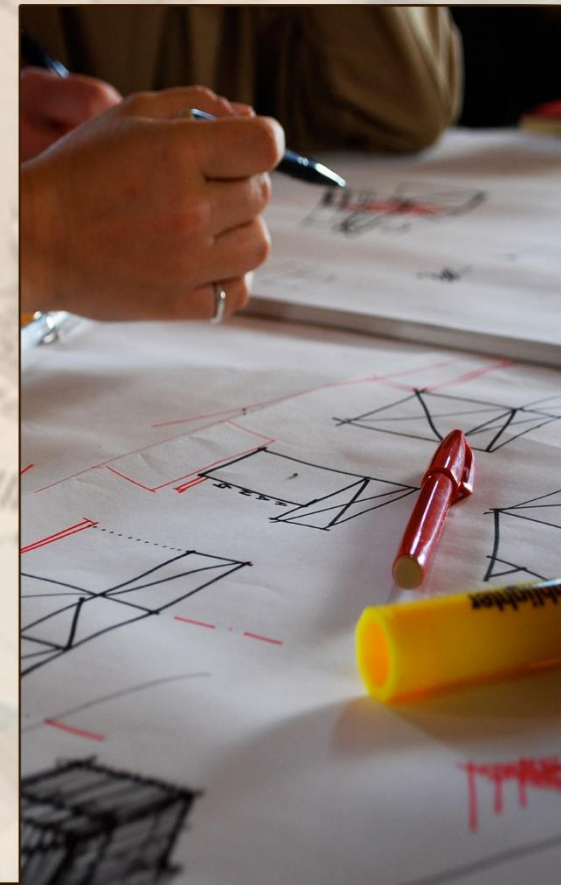# National Vocational Certificate Level 2 in Construction (Architecture Drafting)

Competency Standard

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Title A: Apply Drafting Fundamentals

Overview: This Competency Standard identifies the competencies required to apply drafting fundamentals at workplace by an architect in accordance with the organization's approved guidelines and procedures. You will be expected to create geometrical construction, single view drawings and orthographic projections, either manually or computerized at workplace. Your underpinning knowledge regarding drafting fundamentals will be sufficient to provide you the basis for your work.

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
A1: Know free-hand drawings/ sketching & basic lines	You will be able to: P1. Draw rough lines in different angles • Draw lines in different direction using grades of pencils P2. Draw (free hand) basic shapes P3. Familiarize with the use of T-scale & Set-square P4. Handle drafting tools appropriately	You will be able to: K1. Describe the methodology of stretching of sheet for drawing K2. Describe division of sheet K3. Describe drawing different lines (Free hand, Straight, Angular And Curves) K4. Demonstrate Construction of Seal / Title Strip K5. Demonstrate flow of pencil and line joinery	**Manual:** • A-3 sketchbook • Various grades of soft & hard lead pencil • Eraser • Sharpener
A1. Draw basic geometric shapes	You will be able to: P1. Select tools required for the job P2. Specify construction details as per assignment P3. Select scale required for the object according to construction detail P4. Draw construction lines according to object sizes	You will be able to: K1. Describe usage of tools for this job K2. Explain the concept of geometrical construction • Triangle • Square/rectangle • Circle • polygon	**Manual:** Drafting table with necessary attachments (horizontal and vertical bar with angle adjustment), architectural triangular scale, stationary items (pencil, rubber, paper), geometry box (compass, divider, attachments, protector)

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
	P5. Convert construction lines into object lines as per object requirement P6. Mark dimensions of the whole object as per drawn sizes P7. Prepare backup file for the assignment to avoid data loss P8. Apply health and safety precautions at workplace	K3. Describe the use of scale for the assignment K4. Describe the types of line K5. Describe dimensioning standards K6. Describe the file saving and backup method K7. Describe specific safety precautions and guidelines	**Computer:** Workstation, Drafting software (latest version), output devices for printing, personal protective equipment (PPE)
A2. Create single view drawing	You will be able to: P1. Select tools required for the job P2. Specify object details as per assignment P3. Select scale required for the object according to the view P4. Draw construction lines according to object sizes P5. Convert construction lines into object lines as per view requirement, to represent actual object	You will be able to: K1. Describe usage of tools for this job K2. Explain the concept of single view drawing K3. Describe the use of scale for the assignment K4. Describe the types of line K5. Describe the concept and types of projection K6. Describe dimensioning standards	**Manual:** Drafting table with necessary attachments (horizontal and vertical bar with angle adjustment), architectural triangular scale, stationary items, geometry box (compass, divider, attachments, protector) **Computer:** Workstation, Drafting software (latest version),

