



TECHNICAL DRAFTING

TECHNICAL-PROFESSIONAL

Grade 12

Three-Term Budget Of Work (BOW)
for Learning Competencies

**TECHNICAL-PROFESSIONAL
CONSTRUCTION AND BUILDING TECHNOLOGIES
Grade 12**

**Three-Term Budget Of Work
For Learning Competencies**

Please note that each Tech-Pro elective is completed in one term if delivered at Grade 12.

Elective	Technical Drafting
Prerequisite	None
Content Standard	Demonstrate understanding of the fundamentals of technical drafting, tools and materials in manual drafting, mensuration and calculation, drafting conventions, architectural symbols, and details in producing architectural plans.
Performance Standard	The learners create accurate technical drawings, and architectural plans observing relevant building codes, standards, and conventions.

Week	Learning Competency	Suggested Activities
1	Discuss technical drafting fundamentals.	Drafting Tools Exploration - Learners identify and familiarize themselves with technical drafting tools, materials, and their specific uses in creating accurate drawings. - Examine each drafting tool and material, noting its purpose and demonstrating how it is used in

Week	Learning Competency	Suggested Activities
		creating lines, shapes, and measurements. • Basic Drawing Practice ○ Learners practice fundamental drafting techniques such as orthographic projection, dimensioning, and line types to understand technical drawing principles. ○ Draw simple objects using proper drafting symbols, line weights, and measurement standards on paper or CAD software.
	• Explain tools, materials and equipment in manual drafting.	• Drafting Tools Showcase ○ Learners explore common manual drafting tools such as T-squares, compasses, protractors, and drawing pencils, and discuss their purposes in technical drawing. ○ Examine each tool, identify its function, and demonstrate how it is used in creating accurate drawings. • Materials & Equipment Familiarization ○ Learners learn about drafting

Week	Learning Competency	Suggested Activities
		materials (drawing sheets, tracing paper, templates) and equipment (drawing boards, clamps) and their proper usage. ○ Handle each material and piece of equipment, describe its characteristics, and show how it supports manual drafting tasks.
	● Perform mensuration and calculation	● Real Object Measurement ○ Learners measure the dimensions of actual workshop objects (e.g., wooden blocks, metal sheets) to calculate area, volume, and other relevant measurements. ○ Use rulers, calipers, or measuring tapes to take accurate measurements and compute the area, perimeter, or volume as required. ● Material Requirement Calculation ○ Learners apply mensuration skills to determine the quantity of materials needed for a given project based on measurements and design specifications.

Week	Learning Competency	Suggested Activities
		Measure project components, perform calculations, and determine the exact amount of materials required for construction or fabrication.
2	Perform manual drafting conversions.	Scale Conversion Practice - Learners practice converting real-world dimensions into scaled drawings and vice versa to accurately represent objects on paper. - Measure an object, apply a given scale ratio, and draw the scaled representation on drafting paper using proper drafting tools. Unit Transformation Drill - Learners convert measurements between different units (e.g., inches to millimeters, feet to centimeters) for precise manual drafting. - Take existing dimensions, perform the required unit conversions, and update the drawing accordingly to maintain accuracy.

Week	Learning Competency	Suggested Activities
	Create architectural layout and details.	Floor Plan Drafting - Learners design and draw a simple architectural floor plan, showing room layouts, walls, doors, and windows with accurate dimensions. - Measure the area, sketch the layout to scale on drafting paper, and label all rooms and openings clearly. Detail Drawing Development - Learners produce detailed drawings of specific architectural components such as stairs, windows, or doors, showing dimensions and construction specifications. - Select a component from the floor plan, draw it to scale with precise dimensions, and annotate all relevant details for construction.
Suggested Performance Tasks	Individual Performance Task - Code-Compliant Residential Floor Plan - Each learner independently creates a complete and accurate architectural floor plan of a small residential unit (e.g., studio or one-bedroom house), applying proper drafting conventions, dimensioning, symbols, line weights, and relevant	

	building code requirements (e.g., minimum room sizes, door widths, window placement for ventilation). - Design and draft a scaled floor plan with complete dimensions, labels, symbols, and code-compliant specifications following standard architectural drafting conventions. Group Performance Task - Complete Architectural Drawing Set Project - In groups, learners collaboratively produce a full architectural drawing set for a small structure (e.g., residential unit or workshop), including floor plan, elevations, sections, and detailed drawings, ensuring compliance with applicable building codes, drafting standards, and presentation conventions. - Work as a team to develop a coordinated drawing set (plans, elevations, sections and details) that is accurately scaled, properly annotated, and compliant with relevant building codes and drafting standards.
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Content Standard	Demonstrate an understanding of drafting principles, techniques, and industry standards including mastering manual drafting, knowledge of various disciplines (architectural, structural, electrical, plumbing, mechanical).
Performance Standard	The learners create manual Structural, Electrical, Electronic, and Mechanical plans projects observing relevant building codes, standards, and conventions.

