11.05.2	Carry out brick work	3	6	21	27
11.05.3	Apply plaster	3	6	21	27
11.05.4	Construct masonry steps and stairs	3	7	21	28
11.05.5	Prepare Surface and fix tiles	3	10	48	58
Total			35	132	167

11.06 Digital Skills

No.	Name of Occupations and Competency Standards	Level	Contact Hour		
			Th	Pr	Total
11.06.1	Perform computer operations	3	3	9	12
11.06.4	Operate word-processing applications	3	4	21	25
11.06.5	Operate spreadsheet applications	3	3	15	18
11.06.6	Operate presentation packages	3	3	15	18
Total			13	60	73

11.07 AutoCAD

No.	Name of Occupations and Competency Standards	Level	Contact Hour		
			Th	Pr	Total
11.07.1	Perform Drafting Settings	3	6	24	30
11.07.2	Develop 2d Drawings	3	10	45	55
11.07.3	Develop 3d Drawings	3	10	45	55
Total			26	114	140
Total of Level 3			121	486	607



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 **04-08-2020 to 08-08-2020** and will remain valid for 10 years

5. Codes of Qualifications

The International Standard Classification of Education (ISCED) is a framework for assembling, compiling and analyzing cross-nationally comparable statistics on education and training. ISCED codes for these qualifications are assigned as follows:

ISCED Classification for Construction Materials Testing level-5	
Code	Description
	Level 2 National Qualification Certificate, in “construction Materials Sampler”
	Level 3 National Qualification Certificate, in “Construction Materials Assistant”
	Level 4 National Qualification Certificate, in “construction Materials Technician”
	Level 5 National Qualification Diploma, in “construction Materials Supervisor”

6. Members of Qualifications Development Committee

The following members participated in the qualification's development and validation of these qualifications:

S#	Name	Designation	Organization
1	Engr. Azhar Iqbal Shad	Principal	GCT Raiwnd Road, LHR
2	Mr. Nadeem Zaigham	Senior Instructor	GCT Raiwnd Road, LHR
3	Mr. Imtiaz Ahmad Awan	Sr. Instructor Civil	GCT Rasul (M.B.Din)
4	Muhammad Amjad Rafique	Sr. Instructor Civil	GCT Rasul (M.B.Din)
5	Mr. Liaquat Ali Sajid	Sr. Instructor Civil	GCT Rasul (M.B.Din)
6	Engr. Arslan Hameed	Research, Associate Officer	Planning & Project Deptt. Lahore
7	Engr. Ayub Nasir	Site Material Testing Engr.	Ex. FWO Islamabad
8	Engr. Inayat ur Rehman	DACUM, Facilitator	Peshawar
9	Muhammad Ishaq	QDC Coordinator	NAVTTTC, Islamabad



7. Members of Qualifications Validation Committee

The following members participated in the qualification's development and validation of these qualifications:

S#	Name	Designation	Organization
1	Engr. Azhar Iqbal Shad	Principal	GCT Raiwind Road, LHR
2	Mr. Nadeem Zaigham	Senior Instructor Civil	GCT Raiwind Road, LHR
3	Mr. Imtiaz Ahmad Awan	Senior Instructor Civil	GCT Rasul (M.B.Din)
4	Mr. Muhammad Amjad Rafique	Senior Instructor Civil	GCT Rasul (M.B.Din)
5	Engr. Abdul Rasheed	Associate Professor Civil	GCT Peshawar KPTEVTA
6	Engr. Norheen Amina	Consultant	Allied Engg Services/ Lahore
7	Engr. Rebab Maria Mahmood	Site Engineer	IMC Lahore/ Industry
8	Engr. Habiba Mohsin	Project Manager	Jers Engg Lahore/ Industry
9	Mr. Muhammad Dawood Bashir	STI	GCT Mirpur AJK TEVTA
10	Mrs. Syeda Fatima Iqbal	Representative	PBTE Lahore
11	Mr. Liaqat Ali Jhamroo	Representative	STEVTA
12	Engr. Inayat ur Rehman	DACUM, Facilitator	Peshawar
13	Mr. Muhammad Ishaq	QDC Coordinator	NAVTTTC, Islamabad

8. Entry Requirements

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

1. A person having National Vocational Certificate level 2, in Construction Materials Assistant for entry in level 3.

9. Scheme of Studies

Construction Materials Assistant Level-3

S#	Occupation/ Subjects	Category	Total Contact Hours			Credit	Periods Per Week			No. of Weeks
			Th	Pr	Total		Th	Pr	Total	
11.4	Basic Lab Testing	Technical	47	180	227	22.7	3	11	14	16
11.5	Construction Practices-I	Technical	35	132	167	16.7	2	8	10	16
11.6	Digital Skills	Technical	13	60	73	7.3	1	4	5	16
11.7	AutoCAD	Technical	26	114	140	14	2	7	9	16
		Allied								
	Total		121	486	607	60.7	8	30	38	



10. A- Occupation Packaging of Construction Materials Testing

S.#	Name of Occupation	Level	Generic Skills	Core Skills
1.	Building Materials Sampler	2	11.2.1,11.2.4, 11.2.5	11.1.01, 11.1.02, 11.1.03, 11.1.05, 11.2.6
2.	Highway Materials Testing Sampler	2	11.2.1,11.2.4, 11.2.5	11.1.01, 11.1.03, 11.1.04, 11.1.05, 11.1.06, 11.2.6
3.	Building Materials Assistant	3	11.6.4, 11.6.5, 11.4.5	11.4.1 to 11.4.4, 11.6.1, 11.7.1, 11.7.2
4.	Highway Materials Testing Assistant	3	11.6.4, 11.6.5, 11.4.5	11.4.1 to 11.4.2, 11.2.4, 11.6.1, 11.9.1 to 11.9.5
5.	Building Materials Technician	4	11.12.5, 11.12.7, 11.24.3	11.10.1 to 11.10.6, 11.14.1 to 11.14.10, 11.15.1 to 11.15.4, 11.16.1 to 11.16.3, 11.21.3, 11.23.1 to 11.23.6.
6.	Highway Quality Control Inspector	4	11.12.5, 11.12.7, 11.24.3	11.9.1 to 11.9.9, 11.13.1 to 11.13.7, 11.16.1 to 11.16.3, 11.19.2, 11.21.3
7.	Bridge Inspector (NDT)	4	11.12.5, 11.12.7, 11.24.3	11.22.1 to 11.22.11, 11.23.1 to 11.23.12
8.	Public Health Quality Control Inspector	4	11.12.5, 11.12.7	11.11.1 to 11.11.5, 11.22.8 to 11.22.10
9.	Construction Plants Operator	4	11.12.5, 11.12.7, 11.24.3	11.13.8, 11.17.1 to 11.17.3
10	Field Testing Lab Assistant	3	11.6.1, 11.6.3, 11.6.4, 11.6.5	11.4.1, 11.1.1, 11.1.3, 11.1.4, 11.1.5, 11.1.6, 11.3.8, 11.9.1 11.9.4, 11.10.1, 11.10.3, 11.14.1 to 11.17.3
11.	Field Testing Lab Technician	4	11.2.6, 11.2.8, 11.2.9, 11.2.10, 11.2.11,11.2.15,	11.4.1, 11.1.2, 11.1.3, 11.1.4, 11.1.5, 11.1.6, 11.4.3, 11.4.4, 11.3.8, 11.9.1, 11.9.3, 11.9.4, 11.9.8, 11.10.1 to 11.10.3, 11.10.5, 11.14.1, 11.14.3