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
	P6. Mark dimensions of the whole object as per drawn size		output devices for printing, PPE

A3. Create orthographic projections	You will be able to:
	
	P1. Select tools required for the job
	
	P2. Specify object details as per assignment
	
	P3. Select scale required for the object according to the view
	
	P4. Draw construction lines according to object sizes
	P5. Use the following:
	  I. First angle projection method
	  II. Third Angle projection method
	
	P6. Convert construction lines into object lines as per view requirement
	
	P7. Mark dimensions of the whole object as per drawn sizes
		You will be able to:
		
		K1. Describe the use of tools for this job
		
		K2. Explain the concept of orthographic projection
		
		K3. Describe the following
		
		  III. First angle projection method
		  IV. Third Angle projection method
		
		K4. Describe dimensioning standards
			Manual:
			
			Drafting table with necessary attachments (horizontal and vertical bar with angle adjustment), architectural triangular scale, stationary items, geometry box (compass, divider, attachments, protector)
			
			Computer:
			
			Workstation, Drafting software (latest version), output devices for printing, PPE

A5: Develop drawing format & read technical drawings	You will be able to: P1. Format the drawings according to the following specifications: • Required scale & dimensioning • Required labeling and symbols	You will be able to: K1. Describe drawing format for the particular assignment including: • Required scale & dimensioning • Required labeling and symbols • Specified title block (seal)	

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
	• Specified title block (seal) P2. Read and analyze technical drawings as per standards P3. Communicate technical drawings as per standards	K2. Describe how to read and analyze technical drawings K3. Describe how to communicate technical drawings	

Title B. Carry out Technical Mathematics

Overview: This Competency Standard identifies the competencies required to perform technical mathematics at workplace by an architect in accordance with the organization's approved guidelines and procedures. You will be expected to Calculate decimals and fractions, Apply unit conversion in system of measurement, Apply ratio/proportion using scales, Calculate perimeter, area and volume of objects and Derive area and perimeter using trigonometric formula, either manually or computerized at workplace. Your underpinning knowledge regarding technical mathematics will be sufficient to provide you the basis for your work.

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
B1. Calculate decimals and fractions	You will be able to: P1. Arrange tools required for the job P2. Apply tools to calculate mathematical fractions	You will be able to: K1. Describe the usage of tools required for this job K2. Identify the symbols of mathematical fractions	Computer, calculator, stationary items,

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
B2. Apply unit conversion in system of measurement	You will be able to: P1. Arrange tools required for the job P2. Apply tools to calculate mathematical conversion factors P3. Apply the FPS (foot pound second) and MKS (meter, kilogram, second) systems of measurement	You will be able to: K1. Describe the usage of tools required for this job K2. Explain the systems of measurements K3. Describe the FPS (foot pound second) and MKS (meter, kilogram, second) systems of measurement	Computer, calculator, stationary items
B3. Apply ratio/proportion using scales	You will be able to: P1. Select scales required for the job P2. Apply the concept of ratio of scale (e.g: 1/96 to a foot) P3. Select the scale ratio appropriate to draw larger object into a smaller one and vice versa	You will be able to: K1. Describe the usage of scale required for this job K2. Describe the concept of proportion K3. Describe the concept of ratio of scale (e.g: 1/96 to a foot)	Architectural triangular scale, measuring tape, computer, stationary items
B4. Calculate perimeter, area and volume of objects	You will be able to: P1. Select tools required for calculation P2. Calculate area of square, rectangle, triangle and circle etc using formula	You will be able to: K1. Describe the usage of tools required for this job K2. Describe the geometrical figures K3. Describe the formula for calculating area	Computer, calculator, stationary items