Week	Learning Competency	Suggested Activities
3	Create structural layout and details.	Structural Plan Drafting - Learners design and draw the structural layout of a building, including beams, columns,

Week	Learning Competency	Suggested Activities
		foundations, and load-bearing elements. - Sketch the building framework to scale on drafting paper, indicating positions and dimensions of all structural components. Component Detailing - Learners create detailed drawings of structural elements such as columns, beams, or slabs, showing dimensions, reinforcements, and construction specifications. - Select a structural element from the layout and draw it to scale with complete annotations of measurements and material specifications.
	Create electrical and electronic layout and details.	Circuit Layout Drafting - Learners design and draw a layout of an electrical circuit, showing connections, switches, power sources, and components accurately. - Arrange all circuit components on paper, connect them using standard

Week	Learning Competency	Suggested Activities
		symbols, and label each part clearly. • Component Detail Drawing ○ Learners produce detailed drawings of individual electrical or electronic components (e.g., resistors, relays, switches) including dimensions and specifications. ○ Select a component from the circuit, draw it to scale, and annotate its key electrical specifications and connection points.

Suggested Performance Tasks	• Individual Performance Task - Manual Drafting of a Residential Building Plan Set ○ The learner will manually create a complete set of Structural, Electrical, Electronic, and Mechanical plans for a simple one-story residential building. The drawings must follow applicable building codes, drafting standards, symbols, line conventions, and proper sheet layout. The output should demonstrate accuracy, completeness, and neatness in technical drafting. ○ Prepare and manually draft a complete residential building plan set (Structural, Electrical, Electronic, and Mechanical) following standard drafting conventions and relevant building codes. • Group Performance Task - Integrated Manual Building Plan Project
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	○ In groups, learners will collaboratively design and manually draft an integrated building project (e.g., a small office, classroom, or residential unit) consisting of Structural, Electrical, Electronic, and Mechanical plans. Each member will be assigned a discipline, and the group must ensure that all plans are coordinated, code-compliant, and presented as a unified project portfolio. ○ <i>Work as a team to manually produce coordinated Structural, Electrical, Electronic, and Mechanical plans for a building project while observing drafting standards, conventions, and applicable codes.</i>
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Content Standard	Demonstrate an understanding of drafting principles, techniques, and industry standards including mastering manual drafting, knowledge of various disciplines (architectural, structural, electrical, plumbing, mechanical).	
Performance Standard	The learners create manual Structural, Electrical, Electronic, and Mechanical plans projects observing relevant building codes, standards, and conventions.	
Week	Learning Competency	Suggested Activities
4	Create sanitary and plumbing layout and details	Plumbing System Layout - Learners design and draw the layout of a building's plumbing system, including water supply lines, drainage, fixtures, and pipe routes. - Sketch the plumbing network on drafting paper, showing all pipes, fixtures, and connections according to standard symbols and scale. Fixture and Pipe Detail Drawing - Learners create detailed drawings of plumbing fixtures and pipe connections, indicating dimensions, materials, and flow direction. - Select a fixture or pipe section, draw it to scale, and annotate specifications, fittings, and installation requirements.

Week	Learning Competency	Suggested Activities
	• Create mechanical layout and details.	• Mechanical System Layout ○ Learners design and draw the overall layout of a mechanical system (e.g., conveyor, engine assembly, or workshop machinery), showing all major components and their arrangement. ○ Sketch the mechanical system to scale, positioning each component accurately and labeling parts using standard drafting symbols. • Component Detail Drafting ○ Learners produce detailed drawings of individual mechanical components, showing dimensions, tolerances, materials, and assembly features. ○ Select a mechanical part from the layout, draw it to scale with proper dimensions, and annotate all relevant specifications for fabrication or assembly.

Suggested Performance Tasks	● Individual Performance Task - Integrated Manual Plan Drafting Project ○ Each learner manually drafts a complete set of plans for a small structure, including a structural layout (beams, columns, foundation), electrical layout (lighting and outlets), basic electronic schematic (control circuit), and mechanical layout (simple machine or ventilation system), ensuring proper symbols, scaling, line conventions, and compliance with relevant codes and standards. ○ Manually draft scaled structural, electrical, electronic, and mechanical plans on drawing sheets using correct symbols, dimensions, and standard drafting conventions. ● Group Performance Task - Multisystem Manual Plan Development ○ In groups, learners collaboratively produce a coordinated manual drawing set for a proposed workshop or small building, dividing responsibilities by system (structural, electrical, electronic, mechanical) while ensuring all plans are code-compliant, properly detailed, and professionally presented. ○ Collaboratively create a complete, scaled, and code-compliant manual drawing set, ensuring all system plans are accurate, detailed, and properly integrated.
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Content Standard	Demonstrate an understanding of CAD software installation, interface navigation, creation of 2D and 3D geometries, and produce accurate 2D architectural and structural plans in CAD.
Performance Standard	The learners create 2D and 3D geometries, and detailed 2D architectural and structural plans projects using CAD software observing relevant building codes, standards, and conventions.