10. B-Qualification Packaging of Construction Materials Testing

S.#	Name of Qualification	Level	Generic Skills	Core Skills
1	Construction Materials Sampler	2	11.2.1 to 11.2.5	11.1.1 to 11.1.6, 11.2.6, 11.3.1 to 11.3.8
2	Construction Materials Assistant	3	11.4.5, 11.6.1 to 11.6.6	11.4.1 to 11.4.5, 11.5.1 to 11.5.4, 11.7.1 to 11.4.3
3	Construction Materials Technician	4	11.12.1 to 11.12.8	11.8.1 to 11.8.7, 11.9.1 to 11.9.9, 11.10.1 to 11.10.6, 11.11.1 to 11.11.5, 11.13.1 to 11.13.8, 11.14.1 to 11.14.10, 11.15.1 to 11.15.4
4	Construction Materials Supervisor	5	11.24.1 to 11.24.9	11.16.1 to 11.16.3, 11.17.1 to 11.17.3, 11.18.1 to 11.18.3, 11.19.1 to 11.19.5, 11.20.1 to 11.20.2, 11.21.1 to 11.21.4, 11.22.1 to 11.22.11, 11.23.1 to 11.23.12



11. Detail of Qualifications and its Competency Standards

B. National Qualification Certificate Level-3 in Construction Materials Assistant

11.4. Basic Lab Testing

11.4.1. Maintain testing tools & equipment.

Overview: This competency standard 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 .

Competency Units	Performance Criteria
CU1. Select tools & equipment for specific testing job.	P1. Identify the tools & equipment. P2. Prepare the list of tools & equipment for specific testing job. P3. Collect the tools & equipment from the store. P4. Clean and lubricate the tools & equipment. P5. Place tools and equipment at appropriate place.
CU2. Maintain the tools & equipment.	P1. Identify the appropriate measuring tools as per material as well as test requirements P2. Check Physical Condition of Tools & Equipment before use P3. Perform measurements with the measuring tools such as; measuring tape, measuring jar, metal gauge, Vernier calliper, micro meter, weighing balance, pressure gauges and thermometer etc. P4. Perform routine maintenance as per standards. P5. Clean the tools & equipment after use P6. Place tools and equipment at appropriate place after use.
CU3. Calibrate the measuring tools.	P1. Check the calibration status of the measuring tools as per specified procedure/standards P2. Perform calibration of measuring tools as per standard procedure. P3. Report the calibration test result.
CU4. Follow the standard house keeping	P1. Arrange the testing tools and equipment at appropriate positions in store.



procedures in lab and field	P2. Protect instrument and equipment from heat, dust and moisture. P3. Carry and store loose and fluid materials like chemical admixtures as per standard safety practices. P4. Identify and label the damaged and out of order tools and equipment. P5. Maintain the inventory record of tools, instruments and equipment. P6. Prepare the maintenance log sheet of tools & equipment.
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Knowledge & Understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- K1.** State Basic measuring units and it's inter-conversion
- K2.** Identify different Tools and Equipment
- K3.** Check Physical Condition of Tools & Equipment before use
- K4.** Perform maintenance as per standards
- K5.** Prepare list of the required tools
- K6.** Calibrate the measuring tools and Calibration techniques and importance
- K7.** Storing of tools and equipment at appropriate place
- K8.** State Inventory Management
- K9.** Describe Preventive and corrective measures for tools and equipment

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Identify Tools and Equipment
- Check Physical Condition of Tools & Equipment before use
- Perform maintenance as per standards
- Prepare list of the required tools
- Calibrate the measuring tools.
- Storing of tools and equipment at appropriate place
- Inter convert measuring units

TOOLS AND EQUIPMENT'S

Measuring Tape	Standard cement cube molds
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Metallic Tri-Square	Gauging trowel
Spirit level	Standard sieves for Fine aggregate tests
Steel scale	Standard sieves for coarse aggregate test
Weighing balance	Pycnometer
Weighing dishes	calibrated volume measure for density test,
Enameled trays	tamping rod
Desiccators	Brushes
Thermometers,	Funnels
Vernier calipers	Graduated glass measuring cylinders
Stopwatch	Slump cone Apparatus
Straight edge	compacting factor test apparatus
measuring tape	Flow table test apparatus
Vicat apparatus	Vee Bee test apparatus
Le-Chatelier apparatus	Compression testing machine
Le-Chatelier flask	Casagrande apparatus
Plastic limit test apparatus	Shrinkage test apparatus
Cylindrical metal container	heating oven
elongation gauge	flakiness gauge
Impact value apparatus	Marshall stability test apparatus
Speedy moisture meter apparatus	Skid Resistance /Abrasion value apparatus
Specific gravity bottle	mechanical sieve shaker
flash and fire point test apparatus	bitumen compactor
Safety Helmets	Safety Shoes (Assorted size)
Safety goggles	Safety Apron
Hand gloves	Ear Plug
Lab coat	Face Mask



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

Overview: This competency standard 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.

Competency Units	Performance Criteria
U1. Perform pre-use checks of laboratory equipment	P1. Perform set-up of laboratory equipment for the specified job P2. Perform safety checks in accordance with relevant workplace and instrumental procedures. P3. Identify faulty or unsafe components and equipment and report to appropriate personnel
U2. Operate the standard testing instruments & equipment as per standard operating procedure.	P1. Select the attachment and accessories and check the working conditions as per test requirements. P2. Clean and lubricate the machine and attachment P3. Check the working conditions of gauges & meters and make adjustments accordingly. P4. Select and adjust the loading speed, gauges, and attachments as per requirement and standard operating procedure. P5. Perform operations as per standard operating procedure. P6. Observe and record readings of gauges/monitors.
U3. Conduct routine maintenance of instruments & equipment.	P1. Identify service faults and report for appropriate maintenance /repair P2. Adjust maintenance schedules in accordance with operational requirements P3. Replace or repair damaged, worn and/or spent components or items P4. Lubricate the moving parts and tightening of screws etc. P5. Clean instruments and equipment using recommended cleaning agents and techniques P6. Store instruments and equipment in accordance with workplace and/or manufacturer requirement P7. Update maintenance records in accordance with workplace procedures



U4. Maintain the record.	P1. Fill in the maintenance details in the equipment log book. P2. Report information on unsafe and faulty equipment to the authorities.
U5. Conduct work safely.	P1. Select, fit and use appropriate personal protective equipment (PPE) P2. Follow workplace procedures when carrying out work tasks P3. Keep all work areas clean and free from obstacles P4. Maintain workplace standards of personal hygiene P5. Safely store, transport and dispose of hazardous materials and dangerous goods

Knowledge & Understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- K1.** Knowledge of basic principles of measurement, geometry and arithmetic calculation
- K2.** Know about different type of PPE's used for testing of cement, concrete, bricks, aggregate, soil and bitumen.
- K3.** Know about different types of various tools, instruments and equipment used for testing of cement, concrete, bricks, aggregate, soil and bitumen
- K4.** Know about storing and handling technique of testing tools and equipment used in laboratory.
- K5.** Understand Importance of periodical calibration of testing tools, apparatus, instruments and equipment
- K6.** Check working condition of testing instruments and equipment used for testing of cement, concrete, bricks, aggregate, soil and bitumen
- K7.** Reading, record temperature & monitor the instrument/apparatus as per applicability and requirement
- K8.** Knowledge, working & purpose of compression testing machine and others equipment for testing of cement, concrete, bricks, aggregate, soil & bitumen etc.
- K9.** Proper repair and maintenance of tools and equipment for testing of cement, concrete, bricks, aggregate, soil and bitumen.
- K10.** Function of key components of the laboratory equipment and details of the pre-use, calibration and safety checks and operating procedures for items of equipment used
- K11.** Sources of uncertainty in laboratory equipment operation and their control



K12. Common sources of faults in the instruments or equipment used and details of their repair

K13. workplace procedures for recording maintenance data and reporting results, communicating with service agents and suppliers and ordering stocks

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Performed set-up, pre-use and standard operations of major laboratory equipment using standard procedures.
- Perform routine maintenance of major laboratory equipment using standard procedures.