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
	P3. Calculate perimeter of square, rectangle, triangle and circle etc using formula P4. Calculate volume of cube, slab, prism, sphere etc using formula P5. Add standard units to the derived quantity (e.g: Square foot Sft etc.) P6. Calculate area and perimeter using Auto CAD (software)	K4. Describe the formula for calculating perimeter K5. Describe the formula for calculating volume K6. Explain the standard units for area, perimeter and volume K7. Describe the Auto CAD commands used for calculation of area and perimeter	
B5. Derive area and perimeter using trigonometric formulae	You will be able to: P1. Select tools required for calculation P2. Use trigonometric table P3. Calculate area of triangle by using trigonometric formula P4. Calculate perimeters of triangle using trigonometric formula P5. Add standard units to the derived quantity (e.g: Square foot Sft etc.)	You will be able to: K1. Describe the usage of tools required for this job K2. Explain use of trigonometric table K3. Describe formulas for derivation of perimeter and area K4. Explain the standard units for area, perimeter and volume K5. Explain the use of standard units to the derived quantity (e.g: Square foot Sft etc.)	Calculator, stationary item, trigonometric table

Title C. Apply Computer Aided Design/Drafting

Overview: This Competency Standard identifies the competencies required to apply Computer Aided Design/drafting at workplace by an architect in accordance with the organization's approved guidelines and procedures. You will be expected to Apply Auto-CAD fundamentals, Apply CAD draw tools to make a sketch, Apply Auto CAD modify tools, Apply layer, text and dimension tools, Build and use library of components (blocks), Create working set of drawings and submission drawing, Apply plotting/printing to design and Create 3D model (presentation) of architect's concept at workplace. Your underpinning knowledge regarding Computer Aided Design/drafting will be sufficient to provide you the basis for your work.

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
C1. Apply Auto-CAD fundamentals	You will be able to: P1. Specify the uses of the software Auto-CAD P2. Install the Auto-CAD on the system following installation instructions	You will be able to: K1. Describe the uses of software AutoCAD K2. Describe the features of drawing window including • Main menu • Down drop menu, sub menu • Tool bar • Task bar	Compatible Computer system for using Auto-CAD, Auto-CAD software (latest version) CD, personal protective equipment (PPE)

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment

	P3. Specify the unit (scale), precision, drawing limits in the model space for a specific drawing assignment
	
	P4. Specify grid, snap and selection tool for specific drawing assignment
	
	P5. Prepare backup file for the assignment to avoid data loss
	
	P6. Apply health and safety precautions at workplace
		• Command area
		• User coordinate system (UCS)
		
		K3. Explain the followings
		  I. Unit
		  II. Drawing limits
		  III. Grid
		  IV. Snap
		  V. Selection
		
		K4. Describe the file saving and backup method
		
		K5. Describe specific safety precautions and guidelines	

C2. Apply Auto-CAD draw toolbar to make a sketch	You will be able to: P1. Draw following lines, as per assignment requirement: • Construction line • Ray line • Line • Poly line P2. Draw following geometric objects, as per assignment requirement: • Rectangle/square • Circle/arc • Ellipse/ elliptical arc	You will be able to: K1. Describe the usage of tools required for this job K2. Describe the method to carry out the following commands using lines • Construction line • Ray line • Line • Poly line K3. Describe the method to draw the following objects:	Compatible Computer system for using Auto-CAD, Auto-CAD software (latest version), PPE

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
	• Polygon P3. divide and measure specific space using point command P4. Apply boundary and hatch command for filling space, with specific symbols and solid colors	• Rectangle/square • Circle/arc • Ellipse/ elliptical arc • Polygon K4. Describe how to divide and measure a line or object with the help of point command K5. Describe how to fill up space with specific material symbol and colors	
C3. Apply Auto CAD modify toolbar	You will be able to: P1. Apply following tools to modify objects in Auto CAD • Erase • Trim • Chamfer • Fillet • Break/join P2. Apply following tools to modify objects in Auto CAD • Off set / mirror • Copy • Extend • Array • Move • Rotate • Scale • Stretch	You will be able to: K1. Describe the usage of tools required for this job K2. Describe the use of the following tools to modify drawings in Auto CAD • Erase • Trim • Chamfer • Fillet • Break/join K3. Describe the use of the following tools to modify objects in Auto CAD • Off set / mirror • Copy • Extend • Array • Move	System compatible for using Auto-CAD, Auto-CAD software(latest version), PPE