Week	Learning Competency	Suggested Activities
5	Perform installation and exploration of the Computer-Aided Design (CAD) Software.	CAD Software Installation - Learners install CAD software on their computers, ensuring all system requirements are met and the program runs properly. - Follow the software installation guide step-by-step, verify system compatibility, and launch the program to confirm proper installation. CAD Interface Exploration - Learners navigate the CAD software interface to identify tools, menus, drawing areas, and basic functions for creating digital designs. - Open the CAD program, explore menus and toolbars, and practice drawing simple shapes while noting the function of each tool.
	Create 2D geometries and shapes.	Basic 2D Shape Drafting - Learners practice creating fundamental 2D shapes such as lines, rectangles, circles, polygons, and arcs

Week	Learning Competency	Suggested Activities
		using CAD or manual drafting tools. ○ Use the drawing tools to construct each shape accurately, applying proper dimensions and snapping/constraint features where applicable. ● Composite Geometry Design ○ Learners combine multiple 2D shapes to form more complex geometries and patterns, simulating real-world design components. ○ Arrange and connect individual shapes to create a composite design, ensuring all elements are dimensionally accurate and aligned.
6	● Discuss 3D Computer Aided Design User Interface.	● 3D CAD Interface Tour ○ Learners explore the 3D CAD software interface, identifying toolbars, menus, viewports, and navigation controls used for 3D modeling. ○ Open the 3D CAD software and navigate each section of the interface,

Week	Learning Competency	Suggested Activities
		noting the function of tools and panels for modeling tasks. • Tool Function Demonstration ○ Learners practice using basic 3D CAD tools such as extrude, revolve, fillet, and rotate to understand their roles in creating 3D models. ○ Select a simple 2D sketch and apply 3D tools to manipulate it into a 3D object, observing how each tool changes the model.
	• Create 3D Geometry.	• 3D Solid Modeling ○ Learners create basic 3D solids such as cubes, cylinders, spheres, and prisms using CAD software to understand solid geometry principles. ○ Use extrusion, revolution, and other 3D tools to convert 2D sketches into 3D solid objects accurately. • Complex 3D Shape Construction ○ Learners combine multiple 3D solids to form more complex geometries, simulating real-world components or assemblies.

Week	Learning Competency	Suggested Activities
		○ Merge, subtract, or intersect individual 3D solids to build a composite model while maintaining proper dimensions and alignment.
7	● Create 2D architectural layout and details.	● Floor Plan Drafting ○ Learners create a 2D floor plan of a simple building, including walls, doors, windows, and room dimensions. ○ Sketch the building layout to scale on drafting paper or CAD software, labeling all rooms and openings accurately. ● Architectural Detail Drawing ○ Learners produce detailed 2D drawings of architectural components such as doors, windows, stairs, or roof sections. ○ Select a component from the layout, draw it to scale, and annotate dimensions and construction specifications.

Week	Learning Competency	Suggested Activities
	Create 2D structural layout and details.	Structural Layout Drafting - Learners create a 2D plan showing the arrangement of structural elements like beams, columns, and foundations. - Sketch the structural framework to scale on paper or CAD, indicating positions and dimensions of all load-bearing components. Structural Component Detailing - Learners produce detailed 2D drawings of structural elements, showing dimensions, reinforcements, and construction specifications. - Draw individual structural components to scale and annotate all measurements, materials, and assembly instructions.
Suggested Performance Tasks	Individual Performance Task - 2D–3D Residential Model Development - Each learner designs a small residential unit using CAD software by first creating accurate 2D architectural and structural plans (floor plan, column and beam layout), then developing a corresponding 3D model based on the 2D drawings,	

	ensuring correct scaling, dimensioning, layering, symbols, and compliance with relevant building codes and drafting standards. ○ Create scaled 2D architectural and structural plans in CAD, then generate a matching 3D model from the approved drawings following proper codes and drafting conventions. ● Group Performance Task - Integrated CAD Building Project ○ In groups, learners collaboratively develop a complete CAD project of a small building that includes 2D geometries, detailed 2D architectural and structural plans, and a fully rendered 3D model, ensuring consistency, code compliance, and professional presentation standards. ○ Work as a team to produce a coordinated CAD drawing set (2D plans and 3D model) that is accurate, code-compliant, properly layered, and fully dimensioned.
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Content Standard	Demonstrate an understanding in using Computer-Aided Design (CAD) software to create detailed 2D and 3D drawings of various building systems, and compute project cost estimates align to the industry standards.
Performance Standard	The learners create 2D and 3D Computer-Aided Design (CAD) layouts project integrating Electrical, Electronic, Mechanical plans, Architectural Model and compute project cost estimate observing relevant building codes, standards, and conventions.