TOOLS AND EQUIPMENT'S

Weighing balance	Pycnometer
Thermometers,	
Vernier calipers	Graduated glass measuring cylinders
Stopwatch	Slump cone Apparatus
Sieve set	compacting factor test apparatus
rapid moisture content meter apparatus	Flow table test apparatus
Vicat apparatus	Vee Bee test apparatus
Le-Chatelier apparatus	Compression testing machine
Impact value apparatus	heating oven
bitumen compactor	Marshall stability test apparatus
mechanical sieve shaker	Abrasion value apparatus
flash and fire point test apparatus	
Safety Helmets	Safety Shoes (Assorted size)
Safety goggles	Safety Apron
Hand gloves	Ear Plug
Lab coat	Face Mask
Standard cleaning, decontamination and/or disinfection agents and equipment;	workplace procedures, equipment manuals and information/records



11.4.3. Conduct laboratory work for testing construction materials

Overview: This competency standard 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.

Competency Units	Performance Criteria
CU1. Plan the preparatory activities for laboratory tests.	P1. Identify hazards and workplace controls associated with the sample preparation, test methods, reagents and equipment. P2. List and arrange required equipment and materials. P3. Plan work sequences for optimum efficiency and safety.
CU2. Prepare samples/ test pieces	P1. Retrieve samples / test pieces from storage and record their general appearance. P2. Check the accuracy and completeness of accompanying labels and documentation to ensure traceability P3. Compare samples / test pieces with test specifications, record observations and report discrepancies P4. Prepare samples / test pieces in accordance with appropriate test method
CU3. Check equipment before use	P1. Set-up the required laboratory equipment for the specified job P2. Perform pre-use and safety checks in accordance with relevant instrumental procedures. P3. Identify faulty or unsafe components and equipment and report to appropriate personnel P4. Check calibration status of instruments and report any out-of-calibration items to appropriate personnel
CU4. Perform laboratory tests	P1. Conduct tests in accordance with test method and workplace procedures P2. Record data and observations in lab sheets in accordance with workplace procedures P3. Perform calculations as set out in test method P4. Compare calculated results with expected values and



	report atypical results promptly to appropriate personnel P5. Prepare the technical/administrative records and test reports in the specified lab format/sheets in accordance with workplace procedures
CU5. Conduct work safely.	P1. Select, fit and use appropriate personal protective equipment (PPE) P2. Follow workplace procedures when carrying out work tasks P3. Keep all work areas clean and free from obstacles P4. Safely store, transport and dispose of hazardous materials and dangerous goods in accordance with environmental procedures P5. Care for and store equipment, used test pieces and back-up samples in accordance with workplace procedures

Knowledge & Understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- K1.** Knowledge of basic principles of measurement, geometry and arithmetic calculation
- K2.** Know about different type of PPE's used for testing of cement, concrete, bricks, aggregate, soil and bitumen.
- K3.** Know about different types of various tools, instruments and equipment used for testing of cement, concrete, bricks, aggregate, soil and bitumen
- K4.** Know about storing and handling technique of testing tools and equipment used in laboratory.
- K5.** Check working condition of testing instruments and equipment used for testing of cement, concrete, bricks, aggregate, soil and bitumen
- K6.** Reading, record temperature & monitor the instrument/apparatus as per applicability and requirement
- K7.** Knowledge, working & purpose of compression testing machine and others equipment for testing of cement, concrete, bricks, aggregate, soil & bitumen etc.
- K8.** The purpose and principles of construction materials tests performed as part of job role and key preparation/measurement steps in the test methods
- K9.** Pre-use checks and operating test equipment routinely used in job role.
- K10.** Recording and reporting test results, calculations, test observations, and unexpected or atypical results and equipment problems



Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- safely conducted laboratory-based acceptance tests in accordance with workplace procedures and test methods to provide reliable data within the required timeframe

TOOLS AND EQUIPMENT'S

Measuring Tape	Standard cement cube molds
Metal- Tri-Square	Gauging trowel
Spirit level	Standard sieves for Fine aggregate tests
Steel scale	Standard sieves for coarse aggregate test
Weighing balance	Pycnometer
Weighing dishes	calibrated volume measure for density test,
Enameled trays	tamping rod
Desiccators	Brushes
Thermometers,	Funnels
Vernier calipers	Graduated glass measuring cylinders
Stopwatch	Slump cone Apparatus
Straight edge	compacting factor test apparatus
measuring tape	Flow table test apparatus
Vicat apparatus	Vee Bee test apparatus
Le-Chatelier apparatus	Compression testing machine
Le-Chatelier flask	Casagrande apparatus
Plastic limit	test apparatus
Shrinkage	limit test apparatus
Cylindrical metal container	heating oven
IS sieve	flakiness gauge
elongation gauge crushing value apparatus	Marshall stability test apparatus
impact value apparatus	Abrasion value apparatus
rapid moisture content meter apparatus	mechanical sieve shaker
Specific gravity bottle	bitumen compactor
flash and fire point test apparatus	
Safety Helmets	Safety Shoes (Assorted size)



Safety goggles	Safety Apron
Hand gloves	Ear Plug
Lab coat	Face Mask



11.4.4. Process and present test data

Overview: This competency standard 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.

Competency Units	Performance Criteria
CU1. Record and check data	P1. Enter original measurement data and observation into laboratory information system or record sheets as required. P2. Record identities of equipment used, reference standards, methods, standard solutions, operator and necessary information to ensure the traceability of measurement. P3. Check data to identify transcription errors or atypical entries. P4. Rectify errors in data using documented procedures.
CU2. Calculate scientific quantities	P1. Calculate scientific quantities using given formulae and data and estimate uncertainties P2. Ensure calculated quantities are consistent with estimations and expectations P3. Report all calculated quantities using the appropriate units and correct number of significant figures
CU3. Present data	P1. Present data in clearly labelled tables, charts and graphs using given formats and scales. P2. Report all data using the appropriate units and number of significant figures
CU4. Interpret data	P1. Interpret significant features of tables, charts and graphs, including gradients, intercepts, maximum and minimum values, and limit lines P2. Verify the accuracy of transcription of measurement data and processed results. P3. Recognise and report trends in data
CU5. Keep records	P1. File and store data in accordance with documented procedures P2. Maintain the confidentiality of data in accordance with documented procedures and code of conduct.

Knowledge & Understanding.