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
	• Align	• Rotate • Scale • Stretch • Align	
C4. Apply layer, text and dimension toolbar	You will be able to: P1. Create layers for an object in Auto CAD as per assignment's requirement (e.g: line, boundary, hatch, text, dimension, fixture etc.) P2. Prepare text style and create text as per assignment's requirement P3. Prepare dimensional style and create following dimensions • Linear • Aligned • Base line • Continuous • Oblique • Diameter/radius • Angular P4. Create and modify dimensions as per assignment • Align text • Update dimensions	You will be able to: K1. Describe the concept of layers and its application • Line weight • Line type • Color • Defpoint layer K2. Describe working of layer • Freeze/thaw • Lock/unlock • Current • Filter • Layer match • Layer delete K3. Describe text type and style K4. Explain dimension style as per following • Linear • Aligned • Base line • Continuous • Oblique • Diameter/radius	System compatible for using Auto-CAD, installed Auto CAD software, PPE

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
		• Angular K5. Explain modify dimensions	
C5. Build and use library of components (blocks)	You will be able to: P1. Create a specific small object (symbols etc) to be used in a drawing as per assignment's requirement • Door • Window • Ventilator • Furniture / interior items • Fixtures • Landscape P2. Insert block in a drawing as per assignment P3. Modify blocks required for a specific drawing	You will be able to: K1. Explain block creation for the following • Door • Window • Ventilator • Furniture / interior items • Fixtures • Landscape K2. Describe method of insertion of a block K3. Explain how to modify a block for specific requirement in a drawing	System compatible for using Auto-CAD, installed Auto CAD software, PPE
C6. Create working set of drawings, submission drawing	You will be able to: P1. Create working set of drawings as per assignment • Layout plan • Working plan • Elevation • Section • block diagram P2. Create working details of following as per assignment	You will be able to: K1. Explain working set of drawing as per following: • Layout plan • Working plan • Elevation • Section • block diagram K2. Describe detail working drawing including • Doors /windows	System compatible for using Auto-CAD, installed Auto CAD software, PPE

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
	• Doors /windows • Kitchen/bath • Foundation • Stair • Tanks (septic, water storage) • Floor finishing	• Kitchen/bath • Foundation • Stair • Tanks (septic, water storage) • Floor finishing	
C7. Create 3D model (presentation) of architect's concept	You will be able to: P1. Create 3D model (wireframe) of an architectural assignment as per requirement P2. Apply followings to the wireframe model • Material application • Light application • Camera as per view requirement P3. Apply render command and create raster image of the assigned model	You will be able to: K1. Explain 3D model (wireframe) for an architectural assignment K2. Describe how to prepare 3D model including the following • Material application • Light application • Camera as per view requirement K3. Explain how to render and create raster image of 3D model	System compatible for using Auto-CAD, installed Auto CAD software, PPE
C8. Apply printing to design	You will be able to: P1. Install/select the printer/ plotter software as per installation manual P2. Set up printing/plotting detail for a particular drawing/assignment • Paper size • Orientation • Scale • Color / monochrome	You will be able to: K1. Define printing/plotting process and its importance K2. Explain set up procedure for printing/plotting a drawing • Paper size • Orientation • Scale • Color / monochrome	System compatible for using Auto-CAD, installed Auto CAD software, printer, plotter, scanner , PPE

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
	P3. Apply printing/plotting command in different formats • Hard copy • Raster image • PDF	K3. Describe printing/plotting command for the following out put • Hard copy • Raster image • PDF	

TITLE D. Assist in managing Architectural Projects

Overview: This Competency Standard identifies the competencies required to manage the Architectural Project at workplace by an architect in accordance with the organization's approved guidelines and procedures. You will be expected to manage work flow and maintain documentation of architectural projects at workplace. Your underpinning knowledge regarding management of Architectural Project will be sufficient to provide you the basis for your work.