Week	Learning Competency	Suggested Activities
8	● Create 2D electrical and electronic layout and details.	● Electrical Layout Drafting ○ Learners create a 2D layout of a basic electrical system (e.g., lighting and outlet plan), showing

Week	Learning Competency	Suggested Activities
		wiring routes, switches, fixtures, and panel board placement using standard symbols. ○ Draw the electrical plan to scale on drafting paper or CAD, applying correct electrical symbols and labeling all components clearly. ● Electronic Circuit Detail Drawing ○ Learners produce detailed 2D schematic drawings of an electronic circuit, including components such as resistors, capacitors, switches, and power sources. ○ Draft the circuit diagram using standard schematic symbols and annotate component values, connections, and specifications accurately.
	● Create 2D sanitary and plumbing layout and details.	● Sanitary & Plumbing Layout Drafting ○ Learners create a 2D layout showing the water supply system, drainage lines, vents, and plumbing fixtures of a simple residential structure using

Week	Learning Competency	Suggested Activities
		standard plumbing symbols. ○ Draw the plumbing plan to scale on drafting paper or CAD, indicating pipe routes, fixture locations, and flow direction clearly. ● Plumbing Detail Drawing ○ Learners develop detailed 2D drawings of specific plumbing components such as pipe connections, traps, or septic tank sections, including dimensions and installation notes. ○ Select one plumbing component from the layout and draft a scaled detailed drawing with complete measurements and annotations.
9	● Create a 2D mechanical layout and details	● Mechanical System Layout Drafting ○ Learners create a 2D layout of a simple mechanical system (e.g., belt drive system, gear assembly, or workshop machine arrangement), showing the position and relationship of major components. ○ Draft the mechanical layout to scale

Week	Learning Competency	Suggested Activities
		on paper or CAD, accurately positioning and labeling all components using standard drafting conventions. • Mechanical Component Detail Drawing ○ Learners produce detailed 2D drawings of individual mechanical parts (e.g., shaft, bracket, gear, or pulley), including dimensions, tolerances, and material specifications. ○ Select a component from the layout and draw it to scale with complete dimensions and annotations suitable for fabrication.
	• Create 3D architectural model.	• 3D House Modeling ○ Learners develop a 3D architectural model of a simple residential structure, including walls, floors, doors, windows, and roof components using CAD or modeling software. ○ Convert a 2D floor plan into a 3D model by extruding walls, inserting openings, and adding roof elements

Week	Learning Competency	Suggested Activities
		with accurate dimensions. • Architectural Detail Modeling ◦ Learners create detailed 3D models of specific architectural components such as stairs, columns, beams, or roof trusses to understand structural and design features. ◦ Select a building component and model it in 3D using appropriate tools, ensuring correct proportions, dimensions, and alignment.
10	• Compute project cost estimation.	• Bill of Materials (BOM) Preparation ◦ Learners identify all materials, quantities, labor requirements, and other resources needed for a specific workshop or construction project, preparing a complete cost breakdown. ◦ List all required materials and labor, assign unit costs, multiply by quantities, and compute the total estimated project cost. • Project Costing Simulation ◦ Learners simulate preparing a full

Week	Learning Competency	Suggested Activities
		project estimate for a client, including direct costs (materials and labor), indirect costs (overhead), contingency, and profit margin. Analyze the project plan, compute all direct and indirect costs, add contingency and profit, and present the final estimated project cost.
Suggested Performance Tasks	Individual Performance Task - Integrated CAD Design and Costing Project - Each learner independently creates a complete CAD project of a small structure, including 2D architectural and structural plans, electrical/electronic and mechanical layouts, a 3D architectural model, and a detailed project cost estimate, following proper layering, scaling, dimensioning, symbols, and applicable building codes and drafting standards. - Create a fully detailed 2D and 3D CAD drawing set integrating all required systems, then compute and present a complete project cost estimate based on the design. Group Performance Task - Multisystem CAD Design and Cost Proposal - In groups, learners collaboratively design a complete building project using CAD software, dividing responsibilities across systems (architectural, structural, electrical/electronic, mechanical), producing coordinated 2D plans and a unified 3D model, and preparing a professional cost estimate and project proposal compliant with relevant codes and standards.	

	○ Work as a team to produce an integrated CAD drawing package (2D layouts and 3D model) with a consolidated and itemized project cost estimate following standard codes and conventions.
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