The candidate must be able to demonstrate underpinning knowledge and understanding required



to carry out tasks covered in this competency standard. This includes the knowledge of:

- K-1.** Procedures for coding, entering, storing, retrieving and communicating data
- K-2.** 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.
- K-3.** Calculate statistical quantities with or without a calculator or computer software. such as mean, median, mode and standard deviation.
- K-4.** Calculate areas, volumes and perimeters of regular shapes.
- K-5.** Concept of average mass, mass percentage, density, specific gravity, moisture, relative and absolute humidity, viscosity and permeability.
- K-6.** Concept of ratios, such as mass to mass, mass to volume and volume to volume percentages.
- K-7.** Explain the concentration, such as molarity, g/100mL, mg/L, mg/L, ppm, ppb.
- K-8.** Calculate colonies per swab surface and cell counts, such as live and dead/total
- K-9.** Concepts of metrology, including: repeatability, precision, accuracy sources of error and uncertainty.
- K-10.** Prepare and present data in the form of tables, graphs, pie charts, bar charts and control charts.
- K-11.** Recognize obvious features and trends in data, including: maximum and minimum values spread of data increasing/decreasing data and rate of change etc.

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Record and present data in the required format accurately.
- Compute simple scientific quantities.
- Verify data and rectifying mistakes
- Verify accuracy of processed data in compliance with specifications of test methods/standards or documented procedures.
- Maintain records and maintaining security of data.

TOOLS AND EQUIPMENT'S

1. Pencil,
2. Eraser,
3. Sharpner,
4. Calculator



11.4.5. Work in a Team Environment

Overview: 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

Unit of Competency	Performance Criteria
CU-1: Obtain and convey Workplace information	P-1 Assess the Specific and relevant information from the appropriate sources P-2 Convey the information using the appropriate medium and ideas. P-3 Use appropriate non- verbal communication. P-4 Identify appropriate lines of communication with supervisors and colleagues. P-5 Use the defined workplace procedures for the location and storage of information. P-6 Inform coworkers and superiors about any deviation P-7 Carry out Personal interaction clearly and concisely.
CU-2: Participate in workplace meetings and discussions	P-1 Express your own opinions P-2 Listen other's point of view without interruption. P-3 Follow the protocols in the courteous manner P-4 Put simple questions about workplace procedures and matters concerning working conditions of employment.
CU-3: Identify own role and responsibility within team	P-1 Identify the individual role and responsibilities within the team environment. P-2 Recognize the roles and responsibility of other team members. P-3 Report relationships within team and external to team are identified P-4 Share report with co-workers
CU-4: Support the co-workers	P-1 Hand over the required materials and tools timely to interfacing team P-2 Work together with co-workers in a synchronized manner. P-3 Address the problems of co-Workers effectively P-4 Report to immediate boss (if required)

Knowledge & Understanding:

K-1 Describe the importance of effective communication



- K-2 Describe the different mode of communication
- K-3 Explain importance of creating cooperative work environment
- K-4 Explain Role and objective of team.
- K-5 Describe different Sources of information
- K-6 Explain risk of failure in team work on the project.
- K-7 Describe the importance of supporting co-workers facing problems
- K-8 Plan work and organize required resources in coordination with team

Critical Evidence(s) Required

- Capable to demonstrate the team work.
- Capable to identify team role and individual task.
- Capable convey the message in the specified format.
- Capable to record minutes of the meeting
- Capable to interpret the work-related documents



11.5. Construction Practices I

11.5.1. Lay out Building plans

Overview: 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

Competency Unit	Performance Criteria
CU-1. Plan and prepare	P1. Obtain work instructions, including plans, specifications, quality requirements and operational details, and apply relevant information for planning and preparation. P2. Follow safety (OHS) requirements in accordance with safety plans and policies. P3. Identify and implement signage and barricade requirements. P4. Select tools and equipment to carry out tasks consistent with job requirements, and check serviceability, and any faults. P5. Calculate material quantity requirements in accordance with plans, specifications and quality requirements. P6. Handle material safely appropriate to the work application
CU-2. Identify and indicate site boundaries.	P1. locate survey pegs at corners of site in accordance with job drawing P2. Set string lines accurately into position to identify site boundary markings in accordance with site plan
CU-3. Set out first line for building alignment.	P1. Identify boundary line from site drawing for setting out. P2. Identify approximate position and length of line at each end for hurdle location in accordance with site plan P3. Install pegs and hurdles/profiles in accordance with job drawing P4. Mark location for line accurately with nails on hurdles/ profiles according to job drawing and specifications
CU-4. Set out right angled corners.	P1. Identify corner of building on set building line and mark with peg in accordance with job drawing. P2. Set up right angle to line from corner peg using triangulation principles. P3. Install hurdles/ profiles and set taut line to right angled



	alignment. P4. check the right angle for accuracy using the 3:4:5 method
CU-5. Install other building lines.	P1. Install hurdles for remaining building lines in accordance with job drawing P2. Mark measurements for remaining building lines P3. Install nails on hurdle for remaining building lines in accordance to site drawing. P4. Set taut string lines into position to nailed location on hurdles
CU-6. Check building lines for square.	P1. Inspect diagonal measurements for square and P2. Adjust lines to provide square P3. Check measurements for accuracy.
CU-7. Clean up work place	P1. Clean work area and dispose of waste in accordance with work specifications. P2. Clean, maintain and store tools plant and equipment in accordance with workplace practices.

Knowledge and understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out the tasks covered in this competency standard. This includes the knowledge of:

- K1.** Knowledge of application and requirements for line, level and plumb in construction projects
- K2.** Explain basic construction processes
- K3.** Describe construction plan, symbols and construction terminology
- K4.** Define different construction terminology
- K5.** Enlist job safety analysis (JSA) and safe work method statements
- K6.** Describe processes for interpreting engineering drawings and sketches
- K7.** Explain processes for setting out
- K8.** Describe project quality requirements
- K9.** Explain site and equipment safety (OHS) requirements
- K10.** Define Types, characteristics, technical capabilities and limitations of setting out devices.

Critical Evidence(s) Required

The candidate needs to produce following critical evidences in order to competent in this competency standard.



- Locate, interpret and apply relevant information, standards and specifications
- Comply with site safety plan, OHS regulations and state and territory legislation applicable to workplace operations
- Comply with organizational policies and procedures, including quality requirements
- Safely and effectively use tools and equipment
- Communicate and work effectively and safely with others
- Set out a full-size L shape building on a relatively level site to specifications.

Instruments & Consumables

S No.	Description (Instruments)
1	Signage & Barricade equipment's
2	Surveying pegs
3	Measuring Tape
4	Nails
5	PPE's
6	Theodolite
7	Auto level
8	Spirit level
9	Ledgers Timber Nails
10	String line
11	Pegs
12	Hurdles/Profiles

11.5.2. Carry out brick work

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

Competency Unit	Performance Criteria
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CU-1. Plan work	P1. Receive the instructions from Supervisor P2. Check serviceability of tools and equipment P3. Identify risk associated with job to be done. P4. Select and wear appropriate PPEs. P5. Calculate material quantity in accordance with specifications.
CU-2. Set out brickwork/ block work	P1. Select brick as per job requirement P2. Develop work platform in accordance with workplace requirements. P3. Identify location and structural details of brickwork/ block work from plans. P4. Set out base brickwork construction, according to dimension and specification.
CU-3. Install damp proof course	P1. Prepare mortar mix for bricks/blocks P2. Determine brick work/ block work gauge P3. Prepare set out rod. P4. Level base brickwork/block work for laying DPC P5. Install sub-floor ventilation in accordance with specifications.
CU-4. Clean up	P1. Clean work area, and waste disposed of, reused or recycled in accordance with work specifications. P2. Clean, maintain and store tool, plant and equipment in accordance with workplace practices

Knowledge and understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out the tasks covered in this competency standard. This includes the knowledge of:

- K1.** Explain brick and block expansion and growth, control and articulation joints
- K2.** Describe brick bond patterns
- K3.** Explain the characteristics and applications of materials for masonry veneer construction

Critical Evidence(s) Required

The candidate needs to produce following critical evidences in order to competent in this competency standard.