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
D1. Steps involved in completion of an Architectural Project	You will be able to: P1. Carry out the steps involved in an architectural project from conception to completion P2. Complete and fulfil the requirements and implications of individual steps involved P3. Perform in accordance with the timeline required for each step involved during a project	You will be able to: K1. Describe the steps involved in an architectural project from conception to completion K2. Describe the requirements and implications of individual steps involved K3. Describe the importance of the timeline required for each step involved during a project	• Stationery items • Notebook
D1. Manage work flow of an architectural project	You will be able to: P1. Specify the process of developing an architectural product P2. Specify timeframe of a particular project as per project requirement P3. Perform quality control of deliverables as per architectural organization's policy P4. Apply health and safety precautions at workplace	You will be able to: K1. Explain the process of developing an architectural product K2. highlight the importance of timeframe for different activities in an architectural project K3. Define quality control for an architectural project regarding • Printing (size etc) • Hierarchy wise signature • Date/revised date • Sheet number/record number • Scale	Computer, printer, stationary items, PPE

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
		• Scheme number/project K5. Describe standard operating procedure (s) of the organization K6. Describe specific safety precautions and guidelines	
D2. Maintain documentation of architectural project	You will be able to: P1. Manage record for the projects following the organizational instructions P2. Maintain the following records of architectural project: • Agreement • Correspondence • Approval • Design data • Delivery data • Revised data	You will be able to: K1. Describe organizational record keeping procedure: • Agreement • Correspondence • Approval • Design data • Delivery data • Revised data	Computer, Stationary items, PPE

TITLE E: Develop Professionalism

Overview: This Competency Standard identifies the competencies required to develop professionalism at workplace by an architect in accordance with the organization's approved guidelines and procedures. You will be expected to perform communication in an architectural organization, upgrade professional skills, work in a team and apply health and safety at workplace. Your underpinning knowledge regarding management of Architectural Project will be sufficient to provide you the basis for your work.

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
E1. Communicate in an architectural organization	You will be able to: **P1.** Communicate with supervisor following communication procedure **P2.** Communication with other departments following communication procedure P3. Use media to communicate effectively (e.g: email, telephone etc)	You will be able to: **K1.** Identify factors required to communicate effectively and precisely within organisation. K2. Justify the appropriate use of electronic and relative media as per need	▪ Computer ▪ Internet facility ▪ Telephone
E2. Upgrade professional skills	You will be able to: **P1.** Participate in Skill test for professional development **P2.** Attend seminars / workshops related to architectural developments **P3.** Perform market research for professional growth **P4.** Adopt upcoming market trends in	You will be able to: **K1.** Identify the need of skills sets by getting involved in seminars, workshops and competitions. **K2.** Describe the importance of and carry out market research. **K3.** Describe the importance of and adopt changing market trends	Computer, internet facility

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
	architectural field		
E3. Work in a team	You will be able to: **P1.** Demonstrate good team skills including • Cooperation/coordination • Work ethics • Etiquettes/manners **P2.** Carry an appropriate appearance at workplace **P3.** Show comfort and tolerance at workplace **P4.** Present and observe good work ethics at workplace	You will be able to: **K1.** Identify the importance of being a good team player including • Cooperation/coordination • Work ethics • Etiquettes/manners **K2.** Identify the importance of carrying an appropriate appearance in workplace **K3.** Describe the importance of showing comfort and tolerance at workplace **K4.** Describe the importance of observing good work ethics at workplace	Computer, internet facility
E4. Apply health and safety precautions	You will be able to: **P1**. Follow safety precautions for different types of tools and equipment **P2**. Follow operating instructions to use tools properly **P3**. Use following protective measures while working on computer • Protective screen • Maintain position/posture and distance from monitor	You will be able to: **K1.** Describe the importance of following safety precautions necessary to use different types of tools and equipment **K2**. Define the importance to follow operating instructions given for tools **K3**. Describe the importance of ergonomics in using computers	Computer, Personal protective equipment (PPE) including Hand rest, foot rest, back rest adjustable chairs, proper lighting in the room, screen filters, adjustable keyboard and mouse etc

Unit of Competency	Performance Criteria	Knowledge	Tools & Equipment
	• Ergonomics		

List of Tools, Equipment and Machinery

- Drafting table with necessary attachments (horizontal and vertical bar with angle adjustment),
- architectural triangular scale,
- stationary items (pencil, rubber, paper),
- geometry box (compass, divider, attachments, protector)
- Drafting software (latest version)
- Calculator
- measuring tape
- trigonometric table
- Compatible Computer system for using Auto-CAD
- Auto-CAD software (latest version) CD
- Printer
- scanner
- Internet facility
- Hand rest,
- foot rest,
- backrest
- Adjustable chairs,
- Proper lighting in the room,
- Screen filters
- Adjustable keyboard
- Adjustable mouse