Construct a section of a brick veneer building, including set out and gauge brickwork to a base; damp proof course (DPC) if applicable, weep holes, air vents, control joints and veneer ties; lintels and flashings; brick gables; and brick sills and flashings, completing all to specifications.



Instruments & Consumables

S No.	Description (Instruments)
1	Construction Lab Tools
2	• Bolsters • Brick buggies and brick grabs • Brooms • Buckets • Concrete mixers • 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 rulers • Mortar boards • Plumb rules • Profiles • Shovels • Spirit levels • Straight edges • String lines • Trowels • Wheelbarrows • Bricks • Cement • Water • Damp Proof Course • Safety Helmets • Safety Goggles • Safety Shoes (Assorted Size) • Safety Apron • Ear Plug • Hand Gloves • Lab Coat

11.5.3. Apply plaster

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

Competency Units	Performance Criteria
CU1. Prepare for work	P1. Select the tools as per job requirement



	P1. Select and wear the PPEs relevant to Job. P2. Identify risk associated with job to be done. P3. Calculate material quantity in accordance with specifications P4. Erect barricades, hoardings, signage in the hazardous areas. P5. Plan task sequence
CU2. Prepare mortar mix	P1. Prepare the mixing machines for mixing of mortar as per the job requirement. P2. Mix materials as per job requirement P3. Transport mortar mix as per the job requirement
CU3. Prepare scaffolding	P1. Prepare scaffolds components as per the job requirement P2. Erect and assemble scaffolds components as per the job requirements P3. Dismantle scaffolding as per the job requirement P4. Store or stockpile components according to standard procedures.
CU4. Perform plastering work	P1. Prepare the surface to be plastered as per the job requirement P2. Prepare cement slurry as per the job requirement P3. Apply mortar mix as per the job requirement P4. Cure the plastered surfaces as per the job requirement

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- Explain occupational Health and Safety (OHS) Regulations
- Explain composition, properties and specifications of plastering materials
- Describe economic use of materials
- Explain procedure for estimation of materials
- Describe purpose of plastering/pointing
- Enlist types of plaster/pointing
- Explain methods of plastering/pointing
- Explain defects in plastering/pointing
- Define curing
- Demonstrate repair and maintenance work

Critical Evidence(s) Required



The candidate needs to produce following critical evidence(s) in order to be competent in this competency standard:

- Demonstrate compliance with occupational health and safety regulations applicable to work operations at all times.
- Mix materials as per the job requirement following standard procedures.
- Plaster to required alignments and thickness following standard practices.

Instruments & Consumables

S No.	Description (Instruments)
1	Personal protective equipment for construction industry.
2	Construction Lab Equipment: • 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 • Screeds (wooden/steel) • Scaffold wrench • Podger • Scaffold Hammer • Scaffolding tool belt and holders • Safety lanyards • Magnetic levels • Cement

11.5.4. Construct masonry steps and stairs

. **Overview:** This competency standard covers the skills and knowledge required to construct masonry steps, stairs and wing walls for different types and styles of buildings. It includes planning, types and styles of stairs and set out and installation of the masonry.



Competency Units	Performance Criteria
CU1. Prepare for work.	P1 Select the tools as per job requirement P2 Select and wear the PPEs relevant to Job. P3 Identify risk associated with job to be done. P4 Calculate material quantity in accordance with specifications P5 Erect barricades, hoardings, signage in the hazardous areas. P6 Plan task sequence.
CU2. Set out brickwork/ block work.	P1. Select brick as per job requirement P2. Develop work platform in accordance with workplace requirements. P3. Check location and relative level of prepared footing from job drawings and specifications. P4. Calculate rise and fall of steps.
CU3. Lay bricks/blocks forming steps and wing walls.	P1. Identify design and profile of steps P2. Prepare mortar mix to required specifications. P3. Construct base brickwork to specifications P4. Apply mortar P5. Set the first riser brick in place P6. Level and flush the brick P7. Set the brick on tread P8. Carry out joints according to work specifications. P9. Clean brick/block faces free of mortar

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- Explain brick bond patterns characteristics and applications of materials for masonry steps and stairs construction
- Explain brick and block expansion and growth, control and articulation joints
- Define construction terminology
- Explain materials storage and environmentally friendly waste management
- Draw plans, specifications and drawings
- Explain processes for the calculation of material requirements
- Demonstrate quality requirements



- Explain techniques of masonry steps and stairs construction
- Explain types, characteristics, uses and limitations of plant, tools and equipment
- Demonstrate workplace and equipment safety requirements

Critical Evidence(s) Required

A person who demonstrates competency in this unit must be able to provide evidence of the ability to:

- Locate, interpret and apply relevant information, standards and specifications
- Safely and effectively use tools, plant and equipment
- Communicate and work effectively and safely with others
- As a minimum, construct a flight of stairs with a minimum of three pre-cast treads, and
- Construct a flight of three solid masonry treads with a parallel wing wall on one side, ensuring:
 - correct identification of requirement and finishing of the tasks
 - correct selection and use of appropriate processes, tools and equipment
 - Completing all work to specification.

Tools and equipment:

- PPE's
- Bolsters
- Brick grabs
- Brooms
- Buckets
- Builders' lines
- Concrete mixers
- Dumpy levels
- Elevators
- Hammers (bricks, club and scotch)
- Hoses
- Jig saws
- Jointing tools
- Line blocks
- Line pins
- Mason's squares
- Masonry saws
- Measuring tapes and rules
- Mortar boards
- Plumb rules



- Margin or raking tools
- Profiles
- Shovels
- Spirit levels
- Straight edges
- String lines
- Trowels
- Wheelbarrows



11.5.5. Prepare Surface and fix tiles

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

Competency Unit	Performance Criteria
CU-1. Plan and prepare.	P1. Receive the instructions from Supervisor P2. Check serviceability of tools and equipment P3. Select the tools as per job requirement P4. Select and wear the PPEs relevant to Job. P5. Identify risk associated with job to be done. P6. Calculate material quantity in accordance with specifications P7. Plan task sequence
CU-2. Prepare materials for tiling application	P1. Check floor and wall tiling materials to ensure they are suitable and meet specifications. P2. Carry out material preparation to satisfy the requirements of the specified application process.
CU-3. Prepare underlay and sheeting substrate	P1. Provide assistance with underlay preparation under supervision. P2. Finish substrate surface to specification, with joints flush and sealed.
CU-4. Prepare render substrate surface	P1. Detach safely surface-mounted construction units and attachments. P2. Clean surfaces of substrate structure to remove all loose material. P3. Mix proportion of materials for splash coat as per instructions ready for application to wet surface. P4. Prepare horizontal and vertical surrounds for tiling process in accordance with type of tile and specified finish. P5. Mix proportion of materials for render coat as per instructions ready for application. P6. Scratch, render, cure and dry Surface in accordance with specifications for tile application.
CU-5. Cut tiles as required.	P1. Cut tiles without jagged or damage to tile surfaces or finish, in accordance with workplace procedures and manufacturer recommendations. P2. Cut by hand or machine recess hole or curve to shape and size and to specified tolerance.



	P3. Form a miter by edging tile jolly so that biscuit is not exposed at the joint in accordance with workplace procedures and manufacturer recommendations.
CU-6. Fix wall tiles	P1. Prepare and apply mortar and/or adhesive to tile surface in accordance with manufacturer recommendations. P2. Prepare and fix tiles with pad tiles set to level alignment. P3. Check horizontal joint for straightness, and check tile edges and surface alignment for conformity. P4. Fix tiles to alignment maintaining designed pattern to specification. P5. Cut bottom course and fix to create a rake or square corner in accordance with drawings and specification. P6. Fix splayed, manufactured, formed coves in accordance with drawings and specifications. P7. Finish vertical tiles plumb and true to square corners. P8. Maintain Joints straight and uniform in width with due allowance for tolerance of tile sizes. P9. Build in control joints, in accordance with specifications and manufacturer recommendations. P10. 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
CU-7. Apply tiles on external corners.	P1. Check setting out for plumb, level and check square be within specified tolerance. P2. Check external corners to ensure surface intersections are straight. P3. 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. P4. Fix tiles with minimum voids in tile bed while maintaining fully bedded alignment to specifications. P5. Keep corner square within specified tolerance and finish to specifications.
CU-8. Apply tiles on	P1. Check internal corner to ensure surfaces are flat and intersection



internal corners	is straight. P2. Cut tiles where required and fix one wall to maintain alignment in accordance with set out and specifications. P3. Cut tiles where required and fixed abutting adjacent wall tiles to line, set out and specifications. P4. Make joints for abutting tiles are made in accordance with designed margin for grouting or for expansion joint, where applicable, to specifications. P5. Install coved tile or trim to coved internal wall or wall and floor junctions. P6. Install coved tile or trim so that line is straight and, where applicable, aligned with set out. P7. Fix tiles to cove tile or trim and finish to alignment and specifications.
CU-9. Perform grout wall tile face	P1. Clean and prepare joints to receive grout according to manufacturer specifications. P2. Mix and apply grout in accordance with workplace and manufacturer specifications and to meet job requirements. P3. Clean and polish tiles with dry cloth to specifications, removing all dust from surface and joints.
CU-10. Perform clean up	P1. Clean work area, and dispose of, reuse or recycle waste in accordance with work specifications. P2. Clean tools plant and equipment, check for faults and maintain & store in accordance with workplace practices

Knowledge and understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out the tasks covered in this competency standard. This includes the knowledge of:

- K1.** Explain surface preparation materials and techniques.
- K2.** Enlist control joints
- K3.** Explain techniques in fixing tiles to walls and corners, including preparation of substrates
- K4.** Describe tiling materials, including tiles, adhesives, mortar, grouting and substrates, their qualities, characteristics, preparation, techniques, applications, limitations and finishing.

Critical Evidence(s) Required



The candidate needs to produce following critical evidences in order to competent in this competency standard.

- Prepare a concrete bathroom floor and pointed fiber cement sheet wall for tiling
- Prepare a timber bathroom floor and pointed fiber cement sheet wall for tiling
- Tile the front and return of a standard framed or bricked bath, including a straight hob between the bath and wall, using adhesive or mortar to fix the tiles; tiles are not to be proud of the bath and coving to floor is to allow for control joints as required.

Instruments & Consumables

S No.	Description (Instruments)
1	Construction Lab Tools
2	• Brooms • Brushes • Buckets • Caulking guns • Cement sheet cutters • Concrete mixers • Electrical leads • Hammers • Hose • Water spray • Ladders • Levelling equipment • Lump hammers • Measuring tapes and rules • Mortar boards • Nippers • Pointed grouters • Power drills • Power screwdrivers • Power grinders • Power sanders and sanders • Rags, rubber mallets



- Sanding blocks
- Saws
- Scrapers
- Shovels
- Spacers and wedges
- Spatulas
- Sponges
- Squares
- Squeegees
- Straight edges
- String lines
- Trowels
- Wet and dry diamond saws
- Wheelbarrows
- Wire brushes
- Wooden floats
- Work platforms

Materials may include:

- Acoustic underlay material
- Caulking compound
- Cement mortar (with and without additives)
- Clouts
- Cornice adhesive
- Crack suppression membrane
- Fixings and fasteners
- Patching materials
- Plasterboard nails
- Pre-mixed and Mixed fillers
- Sand and Cement
- Self-tapping screws
- Soft sheet nails
- Wall board adhesive



11.6. Digital Skills

11.6.1. Perform computer operations

Overview: The competency Standard describe skills and knowledge required to setup a computer system, organize files in folders, and shutdown a computer system.

Unit of Competency	Performance Criteria
CU1. Set up the computer for use	P1. Identify physical components of computer P2. Identify peripheral devices of the computer P3. Connect all components of computer. P4. Follow procedures to turn on the computer system
CU2. Organize files in folder	P1. Create folders/subfolders with suitable names P2. Save files in relevant folders. P3. Rename and move folders in different drives. P4. Move folders and files using drag and drop techniques P5. Save folders and files on different media P6. Search for folders/subfolders and files using appropriate tool bars P7. Delete Folder files. P8. Restore deleted folder files
CU3. Shut down computer system	P1. Save any work to be retained P2. Close open application programs correctly P3. Shut down computer P4. Switch off any unused peripheral devices P5. Ensure computer safety

Knowledge & Understanding

This competency standard will provide knowledge related to:

- Basic parts of a computer
- Definition of computer
- Definition of Drives
- Enlist computer component

Critical Evidence(s) Required

The candidate needs to produce following critical evidence(s) to be competent in this competency standard:



Performance requirements

This competency is to be assessed using standard and authorized work practices, safety requirements and environmental constraints. Demonstrated evidence is required of the ability to:

- Switch on the computer
- Attach Computer component
- Switch on Peripheral devices
- Make a folder in any partition(drive) in hard disk
- Give name to the folder
- Save file in the folder
- delete the folder/File
- Shut down computer
- Selected and used hardware components correctly and according to the task requirement
- Identified and explain the functions of both hardware and software used, their general features and capabilities
- Produced accurate and complete data in accordance with the requirements
- Used appropriate devices and procedures to transfer files/data accurately



11.6.2. Operate word-processing applications

Overview: 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.

Unit of Competency	Performance Criteria
CU1. Apply workplace health and safety (WHS) practices	P1. Use workplace ergonomic work practices and strategies P2. Organize work area to ensure an ergonomic work environment
CU2. Create documents	P1. Open word-processing application, create document and add data according to information requirements P2. Use document templates as required P3. Use simple formatting tools when creating the document P4. Save document in computer
CU3. Customize basic settings to meet page layout conventions	P1. Adjust page layout to meet information requirements P2. Open and view different toolbars P3. Change font format to suit document purpose P4. Change alignment and line spacing according to document information requirements P5. Modify margins to suit the document purpose
CU4. Format documents	P1. Use formatting features and styles as required P2. Highlight and copy text from another area in the document/other document P3. Insert headers and footers to incorporate necessary data P4. Save document in another file format P5. Save and close document to a storage device
CU5. Create tables	P1. Insert standard table into document P2. Change cells to meet information requirements P3. Insert and delete columns and rows as necessary P4. Use formatting tools according to style requirements
CU6. Add images	P1. Insert appropriate images into document and customize as necessary P2. Position and resize images to meet document formatting needs
CU7. Print documents	P1. Preview document in print preview mode P2. Select basic print settings P3. Print document according to requirement



Knowledge & Understanding

- K1. Explain ergonomic work practices and strategies
- K2. Explain ergonomic work environment
- K3. Describe formatting styles and their effect on formatting, readability and appearance of documents
- K4. Differentiate between word Document and Template
- K5. Describe formatting styles and their effect on formatting, readability and appearance of documents
- K6. State how to identify organizational requirements for ergonomics, including work periods and breaks
- K7. Select organizational style guide to use
- K8. Outline purpose, use and function of word-processing software.
- K9. Explain procedure of adding table to the document and formatting/ editing the same
- K10. Explain procedure of adding images to the document
- K11. Describe method to position and resize the image in a document
- K12. Enlist basic print settings
- K13. Explain procedure to preview document in print preview mode

Critical Evidence(s) Required

A person who demonstrates competency in this unit must be able to provide evidence of the ability to create word documents that is clear to the target audience and easy to navigate. The evidence should integrate employability skills with workplace tasks and job roles and verify competency is able to be transferred to other circumstances and environments.

Performance requirements

This competency is to be assessed using standard and authorized work practices, safety requirements and environmental constraints. Demonstrated evidence is required of the ability to:

- follow organizational ergonomic work health and safety (WHS) requirements and practices
- create, open and retrieve documents using customized basic settings
- format documents by creating tables and adding text, objects and images
- Save and prints documents.



11.6.3. Operate Presentation applications

Overview: This unit describes the skills and knowledge required to create presentations, customize basic settings, Format presentations, Add, slide show effects, 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.

Unit of Competency	Performance Criteria
CU1. Create presentations using MS Power Point	P1. Insert Slides with different Layouts according to requirements of presentation. P2. Insert text, tables, images, etc. according to the requirement. P3. Apply a set of effects to animate the slide according to requirement. P4. Apply Slide Transitions on Slides according to requirement. P5. Apply Sound Effects on Objects/text/images according to requirement.
CU2. Customize basic settings	P1. Adjust display to meet user requirements P2. Open and view different toolbars to view options P3. Ensure font settings are appropriate for the presentation purpose P4. View multiple slides at once
CU3. Format presentations	P1. Add objects to meet presentation requirement P2. Import objects and modify presentation P3. Modify slide layout, including text and colors, to meet presentation requirements P4. Use formatting tools as required P5. Duplicate slides within and across a presentation P6. Reorder sequence of slides P7. Delete slides P8. Save presentation in another format P9. Save presentation to the appropriate storage device and folder
CU4. Add slide show effects	P1. apply multimedia effects into presentation as required P2. Add slide transition effects to presentation P3. Test presentation for overall effect P4. Use onscreen navigation tools to start and stop slide show
CU5. Print presentation and notes	P1. Select appropriate print format for presentation P2. Select preferred slide orientation P3. Preview slides on print mode



	P4. Print selected slides
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Knowledge & Understanding

- K1.** list basic technical terminology to read help files and prompts
- K2.** Define presentation
- K3.** Enlist different types of presentations
- K4.** Describe procedure of applying styles to presentation
- K5.** outline the different types of: formal & informal presentations and audience
- K6.** Describe toolbars of a presentation application
- K7.** Enlist fonts used in presentations
- K8.** explain the effect of design and formatting on the readability and usability of presentations
- K9.** Explain organizational charts
- K10.** Enlist procedure to import objects for presentation purpose.
- K11.** outline presentation pitfalls
- K12.** identify suitable presentation effects for different audiences.
- K13.** Enlist onscreen navigation tools in slides
- K14.** Describe procedure to add notes in a presentation

Critical Evidence(s) Required

A person who demonstrates competency in this unit must be able to provide evidence of the ability to presentations that is clear to the target audience and easy to navigate. The evidence should integrate employability skills with workplace tasks and job roles and verify competency is able to be transferred to other circumstances and environments.

Performance requirements

This competency is to be assessed using standard and authorized work practices, safety requirements and environmental constraints. Demonstrated evidence is required of the ability to:

- create, format and prepare presentations for distribution and display
- customize basic settings
- Add slide show effects.



11.6.4. Operate Spread Sheet application

Overview: 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

Unit of Competency	Performance Criteria
CU1. Create spreadsheets using MS Excel	P1. Create worksheet as per given data P2. Apply formulas according to the requirement P3. Correct formulas when error messages occur P4. Edit columns and rows within the spreadsheet P5. Use the auto-fill function to add data where required
CU2. Customize basic settings	P1. Adjust page layout to meet user requirements or special needs P2. Open and view different toolbars P3. Change font settings P4. Change alignment options and line spacing according to spreadsheet formatting features P5. Format cell to display different styles as required P6. Modify margin sizes to suit the purpose of the spreadsheets P7. View multiple spreadsheets simultaneously
CU3. Format spreadsheet	P1. Use formatting features as required P2. Copy selected formatting features from another cell in the spreadsheet or from another active spreadsheet P3. Use formatting tools as required within the spreadsheet P4. Align information in a selected cell as required P5. Insert headers and footers using formatting features P6. Save spreadsheet as another file type P7. Save to storage device and close spreadsheet
CU4. Incorporate object and chart in spreadsheet	P1. Import an object into an active spreadsheet P2. Manipulate imported object by using formatting features P3. Create a chart using selected data in the spreadsheet P4. Display selected data in a different chart P5. Modify chart using formatting features
CU5. Print spreadsheet	P1. Preview spreadsheet in print preview mode P2. Print spreadsheet as per requirement or selected part of spreadsheet



Knowledge & Understanding

- K1. List basic technical terminology related to reading help files and prompts
- K2. Describe the purpose, use and function of spreadsheet applications
- K3. Explain procedure of creating file on excel
- K4. Describe OPERATORS and functions used in formula in spreadsheet
- K5. Describe toolbars of a spreadsheet
- K6. Describe font setting, layout settings and view options setting for excel.
- K7. Explain the effect of formatting and appearance on the readability and usability of spreadsheets
- K8. Describe options of cell formatting, use format painter, insert header & footer.
- K9. save file in different formatting in spreadsheet
- K10. Outline log-in procedures relating to accessing a personal computer (PC)
- K11. Explain method to create a chart of a selected data in spreadsheet
- K12. Explain printing options in MS Excel

Critical Evidence(s) Required

A person who demonstrates competency in this unit must be able to provide evidence of the ability to create technical documentation that is clear to the target audience and easy to navigate. The evidence should integrate employability skills with workplace tasks and job roles and verify competency is able to be transferred to other circumstances and environments.

Performance requirements

This competency is to be assessed using standard and authorized work practices, safety requirements and environmental constraints. Demonstrated evidence is required of the ability to:

- create spreadsheets
- customize basic settings
- format spreadsheets
- create basic formulas
- insert objects and charts in spreadsheets
- Save and print spreadsheets.



11.7. AutoCAD

11.7.1. Perform Drafting Settings

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

Competency Units	Performance Criteria
CU-1. Set up user interface for required specifications	P1. Load the AutoCAD software. P2. Set the units, Limits, coordinate system, Workspace, and Object Snap Settings. P3. Set up the grid, snap, ortho, tracking settings. P4. Save AutoCAD drawing files in different file formats (DWG, DWT).
CU-2. Perform formation of entities- line, line type, text, layers, points, dimensioning.	P1. Setup user interface settings for required specifications P2. Load centre line, dashed line, border, dot. P3. Create layer with lines, colours, weight. P4. Format text styles & multiline styles. P5. Format dimension styles. P6. Format point styles.
CU-3. Create templates of sheets sizes A2, A3 & A4 having geometrical figures in 2D.	P1. Setup user interface settings for required specifications P2. Format the line, line type, text, layers, points. P3. Draw rectangle with line command by adopting coordinates- rectangular (absolute & relative). P4. Draw, polygons, ellipse & circle. P5. Create title block layout for sheets sizes A2, A3 & A4. P6. Use Design centre for inserting styles in new file.

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:



- K-1. Describe and use of Basic Drawing Settings-** Unit setting, Limits setting, User coordinate system, Workspace setting, and Object Snap Settings
- K-2.** Use Direct distance entry system for drawing lines
- K-3.** Set U.C.S for different situations
- K-4. Basic Commands and Concepts-** Angles and lines in AutoCAD
 - a. Differentiate between absolute, relative and polar system
 - b. Explain DIMSTYLE and MTEXT commands
- K-5.** Describe the procedure for Navigation in AutoCAD for AutoCAD classic, 2D
- K-6.** Drafting and Annotation, 3D Modelling and Initial Setup Workspace.
- K-7.** Describe the options in File, Edit, View, Insert, Format, Tools, Draw, modify, Parametric, Windows, help, and Express in AutoCAD classic.
- K-8.** Describe the use of ribbons of “2D drafting and annotation” i.e. Home, Insert, Annotate, Parametric, View, Manage, output and express tools.
- K-9.** Describe the use of various categories in ribbons of Home, Insert, Annotate, Parametric, View, Manage, output and express tools in 2D drafting and annotation menus.
- K-10.** Understand the use of Osnap, inquiry, standard, formatting & other Tool Bars
- K-11.** Understand the use of different ribbons-home, solid, surface, mesh, render, parametric, insert, annotate, view, and manage, output, plug-in, Express Tools.
- K-12.** Describe the use of tool bars of AutoCAD classic i.e. Draw, Modify, Standards, properties, Layers, Osnap, Dimension and their practical application.
- K-13.** Explain the procedure for creation of user tool bars.
- K-14.** Describe Design center feature- Scale and paper sizes
- K-15.** Modify dimension style and text size according to paper size
- K-16.** Apply drafting settings (Units, Limits, Snap, Auto On & Off) and their application

Critical Evidence(s) Required

The candidate needs to produce following critical evidences in order to competent in this competency standard.

- Template of sheets sizes A2, A3 & A4.

Instruments & Consumables

S No.	Description (Instruments)	S No.	Software& Consumable
2	Multimedia Projector	2	AutoCAD
8	Internet Connection		NVQF/Policy Documentation





11.7.2. Develop 2D Drawings

Overview: 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.

Competency Units	Performance Criteria
CU-1. Perform basic settings for AutoCAD.	P1. Setup drawing interface for required specifications P2. Create formation of entities- line, line type, layers. P3. Create styles- text, points, multi-lines
CU-2. Execute draw commands objects.	P1. Draw construction lines. P2. Draw lines with precision as per standards. P3. Draw curves with precision as per standards. P4. Hide the construction lines layer.
CU-3. Perform application of Modify tools / commands to delete whole or part of surplus entities.	P1. Apply FILLET & TRIM, ERASE, BREAK commands to delete whole or part of surplus entities in given scenario. P2. Apply CHAMFER, EXTEND & FILLET to modify corners. P3. Apply SCALE, LENGTHEN, STRETCH for multiple purposes.
CU-4. Change properties of objects to meet set standards.	P1. Apply ROTATE to rotate & MOVE to move objects. P2. Use OFFSET, MIRROR, ARRAY & copy to create multiple objects. P3. Modify properties by SCALE, EXPLODE, PEDIT, JOIN for multiple purposes.
CU-5. Assign symbols to specified materials	P1. Set the scale factors for hatching patterns. P2. Select specified area/ object on drawing. P3. Apply the hatch to the area.
CU-6. Modify drawing objects using properties option.	P1. Perform inquiry commands to get area & distance of object. P2. Observe the objects properties- location, linear & angular measurements, and other drafting formations. P3. Modify the objects properties- location, linear & angular measurements, and other drafting formations

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to



carry out tasks covered in this competency standard. This includes the knowledge of:

- K-1. Apply draw commands and tools.
- K-2. Describe and use modify commands and tools.
- K-3. Describe HATCHING concepts in AutoCAD.
- K-4. Describe zooming options
- K-5. Describe features of Tools palettes window and their application
- K-6. Describe Design centre feature- Scale and paper sizes
- K-7. Apply drafting settings (Unites, Limits, Snap, Auto On & Off) and their application
- K-8. Explain layout settings & printing of CAD drawings and their application
- K-9. Explain integration of total station with AutoCAD & MS Excel and their application
- K-10. Explain how to extend, trim, stretch, break and scale drawn items.
- K-11. Explain how to edit properties of objects.
- K-12. Describe the purpose and use of the use of blocks and symbols.

Critical Evidence(s) Required

The candidate needs to produce following critical evidences in order to competent in this competency standard.

- Create 2D Drawings of C-type residence including Plan, working plan, section, elevation, legend, schedule, areas & measurements according to civil technology.

Instruments & Consumables

S No.	Description (Instruments)
1	PCs/Laptops
2	Multimedia Projector
3	Internet Connection
Software & Consumable	
1	AutoCAD
2	NVQF/Policy Documentation



11.7.3. Develop 3d Drawings

Overview: This competency standard covers the skills and knowledge 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.

Competency Units	Performance Criteria
CU-1. Develop 3D Objects	P1. Setup & save 3D Drawing Interface for required specifications P2. Setup 3D User Interface settings for required specifications P3. Create 3D Objects with given measurements
CU-2. Manipulate 3D Objects Using 3D Editing Tools	P1. Modify 3D Objects in line with the requirements P2. Make customized 3D Models according to the requirements of the given job P3. Convert 3D Face Objects into Single Mesh Objects
CU-3. Render 3D Model	P1. Apply material to required 3D Model as per given specifications P2. Apply lights to get the requisite scene of required 3D model P3. Assign cameras to execute different views of required 3D Model P4. Render and print the 3D model according to required size and orientation

Knowledge & Understanding

The candidate must be able to demonstrate underpinning knowledge and understanding required to carry out tasks covered in this competency standard. This includes the knowledge of:

- P1.** Describe 3D Modelling in AutoCAD- 3D solids, Surfaces, Meshes, Wireframe Objects
- P2.** Differentiate between Surface Modelling and Solid Modelling
- P3.** Explain 3D Face and Edges
- P4.** Explain Boolean Operation Concepts- Subtraction, Intersection, Union
- P5.** Describe 3D Navigate Control- functions of different camera settings, importance of scene creation, PRESET views such as isometric, top, bottom, front, left, etc.
- P6.** Describe Perspective projection and parallel projection
- P7.** Describe walk and Constrained Orbit.



P8. Describe how to assign Material and Light Control- planner mapping, texture map, opacity control, render context and render sampling.

Critical Evidence(s) Required

The candidate needs to produce following critical evidences in order to competent in this competency standard.

- Drawing of Render 3D prototype Model including materials, lights, scene and different camera views

Instruments & Consumables

S No.	Description (Instruments)	S No.	Software& Consumable
1	PCs/Laptops	1	
2	Multimedia Projector	2	AutoCAD
8	Internet Connection		NVQF/Policy Documentation